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THE NATIONAL BUILDER





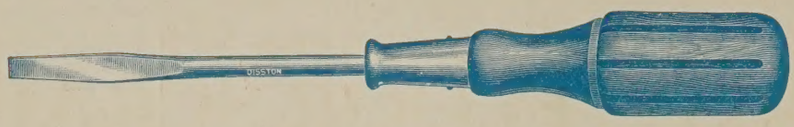


PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

JANUARY, 1911

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DISSTON



"Telegraph" Screw Driver

The Disston Telegraph Screw Driver has a round blade of Crucible Steel. It is hardened and tempered with the greatest of care. Bright finish.

Handle of Hardwood, stained cherry. Like all Disston tools it is unequaled for durability and efficiency. Neat and well finished appearance.

HENRY DISSTON & SONS

(INCORPORATED)

Keystone Saw, Tool, Steel and File Works

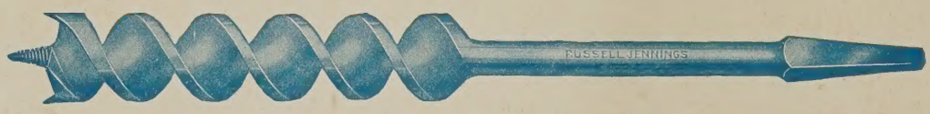
PHILADELPHIA, PA.

BRANCHES: Chicago Boston Cincinnati New Orleans Memphis San Francisco Seattle Portland Spokane Toronto Vancouver

AUGER BIT ESSENTIALS

The Third Reason why the well-known

RUSSELL JENNINGS BITS



are so extensively used is that they have clean-cut, properly shaped

SCREW POINTS



which lead the bit into the wood without forcing.

Our *double-thread* screw point is the standard for accurate work in soft or seasoned wood and in any wood not extremely gummy or hard.

Our *single-thread* screw point is for quick boring. The deep threads take a strong hold on gummy and hard woods. It does not clog in gummy wood and leads the bit into extremely hard woods, such as ironwood and lignum-vitae. It is suitable for end boring.



RUSSELL JENNINGS MFG. CO.

CHESTER, CONN., U. S. A.

21-26

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

As Sure as 2 and 2 Is 4

The DAISY MFG. CO. South Bend, Ind.
Gentlemen: Please send me the "Daisy" Floor Scraper Booklet free.
Name .....
City .....
State .....
Occupation .....

A Shearing Cut Gets Best Results in Floor Scraping

Why does a mechanic when scraping a floor by hand use the Shearing Cut? Because he obtains smoothest and quickest work so. When you whittle a piece of wood you use a Shearing Cut.

A Shearing Cut is ALWAYS made with the

"DAISY" FLOOR SCRAPER



With One Ten-Inch Blade Single Shearing Cut is Made
With Two Five-Inch Blades Double Shearing Cut is Made

The "Daisy"

CUTS EITHER WITH OR ACROSS THE GRAIN
CUTS RIGHT UP TO BASE BOARD AND INTO EVERY CORNER
IS EASIER ON THE OPERATOR AS IT REQUIRES ONLY A SLIGHT LIFT TO GET BEST WORK
WILL DO MORE WORK THAN ANY OTHER IN SAME LENGTH OF TIME
WILL DO PERFECT STRAIGHT EDGED WORK AND WILL PLEASE YOU
CLAMPS ARE INSTANTLY FASTENED
FILING DEVICE FILES BLADES TO RIGHT BEVEL
EDGE-TURNING DEVICE IS A WONDER

UNSOLICITED TESTIMONIALS

FRED L. WALTERS
CARPENTER AND BUILDER
Jobbing Given Prompt Attention
Estimates Furnished

Gillette, N. J., Oct. 11th, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
The flooring has arrived and we have scraped it with your machine and I find it does all you claim for it. Inclosed you will find check as per agreement.
Thanking you for your kindness in allowing me to try this machine and for extending the time for trial, I am, Yours respectfully,
FRED L. WALTERS.

KUTSCH BROTHERS
CARPENTERS AND CONTRACTORS
Jobbing and Repairing
Promptly Attended to
No. 2043 Washington Street

Dubuque, Iowa, Sept. 1st, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
Immediately after using the Scraper we have found it to be satisfactory and superior to any we have seen in use.
We herewith inclose draft in full for same.
Yours truly,
KUTSCH BROTHERS
Per J. P. K.

Belle Fourche, S. Dak., Aug. 4, 1910.
THE DAISY MFG. CO., South Bend, Ind.
Gentlemen:—
After giving the three Floor Scrapers a trial we have decided that the "Daisy" is the one we want. Inclosed find draft in full for same.
Very respectfully,
NELSON & GOLDING



Ten Days Free Trial Offer

We will ship a "DAISY" Outfit to any responsible contractor who intends purchasing a floor scraper for a ten days free trial. Test it with others, if you do not find it best return it. The trial will not cost you a penny.

THE DAISY MFG. CO., SOUTH BEND, IND.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

238083

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

8,000,000 ft. of Hard Wood Flooring

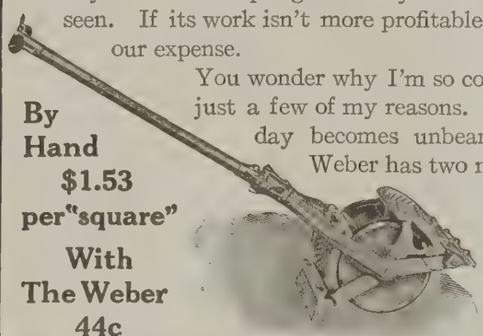


On 3740 ft. you can Save the price of a WEBER

That's approximately what was finished with a Weber the past year—and at a saving of $91,076.88 over hand work. It cost about 1 7-13 cents to hand-finish a single foot. A Weber does the same work for close to 2-5 of a cent. That means about $1.53 a "square" by hand against 44 cents with a Weber. Here's a vital array of money-saving information. Can you beat it? Can you afford to put in another year scraping by hand or with some poor, flimsy scraper? Start 1911 right. Send for

FREE TRIAL **The WEBER DOUBLE ACTING Floor Scraper** **5 to 10 DAYS**

the Weber on trial. Test it out to a "dead certainty" for 5 to 10 days. Put it up against any floor scraper you've ever seen. If its work isn't more profitable to you, return it at our expense.



By Hand $1.53 per "square" With The Weber 44c

You wonder why I'm so confident. I'll tell you just a few of my reasons. To pull a machine all day becomes unbearably tiresome. The Weber has two movements—forward and backward—which relieves you of that monotonous "all day" backward movement. Not only that, but you can smooth up uneven joints and remove dark stains easily and quickly because you can see exactly what you are doing, while it enables you to scrape clean across the centers of very narrow rooms.

Other Weber features are a Flexible Frame—which is **guaranteed to prevent chattering and waves**—Handle and Blade Adjustment—Sander—and Shearing Cut and Bowling Alley Attachments.

Write for Information

about a scraper that has every improvement it should have for perfect work on all kinds of wood floors.

John F. Weber, President, WEBER MFG. CO. 661 71st Ave., West Allis, Wis.

O. K.'d BY UNCLE SAM

Washington, D. C. and Naval Training Station North Chicago, Ill.

WATSON H. BARBER
Contractor

Installing of Cabinet and Joiner Work Specialties

Waukegan, Illinois, May 26th, 1910,

Triple "A" Machine Co., Chicago, Ill.

Gentlemen:—I herein express to you my appreciation for the work and capability of your Triple "A" Floor Surfacing Machine, both as to quantity and quality of the work your machine is capable of doing, as I think I have given the machine a hard test as I had about 2000 squares of oak and maple flooring to dress at the U. S. Naval Training Station, North Chicago, Illinois. This flooring was laid about 4 months before cleaning and was full of grit and dirt from being walked and worked over. This floor had to be dressed so as to pass Government inspection. I had tried different electrical sand paper machines without satisfaction and will say that the Triple "A" Machine is the only one that met the requirements. I would not hesitate to recommend the Triple "A" Machine to any and all that would desire a Floor Surfacing Machine that would do both quantity and quality work.

Yours very truly,

WATSON H. BARBER.



Triple "A" Floor Smoothers in operation at Drill Hall, U. S. N. T. S.

THE TRIPLE "A" SPRING-DRIVEN FLOOR SMOOTHER STOOD THE TEST (where others failed) on 200,000 square feet of oak and maple floors of the U. S. Naval Training Station.

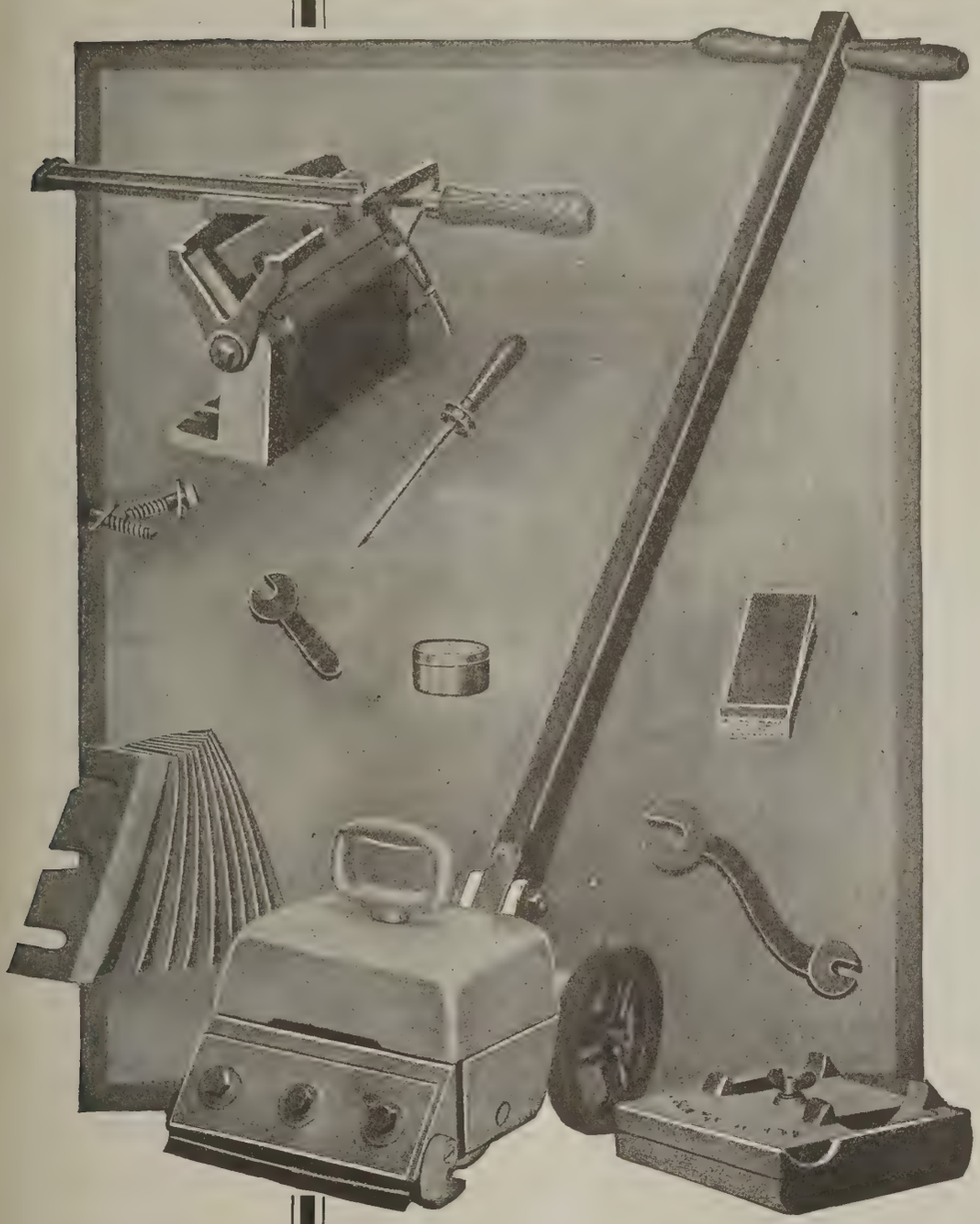
Bear in mind that the *Triple "A" Spring Driven Floor Smoother* is practically a *power machine.*

Write for circular describing this up-to-date. *Floor Smoother* and *Automatic Sandpapering Attachment.*

TRIPLE "A" MACHINE CO.
110 S. Clark Street
CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Look This Over Carefully



Does this equipment look as though it is simply made to sell or has it the appearance of being constructed to do the work for which it is intended—Floor Scraping?

You can find out very easily and it won't cost you one cent. Just write me that you are ready to do some floor scraping and I will ship the **Acme Floor Scraping Outfit** to you on **One Week's Free Trial.** If, after you have given the machines a thorough test, you do not find the same entirely satisfactory, pack them up and ship them back at my expense.

I have been making this **Absolutely Free Trial** proposition for the past three years and thousands of contractors have investigated into it. If you haven't —why not? You certainly want to save 75% of your floor scraping labor expense, don't you? The **Acme Floor Scraping Outfit** offers the means for you to accomplish this saving.

Bear in mind that I devote my entire time to manufacturing floor scrapers. It is not a side issue with me. I superintend the construction of each **Acme Outfit** and can therefore guarantee it in every particular. You take no chances—I assume all responsibility.

I want to send you booklet and full details of my free trial offer. Write me for them to-day.

JOSEPH MIOTKE

249 Lake Street **Milwaukee, Wis.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

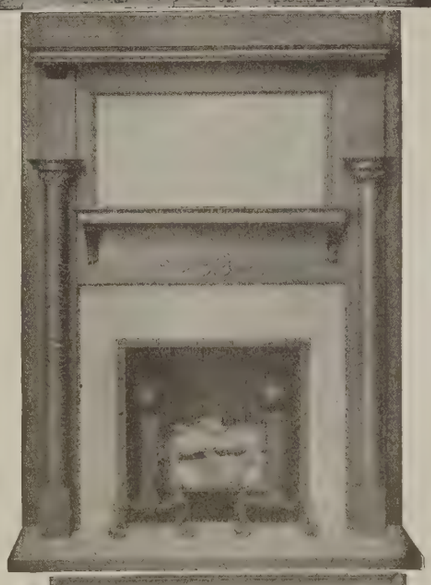
JUST A FEW NEW ONES FROM OUR 1910 LINE



Hornet No. 4

With 3-inch upper quarter-sawed columns, golden oak gloss finish; height, 77 inches; width 4 feet 6 inches or 5 feet; 14x24 bevel mirror; tile opening 36x36, enameled tile facing and hearth and combination coal and wood burning grate with summer front, complete for

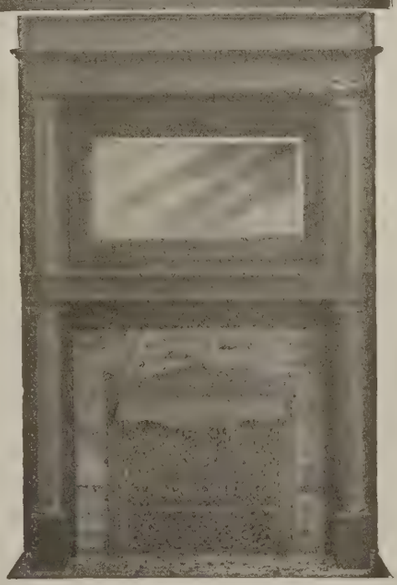
$22.50



Hornet No. 5

With 3½-inch quarter-sawed oak pedestal columns; golden oak finish; height, 84 inches; width, 5 feet or 4 feet 9 inches; 18x36 plate mirror; tile opening 36x39; enameled tile facing and hearth and combination coal and wood burning grate with summer front, complete for

$25.00



Hornet No. 6

With 4-inch quarter-sawed oak double columns. Made of selected oak or maple, finished imitation mahogany, rubbed and polished finish. Height 7 feet 4 inches, width 5 feet, tile opening 42 inches wide by 39 inches high, projection 3 inches. French bevel plate mirror 36 inches wide by 18 inches high. Enameled tile facing and hearth and combination coal and wood burning grate and summer front, complete for

$30.00

Subject to 5 per cent discount if order is accompanied by cash. We guarantee these mantels to be as represented. Workmanship and materials first class. Prompt shipment. Furnished in oak or mahogany finish. Write for illustrated catalogue.

HORNET MANTEL COMPANY

Salesrooms: 1143 Market Street, ST. LOUIS, MO

You can see at a glance what an advantage you have in the

Round Sharpening Stone



You can use the entire surface of the stone. You get the rotary motion so necessary in the sharpening of chisels, planer irons and so forth—and, as it is made of Carborundum you get the fastest cutting, most efficient sharpening stone on earth

The Round Stone is a combination—medium coarse on one side, fine on the other. It is 4 inches in diameter.

Price at your hardware dealers or direct. *$1.00*
In Oak Case 1.50

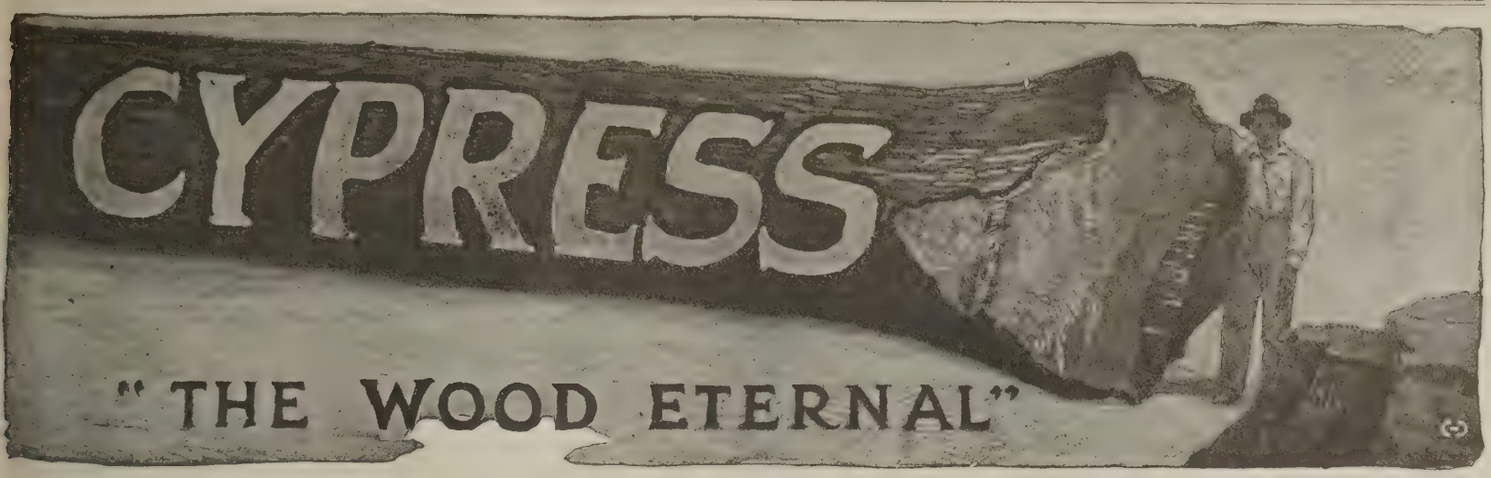
The Carborundum Co.

Niagara Falls, N. Y.



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"PUT A STOP TO DEPRECIATION—BUILD WITH CYPRESS *AT FIRST*"



THE WOOD THAT *LASTS* SHALL BE *FIRST* with *wise* CONTRACTORS

CYPRESS WILL NOT ROT

CYPRESS DEFIES DECAY

By honest and intelligent advice on **woods** we are not only saving losses to people who are going to **build anyhow**—but we are also

CAUSING MORE PEOPLE TO BUILD

This is going to be of more and more benefit to **you** month by month. It is **up to you** to intelligently take advantage of this by **learning for yourself** that **CYPRESS** is not only the ONE BEST OUT-DOOR WOOD for the owner—but also the ONE BEST WOOD FOR **YOU**. Cypress **"makes good."** That helps your reputation. Cypress is easy to work—that's **good for your tools.**

CYPRESS "THE WOOD ETERNAL"

CYPRESS AVERTS REPAIR BILLS

CYPRESS LASTS PRACTICALLY FOREVER

We are giving away complete working plans and specifications for THIS BUNGALOW. Many thousands of people ALL OVER THE U. S. are writing for them. THEY WILL HAVE TO GET **YOU** TO DO THE WORK.

THEY WILL INSIST on CYPRESS.

It will be MONEY IN YOUR POCKET TO HELP THEM GET JUST WHAT THEY WANT.

CYPRESS

is the "comer" in YOUR territory.

LISTEN FOR IT.



(Plan by Henry L. Wilson, Architect, Chicago)

Why not FIND OUT what CYPRESS can do for YOU, NOW?

WRITE US—ASK YOUR OWN QUESTIONS—about your own needs, big or little. You can rely on detailed and reliable **CYPRESS** information if you address our "BUILDERS' HELPS DEPT." We will recommend **CYPRESS ONLY FOR USES WHERE IT IS THE BEST WOOD TO USE.**

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

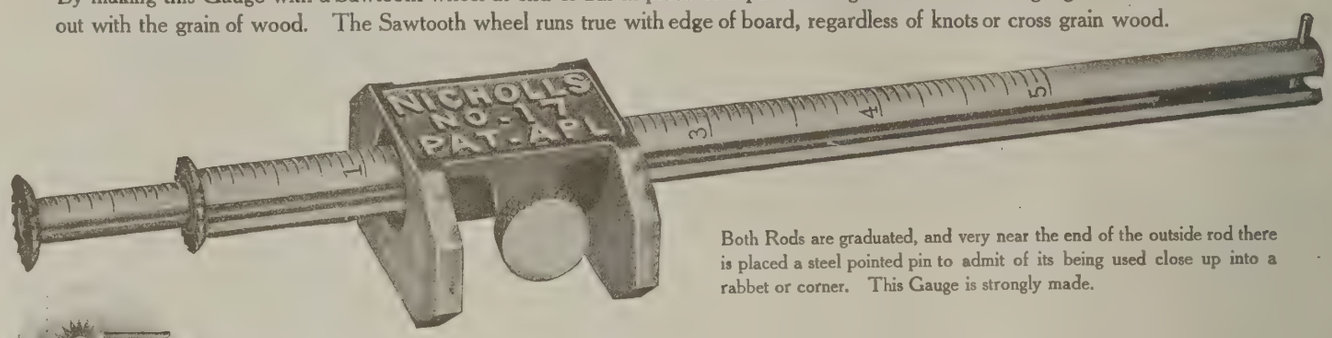
We are *producing* CYPRESS—*and talking it—but not retailing it.* BUY IT NEAR HOME. *ASK your lumber man if he sells CYPRESS; if he does not, ask him WHY. Then WRITE US. We will tell you where you CAN get CYPRESS.*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT BUILDER

"SAWTOOTH" Roller Marking and Mortise Gauges

By making this Gauge with a Sawtooth wheel at end of bar in place of a pin or straight roll we have a gauge which will not run out with the grain of wood. The Sawtooth wheel runs true with edge of board, regardless of knots or cross grain wood.



Both Rods are graduated, and very near the end of the outside rod there is placed a steel pointed pin to admit of its being used close up into a rabbet or corner. This Gauge is strongly made.



This is the only Gauge on the market that will mark true at all times.
Another feature is, the line made by a pin gauge is very hard to see on some kinds of wood, but with our Sawtooth Roller Gauge the marks made are like punch marks, and reflect the light from all sides.

Our Single Gauge No. 10 is like No. 17 without the inner rod. Furnished in Nickel Plated and White Metal Finish.

LIGHT, NEAT AND COMPACT.

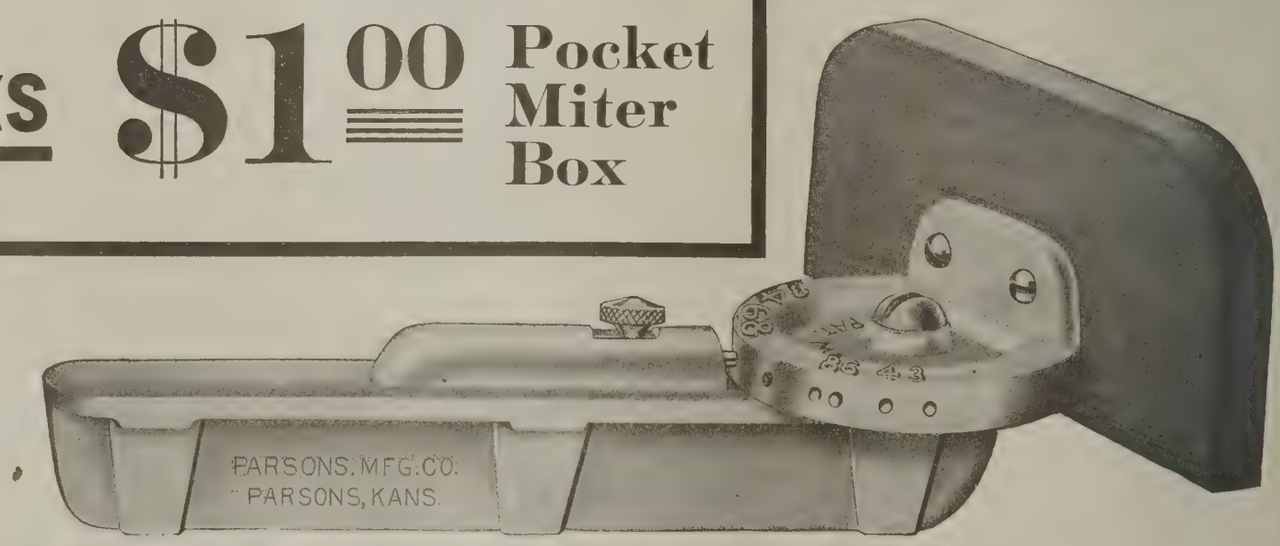
No. 17 Nickel Plated . . . . $1.00 No. 17 White Metal Finish . $0.75 No. 10 Nickel Plated. . . . ,$0.60 No. 10 White Metal Finish . $0.50

NICHOLLS MANUFACTURING COMPANY,

OTTUMWA -:- -:- -:- IOWA

QUALITY'S TRADE MARK
OUR HOBBY

THE MILKS $1.00 Pocket Miter Box



MILKS POCKET MITER BOX is made of aluminum, nicely finished and will stand the hardest usage. It will cut accurately the principal angles on any moulding or strip of any kind. It is placed on the moulding instead of having to turn a long piece to get it in position to cut, as in the ordinary Miter Box. You can cut Miters on scaffolds and ladders with Milks Pocket Miter Box without getting down and it will not be in the way before and after cutting.

WEIGHS EIGHT OUNCES. ORDER FROM YOUR HARDWARE DEALER OR WE WILL SEND YOU ONE PREPAID FOR $1.00

Parsons Manufacturing Company

PARSONS, ∴ ∴ KANSAS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

RED GUM



One of the most successful popular entertainment places in the West is at Cedar Point on Lake Erie.

The Cedar Point Coliseum is the largest building of its kind in the world.

It is an enormous Dancing Pavilion.

The Coliseum is three hundred feet long and one hundred and fifty feet wide—covering an area of 45,000 square feet. The point of particular interest about this building for our purpose is that the floor is built entirely of RED GUM.



They bought it because it was cheap and they like it because it is good.

Anyone planning to build apartment houses, office buildings, hotels, residences or specially designed furniture, should defer final arrangements and correspond at once with any of the following firms regarding samples, prices and lists of important buildings of all types wherein RED GUM has been used with eminent practical success and signal artistic satisfaction:

ANDERSON-TULLY CO. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., St. Louis, Missouri
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
CARRIER LUMBER & MFG. COMPANY . . . . . Sardis, Mississippi
BAKER LUMBER CO. . . . . Turrell, Arkansas

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STAY-LOCKED COLUMNS
DO STAY LOCKED



WE PAY THE FREIGHT

We cater to the careful man, *the man who cares.* Our columns cost him no more than the "don't-care-man" pays for the cheap, sure-to-open-up kind. Without a single exception they are the most beautiful and durable columns made.

THE JOINTS **CANNOT** OPEN. THAT'S WHY WE GUARANTEE THEM FIVE YEARS.

DESIGN BOOK 6 IS FREE; a postal brings it.

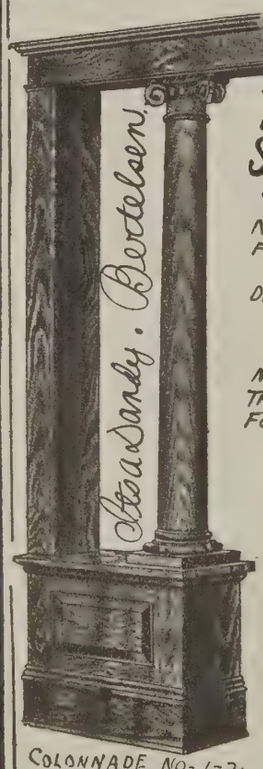
AMERICAN COLUMN COMPANY

BATTLE CREEK, MICH.



GUARANTEED 5 YEARS

$8.50 FOR THIS COLONNADE



COLONNADE NO. 1-2

A VERY LOW PRICE FOR THIS STRICKING NEW COLONNADE

MATERIALS AND WORKMANSHIP FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUDED
MADE FOR 5¾-INCH JAMBS
MADE IN OAK OR YELLOW PINE, IN THE WHITE, HAND SMOOTHED, READY FOR FINISHING.

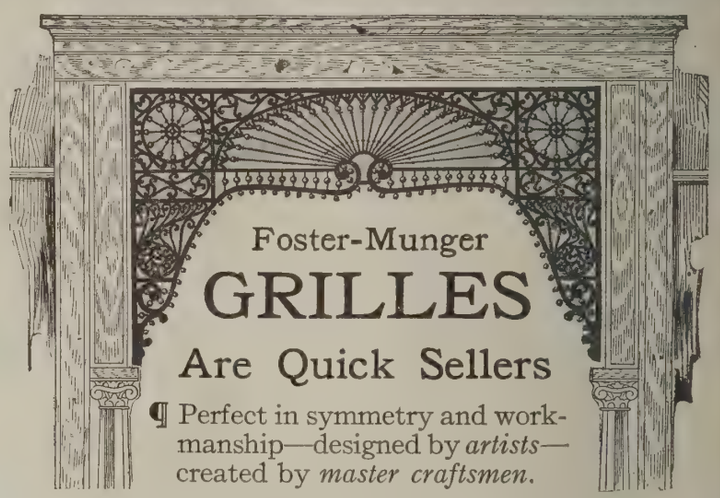
PRICES
ANY HEIGHT NOT OVER 9 FEET.

Style No. 1-2 EACH **$8.50**
Columns are 6 inches in diameter, tapering to receive 5-inch compo. cap, pedestals are 20 inches high over all and the width is 24 inches over all, and when set in to receive casings extension from jamb is 18 inches. Top shelf is 10 in. wide.

Style No. 2-2 EACH **$9.00**
Same measurements as above, only pedestals are 30 inches wide over all and when set in to receive casings extension from jamb is 24 inches.

SEND YOUR ORDER NOW, DONT LET IT GET AWAY FROM YOU.

BERTELSEN ADJUSTABLE GRILLE CO. 619. S. CLINTON ST. CHICAGO.



Foster-Munger
GRILLES
Are Quick Sellers

¶ Perfect in symmetry and workmanship—designed by *artists*—created by *master craftsmen.*

¶ All woods selected with special care as to color and grain.

¶ Each and every detail is turned and finished with the same skill and attention required on the highest grade furniture.

¶ Superior mechanical equipment enables us to produce a greater quantity and still uphold quality.

¶ More than a hundred beautiful designs from which to make a selection. Special order designs quickly executed.

¶ Our prices are as surprisingly low as the quality is high.

Every dealer should have Book 108G—which shows the finest and most complete line of grilles in America; also colonnades, stairs, mantels, wood carpet and parquetry flooring. Mailed postpaid upon request. Write for book 108G—and price list today.

The Foster-Munger Co. Chicago. U.S.A.
AMERICA'S GREATEST SASH & DOOR HOUSE

Another book of interest to dealers—107G—showing 68 choice new patterns in wide stile cottage front doors. Prices about the same as you pay for common doors. Get the book.



Our No. 660

CONSOLES COLUMNS and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG NO. 16

It contains many beautiful designs of Consoles, Columns and Grilles.

You will make no mistake in writing us before ordering elsewhere.

NORTHWESTERN GRILLE WORKS, Office and Showroom 1824 Milwaukee Avenue, Chicago

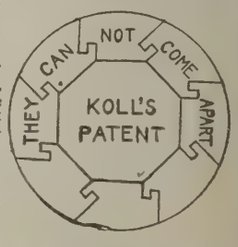


60,000 COLUMNS

at an average of $5.00 each or 6,000 at $50.00 each gives you an idea of the annual capacity of our plant.

We own the largest factory building in the world devoted exclusively to the manufacture of high grade COLUMNS and PORCH WORK.

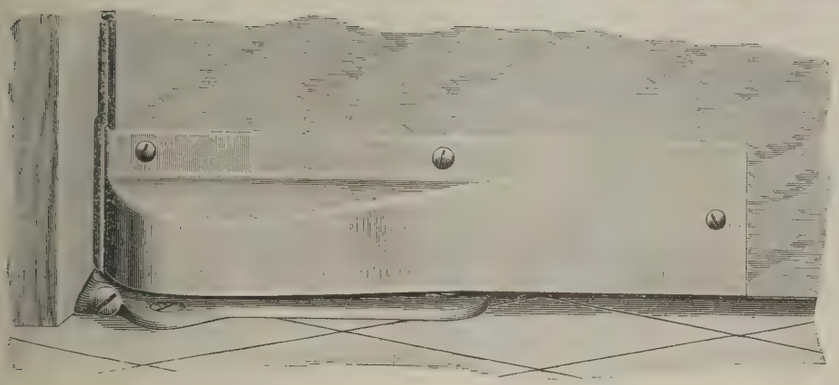
A new and very complete catalogue of COLUMNS will be sent on request. Ask for T-40.



Hartmann-Sanders Company
Sole manufacturers of
KOLL'S PATENT LOCK JOINT COLUMNS
Elston and Webster Avenues, CHICAGO
Eastern Office: 1123 Broadway, New York City
The best columns for porches, pergolas or interior use.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"Standard" SPRING FLOOR HINGES



—Double Acting
—All Steel
—Fool-Proof
—Durable
—Simple

"Everlasting service" is not an idle claim but an assured fact with **Standard** Double Acting Spring Floor Hinges. Just a glance at the illustration and a study of the description will convince you how indefinite life is an assured fact. You will be able to see for yourself how our statements of simplicity, durability and compactness are fully borne out by the hinges themselves.

The **Standard** controls doors that swing in both directions. It is absolutely positive in action, moves smoothly and without noise, is adjustable to doors of various weights, holds doors open in either direction and is very easily and quickly applied.

It is of all-steel construction—no malleable or other castings are used at all. The case-hardened ball-bearings and wearing surfaces not only take care of the weight of the door, but the spring thrust too.

Notice the alignment feature in the floor plate; this allows a door to be adjusted to its proper position without changing the position of a single screw. This floor plate is flexible on the hinge post to accommodate itself to uneven floor.

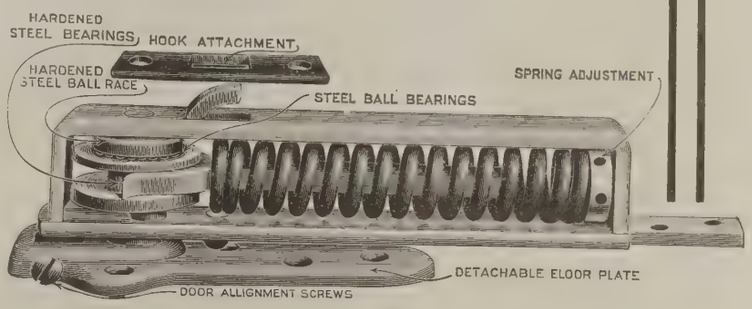
Perfect silence in operation is accomplished by means of a short flexible plunger which is not rigidly fixed in the hinge frame, but takes the same side movements as the coil spring.

A hook-attachment obviates the necessity of making a finished mortise up the rear edge of the door when attaching hinge to door. Furthermore, this feature allows the weight of the door to increase the strength of the fastening. Finish plates are applied to the surface of the door with wood screws—after hinge is on. This method covers any defects in cutting the wood in applying the hinge.

Details Upon Request

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Shelby, Ohio



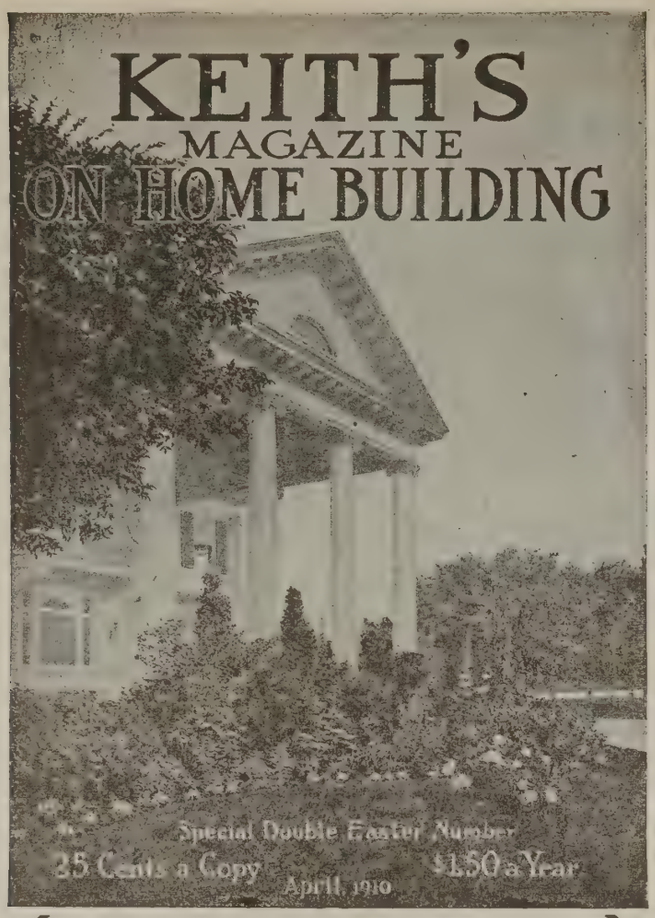
$10.00 For You

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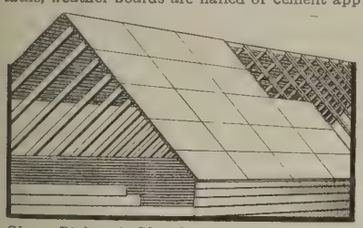
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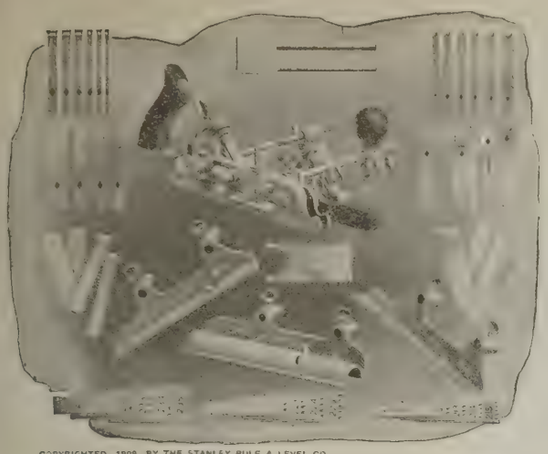
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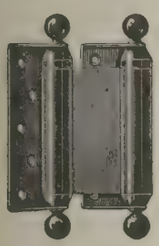
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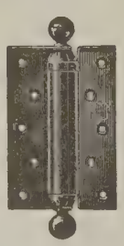
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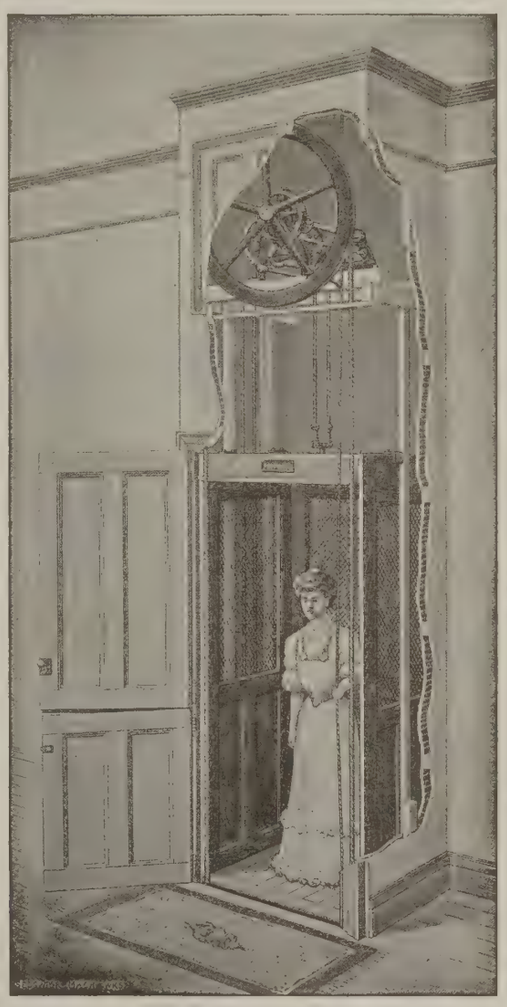
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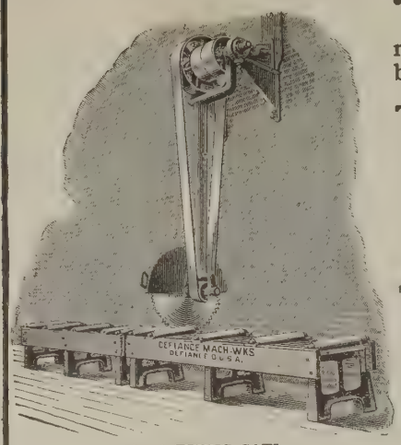
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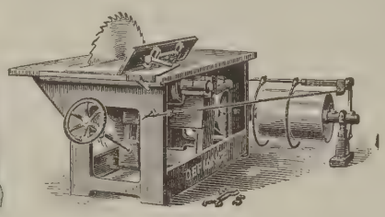
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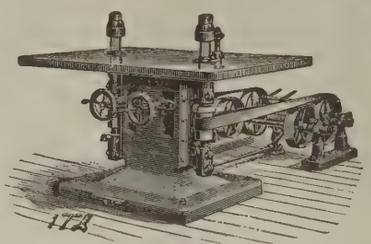
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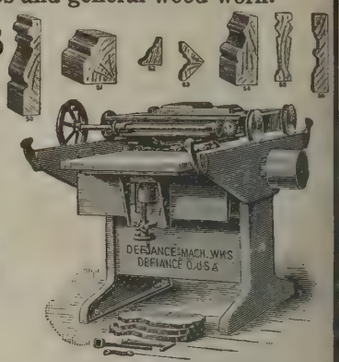
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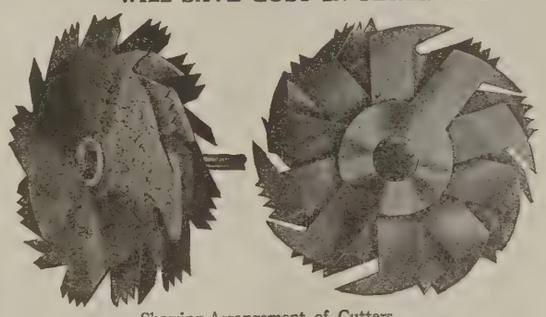

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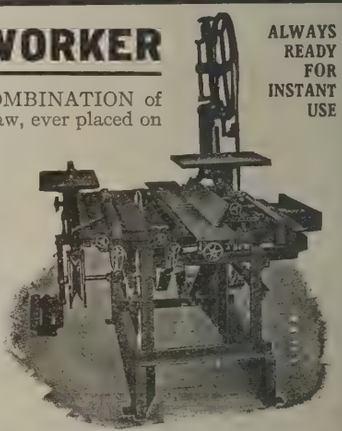
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The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*



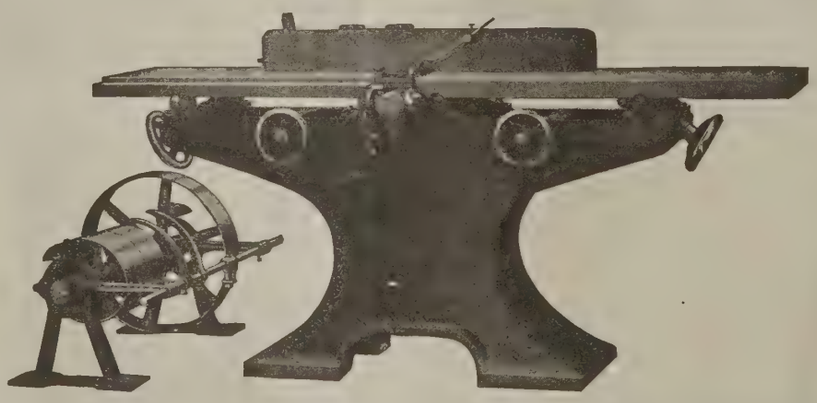
PARKS' BALL BEARING MACHINE COMPANY

KNOWLTON AND FERGUS STREETS **CINCINNATI, O.**

PROTECT YOUR FINGERS

by using a CRESCENT Jointer with Safety Head

The knives in CRESCENT Safety Heads are made of high speed steel which will hold an edge longer and turn out better finished and more work than can be done on a common jointer with ordinary knives. You may crowd the machine to the limit and the quality of work will be just the same as though you hadn't crowded it a bit.



The price of these splendid machines is very reasonable considering the very high quality of the machines and the enormous amount of accurate work they are capable of turning out.

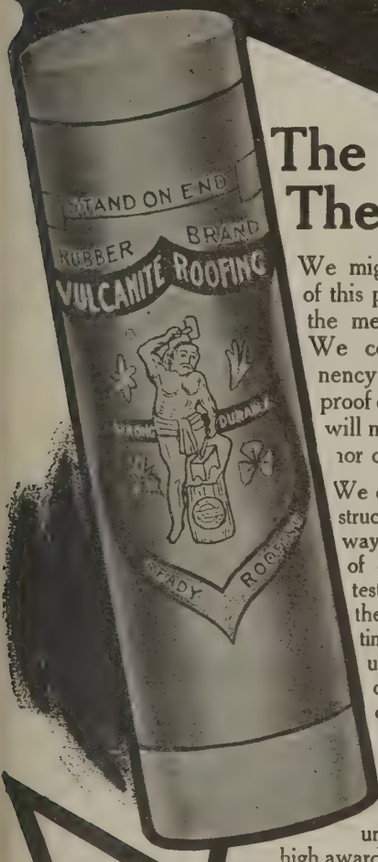
Send for catalog giving complete description. It tells about our elegant line of Band Saws, Saw Tables, Jointers, Borers, Shapers, Planers, Planer and Matchers, Pole Rounders, Disk Grinders, Variety Woodworkers.

THE CRESCENT MACHINE COMPANY 10 MAIN STREET LEETONIA, OHIO, U. S. A.



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Vulcanite Roofing



The Samples Tell The Story SEND FOR THEM

We might easily fill page on page of this publication telling you about the merits of Vulcanite Roofing. We could dilate on its permanency—on its fire-and-water-proof qualities—on the fact that it will not freeze or crack in winter nor crumble in dry weather.

We could describe its construction in a technical way—cite the results of experimental tests and pile up the favorable testimony of actual users who declare that Vulcanite is the best of all composition roofings—could enumerate the high awards Vulcanite has won at expositions, and show you why it costs more to make than any other roofing of its kind.

The contractor and dealer, though, will be more interested in actual samples which will show to his experienced eye and touch just how good, how enduring and how easily laid Vulcanite Roofing really is, and explain why it is the most extensively used roofing in the world. That's why we ask you to

Follow The Arrow and Fill Out The Coupon.

Patent Vulcanite Roofing Co.
Chicago, Ill.



Patent Vulcanite Roofing Co., Chicago, Ill.

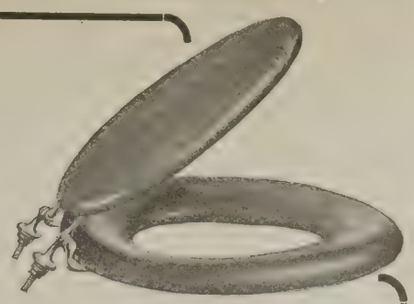
Please send us sample of your Vulcanite Roofing and descriptive literature.

_____

_____

_____

Don't Install Trouble-Making Wooden Seats and Tanks



You know that wooden seats and tanks are made in many pieces and glued, bolted or wired together—that they are constantly warping, opening up and falling to pieces. Wood is porous and absorbs moisture and foul odors, so can never be made sanitary.

Wooden tanks swell and throw fittings out of adjustment.

J-M Sanitor Seats and Tanks

eliminate all these troubles because they are moulded in one solid mass from specially treated wood fibre. They are absolutely unaffected by moisture, so cannot swell, warp or fall apart like wood.

Tanks never swell or throw fittings out of adjustment. Are non-absorbent, therefore do not harbor germs or vermin, so cannot spread disease. **Are absolutely sanitary.**

They are finished equal to wood and have a lustre that is far more lasting.

In some places seats and tanks made of this material have been in continuous service from 16 to 20 years and are practically as good as new.

Write nearest branch for booklet and sample of Sanitor material.

H. W. JOHNS-MANVILLE CO.



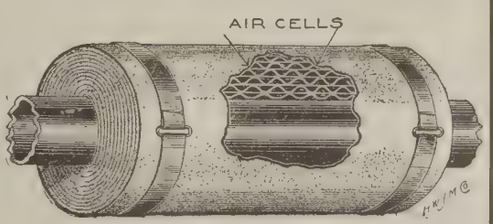
Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, Etc.

Baltimore	Cleveland	London
New Orleans	San Francisco	Boston
Dallas	Los Angeles	New York
Seattle	Buffalo	Detroit
Milwaukee	Philadelphia	St. Louis
Chicago	Kansas City	Pittsburg
	Minneapolis	

For Canada—The CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED
Toronto, Ont. Montreal, Que.
Winnipeg, Man. 1204 Vancouver, B. C.

Improperly Covered Steam Pipes Cause Fires

The following which appeared in a recent issue of a leading engineering magazine, shows the importance of covering steam and hot water pipes with a *fireproof* covering, to prevent them setting fire to building:



J-M ASBESTOCEL

"If the contact of wood with a heated surface is continued sufficiently long, the temperature of a few degrees only above the boiling point of water is enough to produce a semi-carbonized film on the wood, which will start smoldering at a very low temperature. The heat arising from an oil or gas flame some distance away is sufficient to start the smoldering combustion. The temperature of a steam or hot-water pipe has often been found sufficient to cause ignition, due probably to the long continued heat generating certain hydro-carbons of low ignition point, which remain occluded in the pores of the semi-charred wood and are there brought into close contact with the occluded oxygen. In fact, a constant draught, or even a sudden rush of air, coming in contact with highly carbonized wood is sufficient to cause serious conflagration."

J-M Asbestocel Pipe Covering is made of Asbestos and cannot burn. It is not only a positive protection against fire from heated pipes, but the most efficient and durable Pipe covering on the market. A postal request will bring the proof to you.

Write Nearest Branch for Sample and Booklet.

H. W. JOHNS-MANVILLE CO.

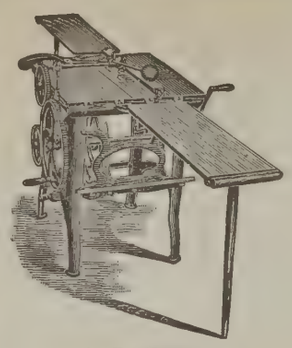
Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, Etc.

Baltimore	Cleveland	London	New Orleans	San Francisco
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For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C. 921

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Carpenters! Builders!

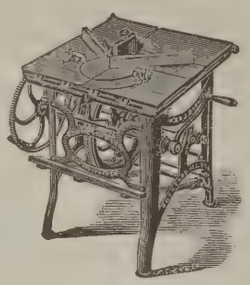


I. For Ripping.

Our new foot and hand power Circular Saw No. 4, the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing etc

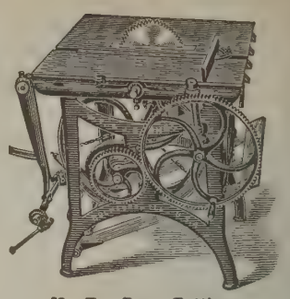
Solid Iron Table Planed Perfectly True.

COUNTERSHAFT IF DESIRED.



III. With Universal Mitre Gauge.

Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, etc.



II. For Cross Cutting.

Send for Our New Catalogue

W. F. & JOHN BARNES CO.
436 Ruby Street, ROCKFORD, ILL.

1000 POUND CAPACITY HOIST



Gasoline or Motor Drive

The "C. H. & E." 1000 Pound Capacity Double Acting Builders' Hoist for carpenter and mason contractors, to hoist lumber, brick and mortar. Six horse power water cooled engine or motor drive. Lifting capacity 500 pounds at 350 feet per minute; 1,000 pounds at 200 feet per minute. All gears machine cut, all shafts turned and ground, all bearings babbited. Entire outfit simple, noiseless and reliable.

WRITE FOR ATTRACTIVE FOLDER AND PRICE.

C. H. & E. Manufacturing Co. Inc.

319 Mineral St., MILWAUKEE, WIS.



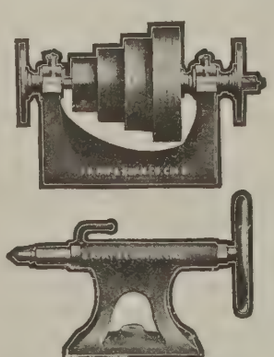
MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

Are You Still Depending on the Planing Mill



Victor Wood Lathe

to supply the finished material used in your business?

Why not do your own mill work and save the loss of time in waiting on planing mills and other inconveniences?

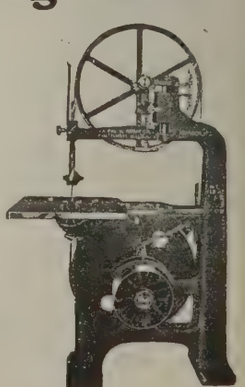
You will not only realize a great saving in time and expense in employing a few woodworking tools, but an enlargement of your business and an increase in profits.

The two machines illustrated herewith will be found a good investment. With a Lathe and Scroll Saw you can turn out an almost endless variety of special decorative woodwork, such as corner blocks, balusters, etc., and various wood novelties.

These machines are inexpensive and will pay for themselves in a short time.

Let Us Tell You More About Them in Our Large Illustrated Circulars

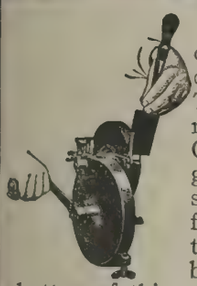
J. A. FAY & EGAN CO., 327-347 W. Front St. CINCINNATI, OHIO



No. 155 Band Scroll Saw

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

6 Months Free Trial



This Luther Diamond Tool Grinder sharpening outfit will help any shop, factory, contractor, or any carpenter, mechanic or tool user to earn more money. This is exactly what we want you to prove by six months' free use of this **genuine** Luther Carborundum Grinder shop and factory outfit. We want tool users generally to try out this outfit for six months free—to sharpen every kind and as many tools as possible free for six months, and then, if you are not fully satisfied that this outfit is a big money-maker for you, send it back at our expense. Send back the coupon at the bottom of this page for particulars of 6 months' Free Trial, and special offer on shop and factory outfit, also Free booklet about Carborundum.

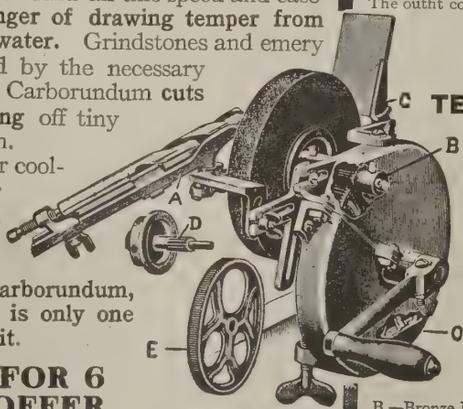
25 Times Faster Than Grindstones—6 Times Faster Than Emery—Will Not Draw Temper—Not Emery Called by a Fancy Name, But

GENUINE CARBORUNDUM

WILL NOT DRAW TEMPER

Carborundum is a wonderful sharpening substance. There's nothing else like it, or near like it in the world. Nothing except the genuine diamond itself is so hard. In fact, Carborundum is made of artificial diamond crystals, actually **created** in the terrific heat of electric furnaces at Niagara Falls, which fuses the elements of real diamonds into hard, sharp, beautiful carborundum crystals. In this **utmost** heat, far beyond the measurements of science, in which fire brick melts and runs like butter, Carborundum crystals get a temper and sharpness that cuts hardest steel as emery does copper. Wheels actually made of genuine South African diamonds would sharpen tools no quicker. And all this speed and ease of tool sharpening is done **without danger of drawing temper from tools,** and with **no need of cooling with water.** Grindstones and emery **wear** steel away; frictional heat caused by the necessary heavy contact draws the temper. But Carborundum **cuts** steel away without frictional heat, **peeling** off tiny shavings of hardest steel at lightest touch.

No need of heavy pressure, no water cooling needed, no danger of drawing temper if it is **genuine** Carborundum. And you can be highly suspicious of anything described as we have described Carborundum, but called by any name other than **Carborundum,** no matter how fancy the name. **There is only one Carborundum; there is nothing else like it.**



SEND COUPON TODAY FOR 6 MONTHS' FREE TRIAL OFFER

Often you work with dull tools because it's not easy to sharpen them. This **outfit** makes any sharpening the work of only a few minutes. Keen, bright tools mean faster work every moment of the day, and that means **more money made,** to say nothing about the time saved in sharpening and the money saved, because there is no danger of drawing temper, and all your tools will last longer. The Carborundum wheels will outlast any number of emery wheels or any other abrasive. We guarantee the wheels for five years. But don't take our word; let the outfit **itself** prove all this in your own shop, on your **own** tools. If you don't want it after six months' free test, send it back. The six months' use will cost nothing.

Send back the coupon today and get our liberal Free Trial offer, also interesting story about the discovery of Carborundum, reprinted from McClure's Magazine.

RETURN THIS COUPON

LUTHER GRINDER MFG. CO.
55 Madison Street - - MILWAUKEE, WIS.

Special Offer on Shop Outfit

LUTHER DIAMOND TOOL GRINDER

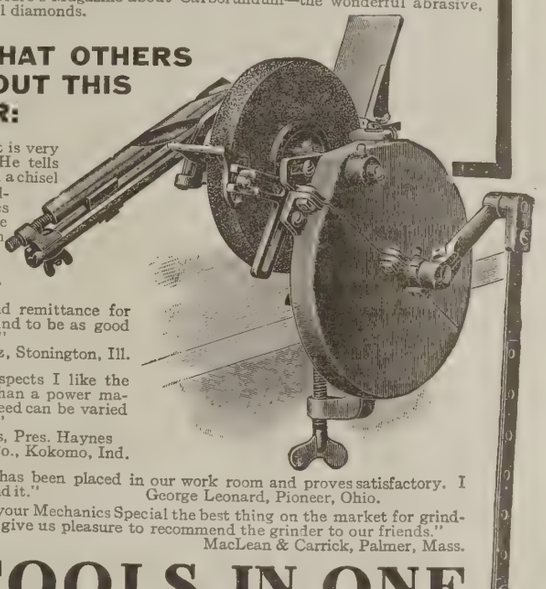
This genuine Carborundum Sharpening Outfit is a remarkable value—the most liberal, reasonably priced outfit ever offered. It provides for every kind of sharpening, buffing and polishing work. The coupon below will bring you our Six Months' Free Trial Offer, and Special Outfit Offer, also a reprint of an interesting article from McClure's Magazine about Carborundum—the wonderful abrasive, made of artificial diamonds.

READ WHAT OTHERS SAY ABOUT THIS GRINDER:

"Our machinist is very much pleased. He tells us that he ground a chisel on this tool grinder in two minutes which would have taken an hour on the grindstone."
W. H. Sears,
Pentwater, Mich.

"Enclosed find remittance for grinder which I find to be as good as recommended."
S. Schrantz, Stonington, Ill.

"In many respects I like the machine better than a power machine, since its speed can be varied instantly at will."
Elwood Haynes, Pres. Haynes Automobile Co., Kokomo, Ind.



"The grinder has been placed in our work room and proves satisfactory. I heartily recommend it."
George Leonard, Pioneer, Ohio.

"We consider your Mechanics Special the best thing on the market for grinding tools. It will give us pleasure to recommend the grinder to our friends."
MacLean & Carrick, Palmer, Mass.

10 TOOLS IN ONE

The Mechanics' Special Shop Outfit, on which we are making this special offer, embraces ten sharpening appliances. The special attachments make it easy for even inexperienced persons to do difficult grinding, such as twist drills, chisels, etc. The outfit consists of one Mechanics' Special, with the following accessories:

WILL NOT DRAW TEMPER

1. One rough genuine Carborundum wheel
2. One fine genuine Carborundum wheel
3. One Chisel grinding attachment
4. One twist drill attachment
5. One buffer
6. One polisher
7. One genuine Carborundum oil stone
8. One genuine Carborundum hone in leather case
9. One genuine Carborundum sickle stone
10. One foot power attachment

BUILT LIKE A HIGH GRADE LATHE

The Luther Mechanics' Special, forming the basis of this shop and factory outfit special offer, is built substantially for a lifetime of service. The genuine Carborundum wheel will not get lopsided. The Mechanics' Special is built with steel and malleable construction—dust-proof, bronze bearings—machine parts run in bath of oil—machine cut spur gears—speed 2,500 revolutions per minute. It will stand the severest, hardest service, out-wear and give better service than any number of emery wheels, grindstones, or anything else.

A.—Twist drill attachment to give twist drills proper angle and clearance.
B.—Bronze Bearing. C.—Chisel Sharpening Attachment.
D.—Spur gear cut from solid steel.
E.—Large spur gear machine-cut, oil bath.

Return the Coupon Below for Six Months' FREE TRIAL OFFER

COUPON

Luther Grinder Mfg. Co., 55 Madison St. Milwaukee:

Gentlemen: At no obligation, please send Six Months' Free Trial Offer on Shop and Factory Outfit. Also interesting booklet about Carborundum. This coupon does not mean that I will buy; it simply means I want full details, and does not obligate me in any way.

Name _____

Address _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.


"Victor" Scroll Saw

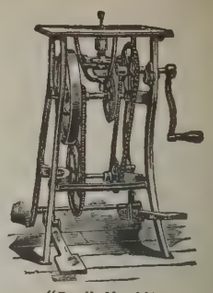

"Diamond" Mortiser

FOOT, HAND AND POWER

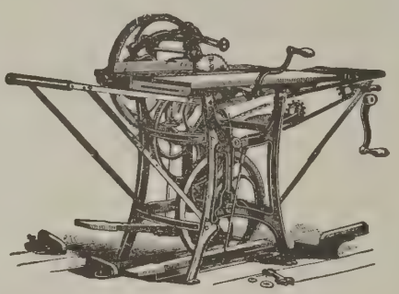
WOOD-WORKING MACHINERY

FOR CARPENTERS, BUILDERS, CABINET-MAKERS AND OTHER WOOD-WORKERS

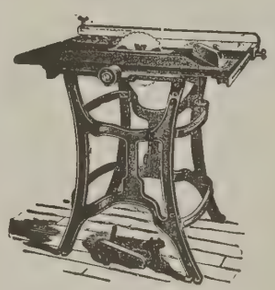
Built for Hard Work, Accurate Work and Long Service


"Rex" Moulder

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.


"Union" Combination Self-Feed-Rip and Cross-Cut Saw

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory, may be returned at our expense.


No. 8 "Union" Power Saw

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

Send for Catalog "A"

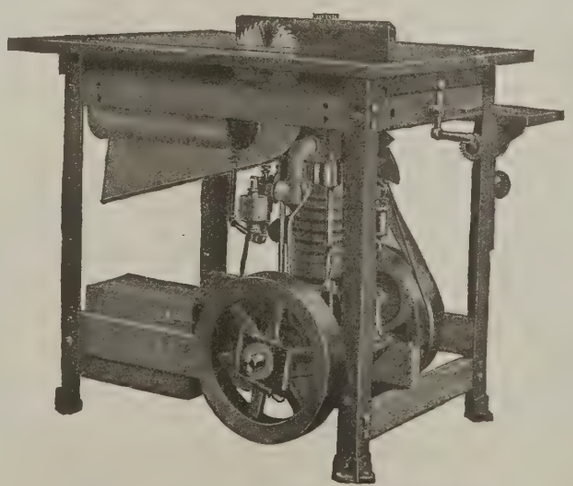
The Seneca Falls Manufacturing Co.

629 Water Street, Seneca Falls, N. Y., U. S. A.


No. 6 "Union" Combination Saw

Have You Investigated

The Grimm Woodworker?


Type A with Gasoline Engine. Weight 400 lbs.

NINE MACHINES IN ONE

8-inch Rip Saw	Moulder (8 prs. knives)
8-inch Cross Cut Saw	10-inch Sander
6-inch Dado Head	4-inch Jointer
Boring Machine (3 bits)	Jig Saw (3 blades)

Two Emery Wheels

Progressive building-contractors are fast coming to realize the importance of substituting practical machines for hand labor. The **Grimm Woodworker,** furnished with either gasoline engine or electric motor and combining so many important attachments in one machine, is undoubtedly one of the greatest time, labor and material savers yet brought out.

Write for descriptive booklet and our attractive selling plans.

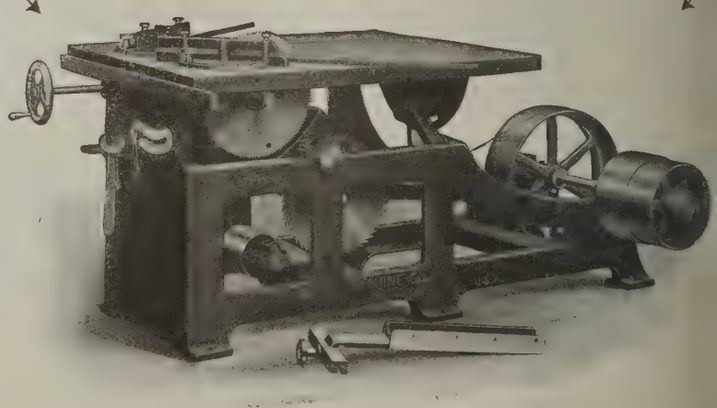
Grimm Manufacturing Company

42 Erie Street, Buffalo, N. Y.

New Combination Saw Bench

Made By

Smith of Smithville



The above cut represents our **New Double Arbor Universal Saw Bench,** adapted for cross-cutting, ripping or grooving, due to the fact that it is fitted with two arbors, the one arbor being fitted with a rip saw and the other a cross-cut saw or dado head as may be desired, and by a few turns of a hand wheel either saw can be brought into operation while the machine is in motion. The table tilts for bevel sawing and is fitted with cross-cutting, slitting and mitre gauges.

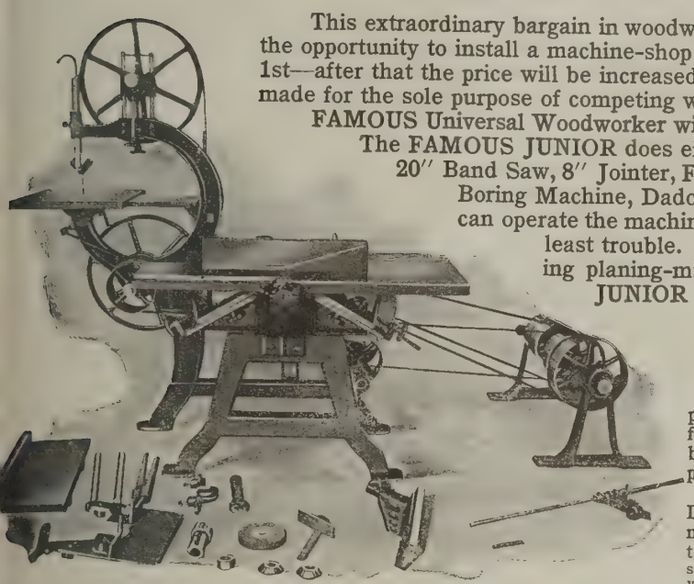
For further particulars concerning this or any other wood-working machines, address

H. B. SMITH MACHINE CO. *SMITHVILLE N. J.* *U. S. A.*
NEW YORK *CHICAGO* *ATLANTA* *MEMPHIS*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS IT WILL HELP.

FAMOUS
Universal Woodworkers

The FAMOUS JUNIOR for $150.00 is the greatest offer in Woodworking Machinery ever made



This extraordinary bargain in woodworking machinery gives every carpenter, builder and contractor in America the opportunity to install a machine-shop for the total investment of $150.00. The offer holds good until February 1st—after that the price will be increased. The present low price is about 50 per cent below the usual cost; it's made for the sole purpose of competing with inferior machines, and to convince the trade how much extra profit a FAMOUS Universal Woodworker will put in their pocket.

The FAMOUS JUNIOR does eight different kinds of work, and embodies the following eight machines: 20″ Band Saw, 8″ Jointer, Felloe Rounder, Emery Grinder, Saw Table with raising or lowering arbor, Boring Machine, Dadoeing Machine, Vertical Shaper. One man, with no previous experience, can operate the machine; there is nothing complicated, nothing to wear out, nothing to cause the least trouble. It means an end to the planing-mill bugbear, because in addition to saving planing-mill bills, there is the saving in time and trouble. Buying a FAMOUS JUNIOR is like putting money in the bank—only the dividends are bigger.

Half Price—Until February 1st

Hundreds upon hundreds of contractors have already taken advantage of our "half-price" offer. You have a clear month to make your application and to lay the foundation for a more profitable business. The year of 1911 will be a busy one for contractors and builders—prepare to meet it by installing the FAMOUS JUNIOR. Think of it—a complete machine-shop for only $150.00 (there are positively no extras).

The FAMOUS JUNIOR is for hard service. We guarantee it—not for a year but for LIFE. Doesn't matter how long you have it, our guarantee is always good. No other manufacturers of woodworkers in the world can afford to make such a sweeping guarantee. But we know what the FAMOUS JUNIOR IS. We know how strong it is—how simple in construction and operation, and how it will live up to its guarantee. Yet the total outlay that you are called upon to make is $150.00. And then we sell on trial and will take time payments

The FAMOUS No. 14 is an Ideal Woodworker for Contractors' Use

While our FAMOUS JUNIOR is the best universal woodworker on the market day for small contractors and builders, this No. 14 FAMOUS is unquestionably e most satisfactory for carpenters, builders and contractors who have a large nount of millwork done, and a great variety, as on the one machine SIXTEEN IFFERENT KINDS OF MILLWORK CAN BE DONE, SIMPLY BY MAKING FEW SIMPLE AD JUSTMENTS.

The No. 14 FAMOUS Universal Woodworker is, without the shadow of a doubt, e most unique piece of woodworking machinery, and the greatest time and labor ver, ever invented. On the one base are embodied the following sixteen woodrking machines:

1. 27″ Band Saw
2. 12″ Jointer
3. Saw Table with raising and lowering Saw Arbor
4. Single Spindle Shaper
5. Boring Attachment arranged on Special Boring Spindle
6. Pony Planer
7. Tongue and Pole Rounder
8. Hollow Chisel Mortiser
9. Single End Tenoner
10. Drum Sander
11. Disc Sander
12. Knife Grinder
13. Emery Grinder
14. Band Re-saw
15. Spoke Tenoner, Rim Borer and Wheel Equalizer
16. Adjustable Felloe Rounder

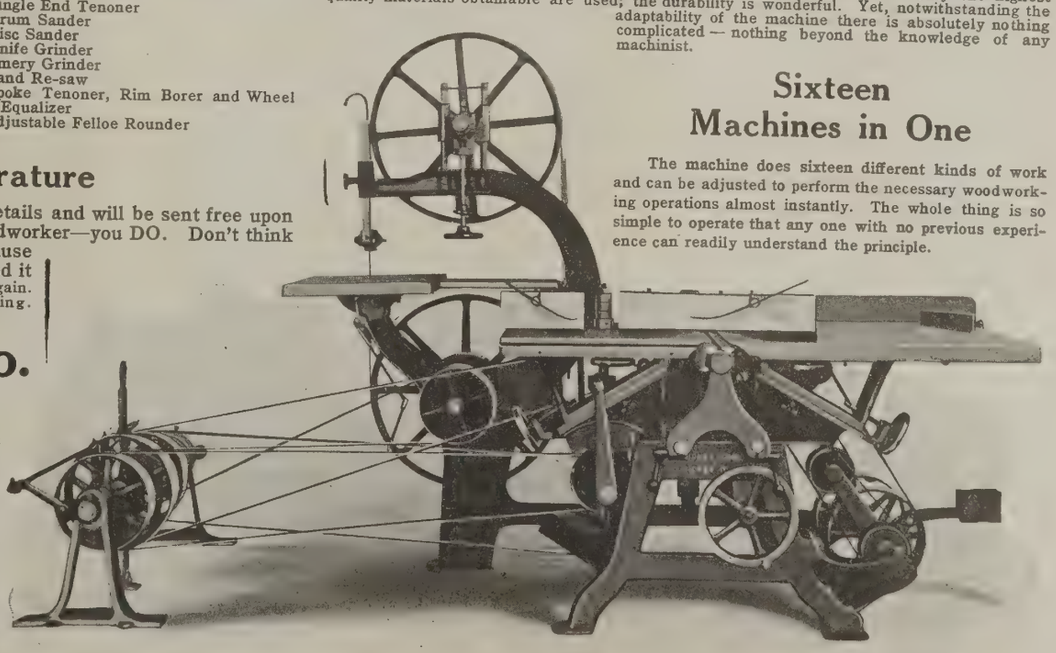
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Over five hundred contractors bought FAMOUS woodworkers during the past year; over a thousand will buy during 1911. We have never had a machine returned for repairs—we have never had an unsatisfactory report. Such a record points to a machine possessing REAL MERIT—a proposition which every contractor should inquire into.

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The machine does sixteen different kinds of work and can be adjusted to perform the necessary woodworking operations almost instantly. The whole thing is so simple to operate that any one with no previous experience can readily understand the principle.



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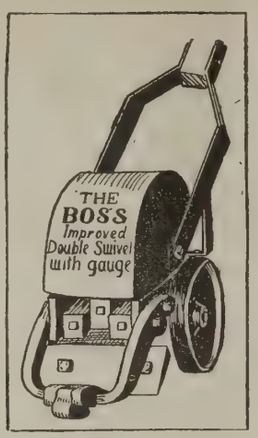


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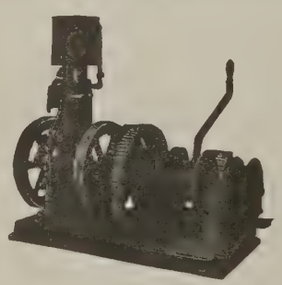
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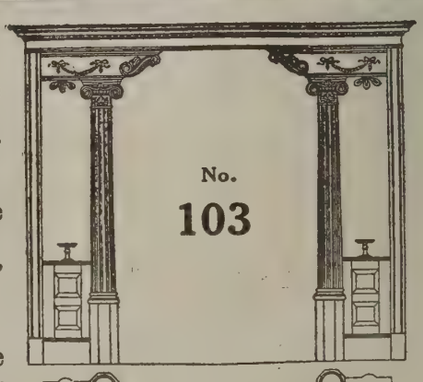
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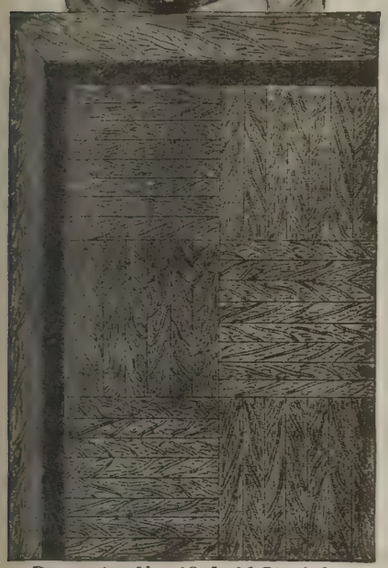
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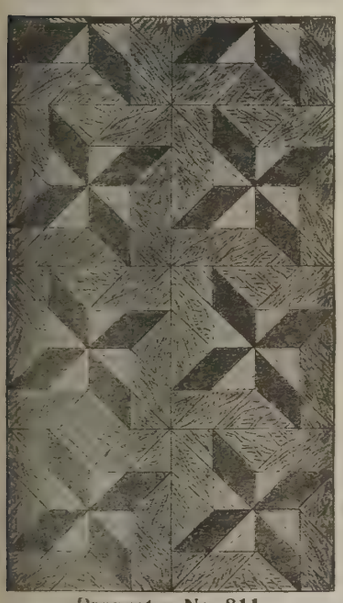
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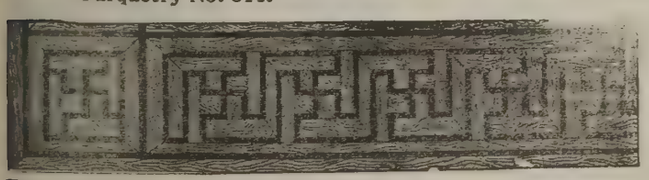
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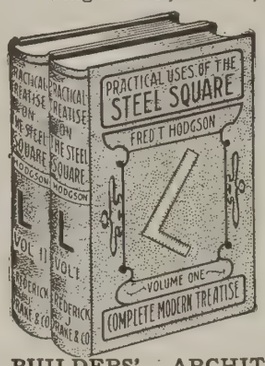
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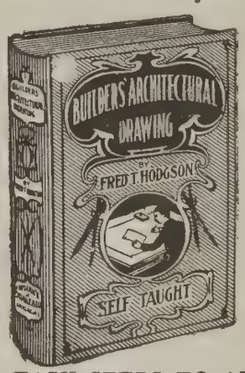
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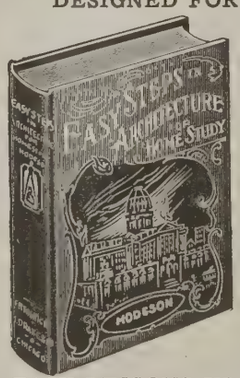
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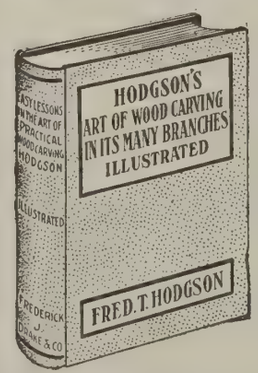
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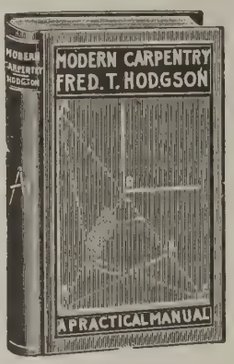
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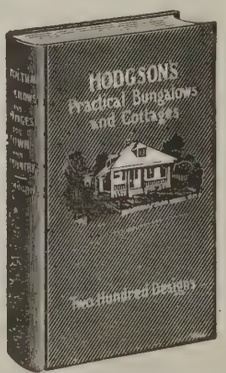
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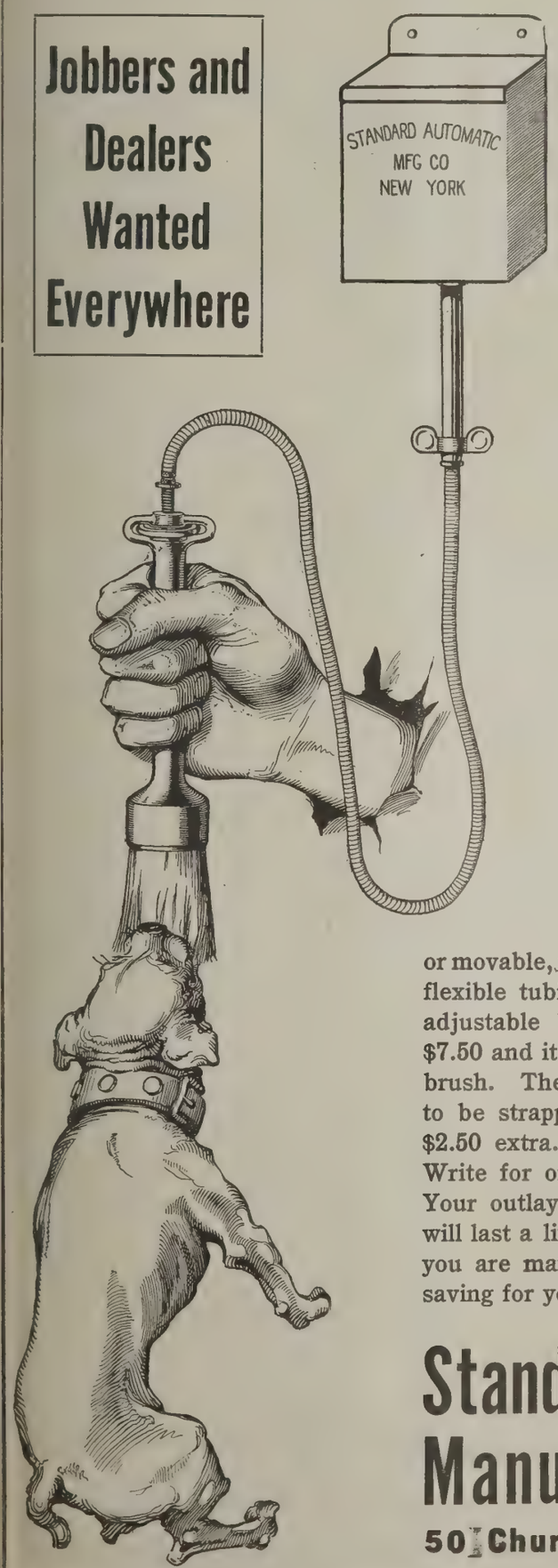
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Where draftsmen Draw from twenty-five to seventy-five dollars per week

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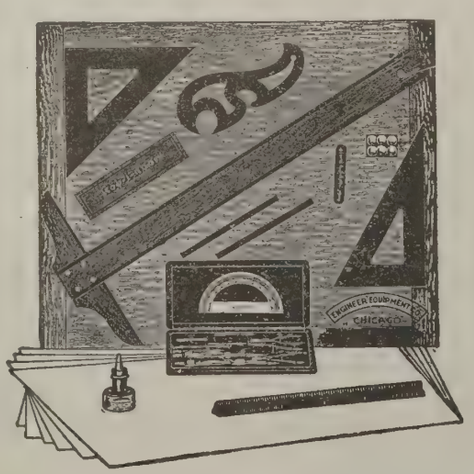
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Mr. F. B. Dobe, chief draftsman of the Engineers' Equipment Company (Inc.), Chicago, with twenty years' experience in training and handling men, has for a good many years given personal individual instruction by mail with the most deserving success, because his instruction work consists of actual drafting room work that gives his personal student and apprentice the required practical experience.

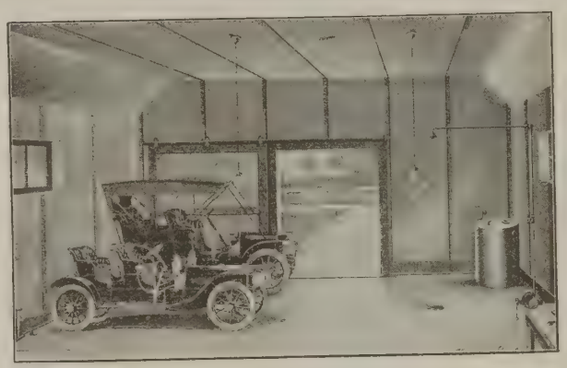
Mr. Dobe has been an advertiser in this paper for a good many years and will send his "Successful Draftsmanship" prospectus, 6 by 9, also list of open draftsmen positions and full information free. His advertisement appears on last page of this paper. Anyone interested should write to him.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UTILITY WALL BOARD

A Fibrous Water-Proof Board Made in Convenient Widths and Lengths

To be Used Instead of Lath and Plaster in New Building or Repair Work



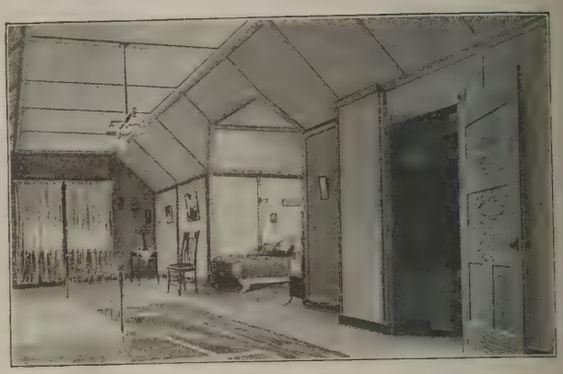
Make your Garage Warm by Lining with UTILITY Wall Board

Mr. Contractor

This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern building material.



This shows how an Attic looks after being finished with UTILITY Wall Board.

Utility Wall Board is better than lath and plaster. It saves the user a lot of money besides giving him a handsome, durable job. Utility Wall Board can be painted and decorated with the finest results. Utility Wall Board is being used in both small and large buildings. Everyone likes it.

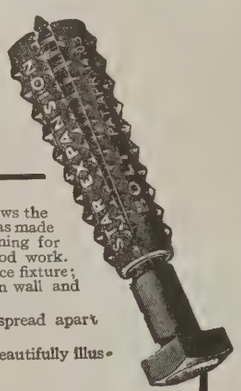


Write Now for FREE Sample and Prices

Utility Wall Board can be applied by the carpenter—nailed right to the studs—easy and clean to handle—cuts with a saw—fits any space and can be put on in winter or summer—no waiting for plaster to dry—no cracked walls—no dirt—no ruined decorations—warm in winter and cool in summer

THE HEPPES COMPANY, 4502 Fillmore Street, Chicago, Ill.

This is why you can't Extract a Star Expansion Bolt

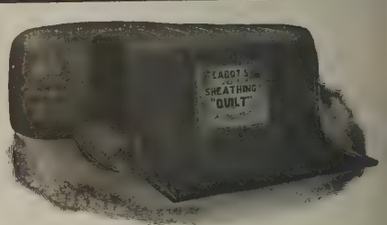


IMPOSSIBLE! Note where the hand is pointing. This shows the beginning of the celebrated "inner end expansion" which has made the Star Expansion Bolt famous as a hold fast forever fastening for wooden cross beams, girders, all ornamental iron and wood work.
TO USE: Insert malleable iron shield in hole in wall and place fixture; run screw through fixture to be attached and on into shield in wall and fasten tight.
As the screw is tightened the teethed jaws of the shield spread apart driving their projections deep into the wall on either side.
Every carpenter and contractor should have a copy of our beautifully illustrated 70 page catalogue number 30 and free samples.
"Write while the iron's hot."

Star Expansion Bolt Company

Catalogue Department 30 147-149 Cedar Street, New York City

The Warmest Sheathing



Wind and Frost Proof

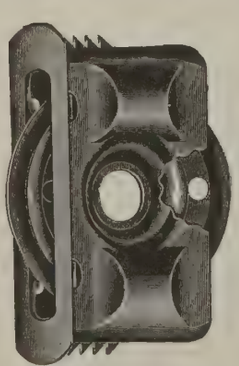
Not a mere felt or paper, but a matted lining that keeps out the cold as a bird's feathers do. Incomparably warmer than common papers, and warmer and cheaper than black plaster. Costs less than 1c a foot. Keeps houses warm in winter and cool in summer. Has no equal as a sound-deadener for floors and partitions.

Send for sample and catalogue—free—of

Cabot's Sheathing "Quilt"

SAMUEL CABOT, Inc., Sole Manufacturers, Boston, Mass.
350 Dearborn Ave., Chicago 1133 Broadway, N. Y.
Cabot's Shingle Stains, Waterproof Cement Stains, Waterproof Brick Stains, Conserve Wood Preservative.

OTTUMWA SASH PULLEYS



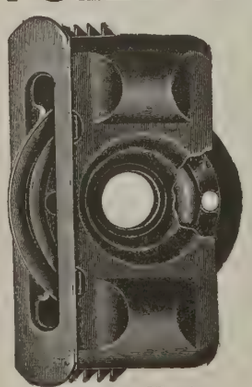
No. 109 Cone Bearing
Fits "Triple" Bit Mortise

Are the best for you to use and specify.

NOTE THE LARGE BEARING

Insures Smooth Action and no Noise.

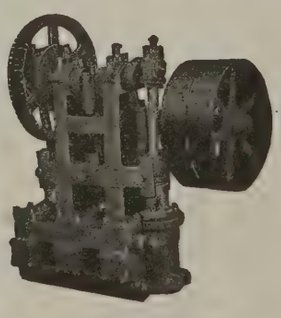
SAMPLES FREE



No. 110 Cone Bearing
Fits "Quad" Bit Mortise

JOHNSTON & SHARP MFG. CO., - - OTTUMWA, IOWA

DEMING PUMPS



Belt driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

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SALEM, OHIO

Hand and Power Pumps for all uses

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NATIONAL BUILDER

Vol. 52 CHICAGO, JANUARY, 1911 No. 1



THE RUSSEL HOUSE

NATIONAL BUILDER DESIGN No. 337

Built at Omaha, Neb., I. P. Hicks, Architect

For Floor Plans, Elevations and Details, See Supplement of This Number. Estimated Cost, Architect's Fees Not Included, $8,671.00

THE RUSSEL HOUSE

A house of stately design recently built at Omaha, Neb., is shown in the supplement sheet this month. The feature that dominates the design is the front portico with classical columns running through two stories by which the design strongly favors the colonial. The dip of the roof at the eaves is another prominent feature of the exterior.

The photograph shows the sweep of the porch along the left side to the large bay window of the sitting room from which access is had to the side steps of the porch.

The exterior is of siding and the roof is shingled. The first floor plan contains the reception hall with seat and stairway to the second floor; a colonnade opens into the parlor from which the sitting room is entered through sliding doors. The dining room is accessible from both the parlor and sitting room. In the second floor are five chambers and the bath room. The house throughout is very conveniently arranged and contains all manner of accommodations not found in the ordinary house. The roof plan is one that is unusually difficult to frame, and it is the subject of an illustrated article in this number, which will interest many readers.

ESTIMATE OF RUSSEL HOUSE*

By I. P. HICKS

EXCAVATING AND MASONRY.

330	yards excavating, 35c	$115.50
9	yards broken stone, $2.50	22.50
6	yards stone chips, $2.25	13.50
28	barrels Portland cement, $2.00	56.00
14	yards sand, $1.50	21.00
46	lineal feet 12x12 flue lining, 40c	18.40
22,500	brick laid in foundation walls, at $13.00	292.50
320	rock face cement blocks, 8x8x16	
215	rock face cement blocks, 4x8x16	
45	rock face cement blocks, 4x4x16	
70	rock face cement blocks, 4x8x16	
4	stone caps for porches, 32x32x3½	
2	stone caps for porches, 32x38x3½	135.00
2	stone caps for porches, 3 ft. 3 in. x 1 ft. 2 in. x 3½	
7	stone window sills, 5 in. x 9 in. x 3 ft. 4 in.	
1	stone window sill, 5 in. x 9 in. x 4 ft. 0 in.	
1	stone door sill, 5 in. x 9 in. x 3 ft. 8 in.	

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

Copyright, 1911, by the Porter-Hodgson Co.

36 M No. 1 W. P. lath, $5.50	$198.00
18 bbls. Ash Grove lime, $1.30	23.40
7¼ tons Fort Dodge plaster, $8.00	58.00
1 ton finish plaster	8.00
24 yards Platte River sand, $1.50	36.00
Total	$997.80

LUMBER BILL.

	Feet.
4 2x8x16 ft. partition plates, basement	84
10 2x4x16 ft. coal bin	110
4 6x8x16 ft. sills	256
1 6x8x18 ft. sills	72
2 6x8x20 ft. sills	160
1 6x8x22 ft. sills	88
2 6x8x14 ft. sills	112
20 2x10x14 ft. sills, first floor joists	460
30 2x10x18 ft. sills, first floor joists	900
26 2x10x16 ft. sills, first floor joists	702
14 2x10x10 ft. sills, second floor joists	189
28 2x10x18 ft. sills, second floor joists	840
30 2x10x16 ft. sills, second floor joists	810
8 2x10x14 ft. sills, second floor joists	184
16 2x6x18 ft. attic joists	192
30 2x6x20 ft. attic joists	600
6 2x6x10 ft. attic joists	60
18 2x6x12 ft. attic joists	216
6 2x6x14 ft. attic joists	84
24 2x6x16 ft. attic joists	384
34 2x4x14 ft. attic ceiling joists	306
34 2x4x16 ft. attic ceiling joists	374
3 2x6x24 ft. hip rafters	72
2 2x6x20 ft. valley rafters	40
2 2x6x18 ft. hip rafters	36
2 2x6x16 ft. hip rafters	32
2 2x6x16 ft. valley rafters	32
20 2x4x20 ft. rafters	260
30 2x4x18 ft. rafters	360
30 2x4x16 ft. rafters	330
20 2x4x10 ft. rafters	130
36 2x4x16 ft. for dormers	396
40 1x4x12 ft. No. 1 com. for bridging	160
60 1x6x12 ft. No. 1 com. for braces	360
40 2x2x18 ft. No. 1 com. for furring	240
60 1x3x10 ft. No. 1 com. for backing	150
6 1x6x16 ft. No. 1 com. for ribbon boards	48
160 2x4x20 ft. outside studding	2,080
90 2x4x20 ft. partitions	1,170
18 2x6x20 ft. partitions	360
100 2x4x18 ft. partitions	1,200
70 2x4x16 ft. plates	770
80 2x4x16 ft. for attic	880
42 2x8x10 ft. porch joists	567
6 2x8x16 ft. porch joists	126
30 2x6x12 ft. ceiling joists, porch	360
4 2x6x16 ft. ceiling joists, porch	64
30 2x4x16 ft. porch rafters	330
Total ft. framing lumber	17,736

17,736 ft. framing lumber, at $28	$496.60
3,500 ft. 8-inch No. 2 Y. P. shiplap, rough floors, $28	98.00
3,800 ft. 8-inch No. 2 Y. P. shiplap outside walls, $28	106.40
500 ft. 8-inch No. 2 Y. P. for tin roofs, $28	14.00
2,700 ft. 6-inch No. 2 Y. P. sheathing for roofs, $27	72.90
24½ M clear R. C. shingles, 5 to 2, $4.75	116.37
4,250 ft. ½x4-inch clear R. C. siding, $32	136.00
20 rolls tarred felt, $1	20.00
700 ft. 1⅛x4 in. x 16 ft. clear fir flg., porch, $50	35.00
550 ft. ⅝x4 in. x 16 ft. clear fir ceiling, porches, $32	17.60
680 ft. ⅝x4 in. x 12 to 16 ft. clear fir, ceiling cornice plancher, $32	21.76
400 sq. ft. 1x6x16 ft. clear fir finish, $50	.20.00
100 sq. ft. 1x4x16 ft. clear fir finish, $50	5.00
400 sq. ft. 1x10x16 ft. clear fir finish, $50	20.00
400 sq. ft. 1x12x16 ft. clear fir finish, $50	.20.00
400 sq. ft. 1x8x16 ft. clear fir finish, $50	20.00
140 sq. ft. 1⅛x12 to 16 ft. clear fir finish, $50	7.00
60 sq. ft. 1⅛x10 ft. corner boards, $50	3.00
200 ft 1x12x16 ft. Y. P. shelves, $50	10.00
60 ft. 1⅛x12x16 ft. Y. P. cellar stairs, $50	$ 3.00
40 ft. 1x8x16 ft. Y. P. cellar stairs, $50	2.00
1,600 ft. ⅜x2¼ face or S. W. O. flg., $80	128.00
2,000 ft. ⅜x2¼ face maple flg., $60	120.00
1,200 ft 1x4 in. Star Y. P. flg., attic, $35	42.00
Total lumber bill	$1,534.63

MILL WORK.

4 porch columns, 22 in. at base, 18 in. at neck, 18 ft. 7 in. long over all, square blocks at base of column 4 in. thick, $20	$80.00
10 porch columns, 10x10 in. x 9 ft. 0 in., No. 2217 W. P., $3.50	35.00
10 square bases, 14 inches square, 1¾ in. thick, 50c	5.00
11 porch newels, 6x6x12 ft. 10 in., W. P., $1	11.00
3 porch newels, 7½x7½x2 ft. 10 in., W. P., $1.25	3.75
800 ft. 1¾x1¾ No. 2007 W. P. balusters, 2c	16.00
2 pcs. bent top rail, No. 2001, $2.50	5.00
2 pcs. bent bot. rail, No. 2002, $2.50	5.00
2 pcs. porch rail, top, 2½x5¼x14 ft. 0 in., 10c	2.80
1 pc. porch rail, top, 2½x5¼x 9 ft. 6 in., 10c	.95
3 pcs. porch rail, top, 2½x5¼x14 ft. 0 in., 10c	4.20
2 pcs. porch rail, top, 2½x5¼x12 ft. 0 in., 10c	1.20
5 pcs. porch rail, bot., 2½x5¼x14 ft. 0 in., 10c	7.00
2 pcs. porch rail, bot., 2½x5¼x12 ft. 0 in., 10c	2.40
1 pc. porch rail, bot., 2½x5¼x 9 ft. 0 in., 10c	.90
1,000 pcs. No. 8005 W. P. mold., 2½c	25.00
120 pcs. No. 8002 W. P. mold, 2c	2.40
1 ice box dr. frame, 1 ft. 8 in. x 2 ft. 4 in. oak sill rabt. outside, 1⅜	2.00
2 pcs. W. P. casing, 1⅛x2½x7 ft. 0 in., 3c	.42
1 sash frame 18x24, 1 lt. Mo. cap slip head, sash to slide up 18 inches	1.50
1 sash, 18x24, 1 lt. 1⅜	1.00
16 ft. No. 8286 W. P., 2¼c	.36
16 ft. No. 8016 W. P., 1¼c	.20
2 pcs. bent crown mold, No. 8005, radius 9 ft. 1¼ in., $2.50	5.00
2 pcs. do., rad. 9 ft. 7½ in., $2.50	5.00
2 pcs. No. 8030, rad. 10 ft. 3¾ in., $2.50	5.00
1 or. circle cone, No. 8061, rad. 7 ft. 9¾ in	1.50
400 ft. dental strips, 1x4, W. P., 3c	12.00
2 pcs. do. 1-3 pitch, 10 ft., 4c	.80
350 ft. No. 8033 W. P. mold., $1.60	5.60
580 ft. No. 8143 W. P. mold., .90	5.52
250 ft. No. 8061 W. P. mold., .70	1.75
120 ft. No. 8285 W. P. mold., 2.30	2.76
1 O. S. dr. frame, 2 ft. 10 in. x 7 ft. 0 in., rab. 1¾ in. oak sill, molded cap	2.50
1 O. S. dr. frame, 2 ft. 8 in. x 6 ft. 8 in., rab. 1¾ in. Mo. cap, oak sill	2.50
3 O. S. dr. frames, 2 ft. 8 in. x 6 ft. 8 in., rab. 1⅜ in., Mo. cap oak sill, $2.25	6.75
1 front dr. frame, 3 ft. 0 in. x 7 ft. 0 in., rab. 1¾, oak sill, side cas., 9½ in., rab. 1¾ in., Mo. cap	2.75
2 side lt. frames, 1 ft. 2 in. x 5 ft. 0 in. x 1¾ in., side cas. 2½ in. side cas 5½ in, tacked on Mo. cap, cas. below sill 2½ in. wide, $2	4.00
1 outside dr. 2 ft. 8 in. x 6 ft. 8 in., 1¾ No. 309 W. P. glazed D. S.	4.50
3 drs., 2 ft. 8 in. x 6 ft. 8 in., 1⅜ No. 309 W. P., No. 309, glazed D. S., $2.50	7.50
1 O. S. dr., 2 ft. 10 in. x 7 ft. 0 in. x 1¾, No. 1078 Q. S. W. O. 2 s. glazed, 1 lt. beveled plate	24.00
1 O. S. dr., 3 ft. 0 in. x 7 ft. 0 in. x 1¾ in., No. 1160 Q. S. W. O., 2 sds., glazed bev. plate, 1 lt	26.00
1 wd. frame, 60x18x42, 2 lt., Mo. cap	2.50
3 wd. frames, 40x30, 2 lt., Mo. cap, $2.25	6.75
2 wd. frames, 32x30, 2 lt., Mo. cap., $2.25	4.50
1 wd. frame, 36x30, 2 lt., Mo. cap	2.25
1 wd. frame, 28x30, 2 lt., Mo. cap	2.25
2 wd. frames, 18x20, 2 lt., Mo. cap., $2	4.00
1 wd. frame, 40x26, 2 lt., Mo. cap	2.25
4 wd. frames, 36x26, 2 lt., Mo. cap, $2.25	9.00
2 wd. frames, 32x26, 2 lt., Mo. cap, $2.25	4.50
1 wd. frame, 30x26, 2 lt., Mo. cap	2.25
1 wd. frame, 26x26, 2 lt., Mo. cap	2.25
1 wd. frame, 20x26, 2 lt., Mo. cap	2.25
2 wd. frames, 18x20, 2 lt., Mo. cap., $2	4.00

1 wd. frame, 20x20, 2 lt., Mo. cap..... $ 2.00
2 sash frames, 36x18, 1 lt., Mo. cap..... 4.00
1 triple frame, 2 side sash 14x25, 1 lt., center wd. 20x12, 2 lt., no head casing, 4 in. mullions, side casing, 10 in. 6.00
2 mullion sash frames, 20x26, 1 lt., no head casing, 4-in. mullions, sash to slide up 12 inches, 11½-in. side casings, $3.50 ..... 7.00
1 piece oak extension sill, 8 ft..... .40
6 pieces sill, 1¾x 2 in. x 2 ft., W. P..... .25
6 pieces casing, 1⅛x11½x3 ft., fir..... .72
7 cellar wd. frames, 12x16, 2 lt., $1.75..... 12.25
1 cellar wd. frame, 16x16, 2 lt..... 2.00
7 cellar sash, 12x16, 2 lt., 1⅜, 80c..... 5.60
1 cellar sash, 16x16, 2 lt., 1⅜..... 1.00
1 wd. 18x20, 2 lt., 1⅜ ck..... 1.50
3 wds., 40x30, 2 lt., 1⅜ ck., D. S., $5..... 15.00
2 wds., 32x30, 2 lt., 1⅜ ck., D. S., $4.05..... 8.10
1 wd., 36x30, 2 lt., 1⅜ ck., D. S..... 4.30
1 wd., 28x30, 2 lt., 1⅜ ck., D. S..... 2.70
1 wd., 40x26, 2 lt., 1⅜ ck., D. S..... 4.35
2 wds., 32x26, 2 lt., 1⅜ ck., D. S., $3.10..... 6.20
4 wds., 36x26, 2 lt., 1⅜ ck., D. S., $3.90..... 14.60
1 wd., 30x26, 2 lt., 1⅜ ck., D. S..... 3.00
1 wd., 26x26, 2 lt., 1⅜ ck., D. S..... 2.35
1 wd., 20x26, 2 lt., 1⅜ ck., D. S..... 1.80
2 wds., 18x20, 2 lt., 1⅜ ck., D. S..... 1.50
1 wd., 20x20, 2 lt., 1⅜ ck., D. S..... 1.65
1 wd., 20x12, 2 lt., 1⅜ ck., D. S..... 1.00
2 sash, 14x25, 1 lt., 1⅜ Div., $1.20..... 2.40
4 sash, 20x26, 1 lt., 1⅜ Div., $1.30..... 5.20
1 sash, 36x18, 1 lt., glazed mitered beveled plate..... 6.00
16 pcs. No. 8085, 8 ft. Q. S. O., 1½c..... 1.92
14 pcs. No. 8084, 12 ft. Q. S. O., 1c..... 1.68
4 pcs. No. 8309, 6 ft. 6 in., birch, 3c..... .89
84 pcs. No. 8309, 6 ft. birch, 3c..... 15.12
28 pcs. No. 8309, 5 ft. birch, 3c 4.20
60 ft. No. 8267 birch, 4c 2.40
70 ft. No. 8381 birch apron, 3c 2.10
270 ft. cap, 1⅛x2¼, birch, No. 8396, 3c..... 8.10
280 ft. cove, 1⅛x1⅛, birch, 1c..... 2.80
22 pcs. 8085, 14 ft. birch, 1¼c..... 3.85
30 pcs. 8084, 14 ft. birch, 1c..... 4.20
580 ft. 8428½, birch, 4c..... 23.20
600 ft. 8422 birch, ½c 3.00
300 ft. 8264, birch, 1½c 4.50
88 base blocks, 1⅛ in. x 4¼ in. x 10 in. No. 1013½ birch, 10c 8.80
1 inside cased opening frame, 8 ft. 0 in. x. 7 ft. 6 in., Q. S. O..... 1.50
1 inside frame, 3 ft. 0 in. x 7 ft. 0 in., Q. S. O..... 1.00
3 inside frames, 2 ft. 8 in. x 7 ft. 0 in., Q. S. O., 90c.... 2.70
3 inside frames, 2 ft. 6 in. x 7 ft. 0 in., Q. S. O., 90c.... 2.70
7 inside frames, 2 ft. 8 in. x 6 ft. 8 in., birch, 80c..... 5.60
5 inside frames, 2 ft. 6 in. x 6 ft. 8 in., birch, 80c..... 4.00
5 inside frames, 2 ft. 4 in. x 6 ft. 8 in., birch, 75c..... 3.75
5 inside frames, 2 ft. 0 in. x 6 ft. 8 in., birch, 75c..... 3.75
1 inside frame, 3 ft. 0 in. x 6 ft. 8 in., birch..... .90
1 window, 60x18x42, 2 lt. ck., top glazed beveled plate, bottom plain plate 35.00
2 side light sash, 10x55, 1⅜ glazed, mitered bevel plate, $4 ..... 10.00
1 pc. 8395, 6 ft. 8in., Q. S. O..... .28
3 pcs. 8395, 5 ft. 0 in., Q. S. O..... .60
3 pcs. 8395, 4 ft. 8 in., Q. S. O..... .56
2 pcs. 8395, 4 ft. 4 in., Q. S. O..... .40
3 pcs. 8395, 9 ft. 0 in., Q. S. O..... 1.08
2 pcs. 8395, 7 ft. 0 in., Q. S. O..... .56
3 pcs. 8395, 4 ft. 0 in., Q. S. O..... .48
9 pcs. 8395, 3 ft. 6 in., Q. S. O..... 1.28
2 pcs. cap, No. 8410, 7 ft. 4 in., Q. S. O..... .60
3 pcs. cap, No. 8410, 4 ft. 4 in., Q. S. O..... .52
9 pcs. cap, No. 8410, 3 ft. 10 in., Q. S. O..... 1.44
3 pcs. cove, 1⅛x1⅛, 9 ft. 6 in., Q. S. O..... .42
2 pcs. cove, 1⅛x1⅛, 7 ft. 6 in., Q. S. O..... .22
3 pcs. cove, 1⅛x1⅛, 4 ft. 6 in., Q. S. O..... .21
9 pcs. cove, 1⅛x1⅛, 4 ft. 0 in., Q. S. O..... .54
210 ft. 8428½, Q. S. O., 5c..... 10.50
220 ft. 8422, Q. S. O., 1c..... 2.20
242 ft. 8464, Q. S. O., 2c..... 4.84
12 pcs. 8309, 12 ft. Y. P., 2c..... $ 2.88
2 pcs. 8267, 14 ft. Y. P., 3c..... .84
200 ft. 8428½ Y. P., 4c..... 8.00
7 oak thresholds, 3 ft. 1 in., 15c..... 1.05
260 ft. 8422 Y. P., ½c..... 1.30
350 ft. 8379 Y. P., 2½c..... 8.75
34 base blocks, 1⅛x4¼x10 in., No. 1013½, O. S. W. O., 10c 3.40
8 blocks do. Y. P., 5c..... .40
4 pcs. plate rail, 12 ft., Q. S. W. O..... 4.80
1 pc. nosing, 1⅛x3¾x16 ft., Y. P..... .64
1 pc. nosing, 1⅛x3¾x 6 ft., Y. P..... .24
4 pcs. 8309, 7 ft. 0 in., Q. S. W. O..... 1.12
34 pcs. 8309, 6 ft. 6 in., Q. S. W. O..... 8.84
16 pcs. 8309, 6 ft. 0 in., Q. S. W. O..... 3.84
1 pc. 8267, 6 ft. 8 in., Q. S. W. O..... .35
3 pcs. 8267, 5 ft. 0 in., Q. S. W. O..... .25
3 pcs. 8267, 4 ft. 8 in., Q. S. W. O..... .70
2 pcs. 8267, 4 ft. 4 in., Q. S. W. O..... .45
1 pc. cap, No. 8410, 7 ft. 0 in., Q. S. W. O..... .21
3 pcs. cap, No. 8410, 5 ft. 0 in., Q. S. W. O..... .45
3 pcs. cap, No. 8410, 4 ft. 8 in., Q. S. W O..... .42
1 head cas., 8397, 6 ft. 8 in., Q. S. W. O..... .35
3 head cas., 8397, 5 ft. 0 in., Q. S. W. O..... .75
3 head cas., 8397, 4 ft. 8 in., Q. S. W. O..... .70
2 head cas., 8397, 4 ft. 4 in., Q. S. W. O..... .45
1 pc. cove, 1⅛x1⅛x7 ft. 0 in., Q. S. W. O..... .10
3 pcs. cove, 1⅛x1⅛x5 ft. 4 in., Q. S. W. O..... .20
3 pcs. cove, 1⅛x1⅛x5 ft. 0 in., Q. S. W. O..... .18
2 pcs. cove, 1⅛x1⅛x4 ft. 8 in., Q. S. W. O..... .12
3 pcs. apron, 8397, 9 ft. 0 in., Q. S. W. O..... 1.08
2 pcs. apron, 8397, 7 ft. 0 in., Q. S. W. O..... .56
3 pcs apron, 8397, 4 ft. 0 in., Q. S. W. O..... .48
9 pcs. apron, 8397, 3 ft. 6 in., Q. S. W. O..... 1.28
3 pcs. cap, No. 8410, 9 ft. 4 in., Q. S. W. O..... .84
1 door, 2 ft. 10 in. x 7 ft. 0 in., 1¾, No. 1078, Q. S. W. O., 2 sds., gla., 1 lt., bevel plate, 24x36..... 22.00
6 drs., 2 ft. 8 in. x 6 ft. 8 in. x 1⅜, No. 381, birch, 2 panel, $6 ..... 36.00
6 drs., 2 ft. 6 in. x 6 ft. 8 in. x 1⅜, do. $6..... 36.00
6 drs., 2 ft. 4 in. x 6 ft. 8 in. x 1⅜, do. $5..... 30.00
4 drs., 2 ft. 0 in. x 6 ft. 8 in. x 1⅜, do. $4..... 16.00
2 med. case drs., 1 ft. 8 in. x 2 ft. 8 in. x 1⅛, 1 lt., birch, gla. bevel plate mirror, 16x28 in., $3..... 6.00
2 clothes chute drs, 11x16x⅞ in., birch, 1 panel, $1.25.. 2.50
2 med. case frames, 1 ft. 8 in. x 2 ft. 8 in., 6¼ in. deep over all, 3 adjustable shelves..... 2.50
2 inside cols., 7½x7½x5 ft. 6 in. over all, No. 1301, Q. S. W. O., mitered corners, square box..... 40.00
2 inside pedestals, 2 ft. 0 in. high, 1 ft. 9 in. out from jambs, case 4¼ inch, base 8428½, No. 1302, Q. S. W. O. 15.00
1 birch case drawers, in bedroom 20.00
1 birch case drawers on first floor..... 18.00
1 birch case drawers in pantry 15.00
2 china closet drs., 2 ft. 4⅞ in. x 4 ft. ¼ in. x 1⅛, 1 lt., D. S., $2..... 4.00
1 birch case in pantry..... 12.00
10 pcs. 8084, 12 ft. 0 in., Y. P..... 1.50
1 rim, rear box stairs, birch..... 30.00
1 rim box stairs, Y. P., attic..... 20.00
2 Y. P. newels, 5x5x3 ft. 2 in., sqr. box, Mo. cap., $3... 6.00
1 pc. rail, No. 1180, 16 ft. Y. P..... .80
50 balusters, 1⅛x1⅛x2 ft. 8 in., Y. P., square, plain.... 2.00
2 birch C. C. drs., 1 ft. 11¼ in. x 4 ft. ¼ in. x 1⅛, 1 lt., D. S., $2 ..... 4.00
2 birch cupboard drs., ope. for doors, 4 ft. 7 in. x 2 ft. 4 in., drs. 1⅛, 2 flat panels, rab. center..... 5.00
1 vestibule dr., 3 ft. 0 in. x 7 ft. 0 in. x 1¾, No. 1145, Q. S. W. O., 2 sds., gla. bevel plate, 22x58 in..... 24.00
1 dr., 2 ft. 8 in. x 6 ft. 6 in. x 1⅜, 5 + panel, Y. P... 2.60
3 drs., 2 ft. 6 in. x 6 ft. 6 in., 1⅜, 4-panel..... 6.00
1 ice box dr., 2 ft. 6 in. x 2 ft. 8 in., 1⅜, 2-panel, W. P. 2.00
1 run O. S. W. O. main stairs, 35 ft., ⅜x2 in. face, O. S. W. O. flg. 120.00
1 O. S. W. O. oak seat in hall..... 5.00
20 balusters, 1⅛x1⅛x2 ft. 8 in., Y. P., plain sqr..... 1.20
3 ft. No. 1182 Y. P..... .30
7 pcs. No. 8309, 6 ft. 6 in., birch..... 1.84

12 birch blocks, No. 1013½, 1⅛x4¼x10 in., 8c	$ 0.96
1 ice box dr., 1 ft. 8 in. x 2 ft. 4 in., 1⅜, 2-panel	2.00
1 piece No. 8428½, 14 ft., birch	.70
1 inside dr. frame, 2 ft. 4 in. x 6 ft. 8 in., birch	.80
1 inside dr. frame, 2 ft. 8 in. x 6 ft. 8 in., Y. P	.65
1 slide dr. frame, 6 ft. 0 in. x 7 ft. 6 in., O. S. W. O., 4 side jambs, ⅞x5, 1 head jamb, ⅞x12 in.	3.00
60 ft. 8428½, Q. S. W. O., 8c	4.80
8 pcs. 8309, 12 ft., Q. S. W. O	3.89
2 pcs. 8397, 12 ft., Q. S. W. O	.96
1 pc. 8397, 14 ft. birch	.56
10 shelves, 1 x 18 in. x 3 ft. 6 in., red cedar	6.00
5 shelves, 1 x 14 in. x 4 ft. 0 in., red cedar	3.00
5 shelves, 1x14 in. x 2 ft. 8 in., red cedar	2.00
1 front screen dr., 3 ft. 0 in. x 7 ft. 0 in., No. 449, Q. S. W. O	3.50
1 screen dr, 2 ft. 10 in. x 7 ft. 0 in., No. 447, Q. S. W. O.	3.50
1 screen dr., 2 ft. 8 in. x 6 ft. 8 in., No. 499, Q. S. W. O.	2.75
3 screen drs., 2 ft. 8 in. x 6 ft. 8 in., 1⅛, W. P., $1.90	5.70
6 cellar sash screens, 12x16, 2 lt	3.00
3 wd. screens, 40x30, 2 lt., $2	6.00
2 wd. screens, 32x30, 2 lt., $1.75	3.50
1 wd. screen, 36x30, 2 lt.	2.00
1 wd. screen, 28x30, 2 lt.	1.75
2 wd. screens, 18x20, 2 lt., $1.50	3.00
1 wd. screen, 40x26, 2 lt.	2.00
4 wd. screens, 36x26, 2 lt., $2	8.00
2 wd. screens, 32x26, 2 lt., $1.75	3.50
1 wd. screen, 30x26, 2 lt.	1.75
1 wd. screen, 26x26, 2 lt.	1.70
1 wd. screen, 20x26, 2 lt.	1.50
1 wd. screen, 20x12, 2 lt	1.20
1 wd. screen, 20x20, 2 lt.	1.30
4 sash screens, 20x26, 1 lt., $1	4.00
1 sash screens, 18x24, 1 lt	1.00
Total cost mill work	$1,374.95

CARPENTER LABOR.

17,736 ft. framing lumber, $10	$ 177.36
7,800 ft. boarding, $10	78.00
2,700 ft. roof boarding, $10	27.00
24½ M shingles, $2.25	55.12
4,250 ft. siding, $1.50	63.75
Add for mitered corners	12.00
700 ft. porch floor, $1.50	10.50
550 ft. porch ceiling, $1.50	7.75
1,120 lineal ft. cornice, 15c porch work	168.00
1,600 ft. oak flooring, $35	56.00
2,000 ft. maple flooring, $35	70.00
1,200 ft. Y. P. flooring, $20	24.00
Finishing 8 cellar window frames, $1.25	12.00
4 cellar door frames, $2	8.00
3 outside doors, $4	12.00
3 outside doors, $3	9.00
1 vestibule door	3.50
1 set sliding doors	10.00
1 cased ope	8.00
1 cased ope	2.00
28 doors, $3	84.00
24 windows, $2.50	36.00
Setting door jambs	8.40
Setting window frames	7.20
Attic frames	12.00
Inside base, 1,050 ft., 5c	50.25
Plate rail	5.00
Picture molding	10.00
Setting up cellar stairs	5.00
Setting up attic stairs	15.00
Setting up rear stairs	20.00
Setting up front stairs	40.00
Pantry work	20.00
Case first floor	8.00
Case second floor	8.00
Medicine cases	5.00
Closets	10.50
Porch work	60.00
Hanging screens	20.00
Incidentals, 10 per cent	123.83
Total estimate	$1,362.16

RECAPITATION.

Excavating and masonry	$ 997.80
Lumber bill	1,534.63
Mill work	1,374.95
Carpenter labor	1,362.16
Hardware and nails	200.00
Plastering	475.00
Heating (hot water)	600.00
Plumbing	700.00
Electric wiring	90.00
Tin work	157.00
Painting	457.00
Fireplace	100.00
Tile floors	65.00
Cellar cementing	145.00
Incidentals, 5 per cent	412.92
Total estimate	$8,671.46

ESTIMATING THE HEATING SURFACE OF A BUILDING

In his work, "Baldwin on Heating," William J. Baldwin gives the following rules for estimating the amount of heating surface necessary to maintain the heat of the air of enclosed spaces in buildings to the desired temperature:

The heating surface necessary to warm a room, of course, should be proportional to the cooling surface, and the glass of the windows and the outside walls form the largest factors in cooling. The glass which forms the windows forms the highest cooling factor in ordinary practice, and it may be taken as 1,000, in which case the following table shows approximately the value of other building materials:

Window glass	1,000
Oak and walnut sheathing on walls	66 to 100
White pine and pitch pine	80 to 100
Lath and plaster, walls good	75 to 100
Lath and plaster, common	100 to 150
Common brick (rough)	150
Common brick (hard finish)	200
Common brick (hollow walls, hard finish)	150
Sheet iron	1,100 to 1,200

A square foot of glass and a square yard of ordinary outside wall have about the same cooling value. It has been found that 1 square foot of heating surface with steam at 1 pound pressure will just about offset the cooling done by 2 square feet of glass, when the outside temperature is 70 degrees. This is so well established now that it need not be questioned. In the early days of steam heating the writer was acquainted with this fact, and he devised the following rule:

Divide the difference in temperature between that at which the room is to be kept and the coldest outside atmosphere, by the difference between the temperature of the steam pipes and that at which you wish to keep the room, and the product will be the square feet, or fraction thereof, of pipe surface to each square foot of glass (or its equivalent in wall surface).

Thus: Temperature of room, 70 degrees; less temperature outside, 0; difference, 70 degrees. Again: Temperature of steam pipe, 212 degrees; less temperature of room 70 degrees; difference, 142 degrees. Thus: 70÷142=0.493, or about one-half of a square foot of heating surface to each square foot of glass, or its equivalent.

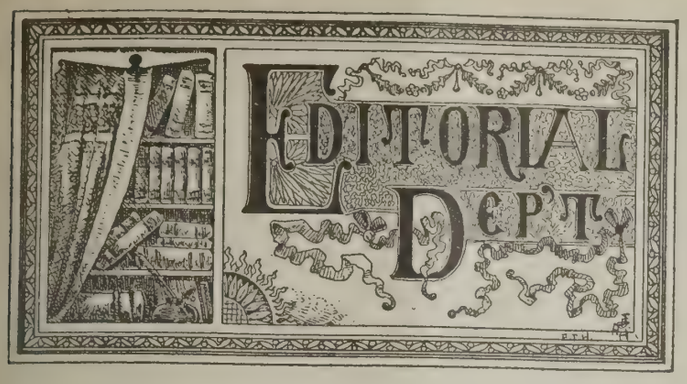
It must be distinctly understood that the extent of heating surface found in this way offsets only the windows and other cooling surface it is figured against, and does not provide for cold air admitted around loose windows, or between the boarding of poorly constructed wooden houses or for ventilation. These latter conditions, when they exist, must be provided for separately.

Sometimes orders are procured by simply exhibiting photographs of buildings previously remodelled with the improved lighting sash. There is considerable work ahead for the trade in this line.

Warman—"Ours is the worst neighborhood for gossip I ever saw."

McNix—"Why so?"

Warman—"If they see carpenters coming out of your house they'll pass it around that you're keeping boarders."



1911!!

Wishing each and every one of you, a happy, peaceful, and prosperous New Year.

* * *

Let the good resolutions made at the first of the year, remain with you, and hold fast to you, during the whole of this 1911.

* * *

It has been the custom for several years with many of our readers who are employers of labor, to gladden the hearts of a number of their deserving workmen each year, by presenting each of them with a paid-up subscription to THE NATIONAL BUILDER, for the incoming year. This is an excellent custom, and one that must commend itself to people who are desirous of bettering the conditions of their working men. The generosity of the employers is more than amply rewarded by the better efforts, and improved efficiency of the men receiving the journal. You have not adopted this custom, of giving to your younger employers, some token or reward for their services rendered or services anticipated, should try this experiment, and we are convinced you will be agreeably surprised. You need not confine your gifts to the giving of THE NATIONAL BUILDER. There are many suitable books advertised in our pages, from which some special one, particularly adapted to the requirements of the individual for whom the gift is intended, that could be presented with profit to both giver and receiver, besides, it is always more "blessed to give than to receive."

* * *

There are other things besides "THE NATIONAL BUILDER," or technical books, that may be suitable and appropriate gifts to workmen. Take for instance, a pair of saws. "A cut-off and a rip"—or the one hundred and one other tools, such as planes, chisels, hammers, mitre boxes, scrapers and gauges. What better gift to a plasterer, or a bricklayer than a set of trowels, pointers, plaster molders, floats, etc.? These little evidences of appreciation by the employer, when given in a proper spirit, will most assuredly bring back profits on the investment, added to by the gratification of knowing you have helped on the road to success, a struggling laborer, whose load of home responsibilities, debarred him from purchasing the class of tools that would enable him to perform a greater and a better service in a shorter time. An old Scotch saying has it, "That naething is lost a freend gets," might be amended and made to read—"That what ye gae to yer deserving workmen, is money saved."

* * *

Dealers who advertise in this, or similar journals, and who have no further use for this paper, after looking over it, would be doing themselves and some deserving workmen, good service by giving their paper to them as they are published, instead of casting them into the waste-basket or throwing them on the floor for the office boy to destroy. It may be that in some instance or another, you may, by this little act of kindness, kindle a spark of action or genius, that will one day be of great importance to the world at large. "Do good and be happy!"

* * *

The policy of THE NATIONAL BUILDER, has always been of a conservative kind. We have at all times refrained from "blowing trumpets or beating drums," or announcing ourselves as the "biggest thing on earth," and have confined ourselves to "pegging away" in our own sphere of influence, that is to say, we have made no attempts to invade the domains that properly belong to the purely high class architectural journals such as "The American Architect," "The Western Architect," "The Architectural Record," and a few others, but have contented ourselves with working among contractors, operative builders, and decorators, and in these fields, we are vain enough to think we have been fairly successful, owing in a great measure, we fancy, to the fact, that we know—from personal knowledge—what to serve up to readers in these classes, and, we imagine, we have served it up in such a manner as to be acceptable to those for whom the meats were intended; as evidence of this, we have but to call the attention of our readers to the figures showing our circulation. No journal devoted to the interests we represent, ever before had a circulation as large as these figures show, either in this country of "immensities," or in Europe; but these figures were not reached without effort, and a very large expenditure. We are not given to boasting or of making promises, but sometimes it is necessary to inform readers of some of the things they may expect during the coming year, and because some of our subscribers have intimated they would like to get information on the several subjects asked for in their correspondence. We have engaged the services of an expert to prepare for our pages, a series of articles on STEEL CONSTRUCTION, also wood and steel construction, and brick, concrete, and steel construction. A series of papers on Architectural Drawing, lettering, etc., will be continued. A column of real practical hints and methods will appear each month, and articles of interest to the workman, contractor and builder, will be furnished by our regular correspondents, and our question and answer columns will give every reader of the paper a chance to ask for any information he may want, also opportunities to air his views on any of the subjects submitted or discussed. We can safely say to our readers that the NATIONAL BUILDER for 1911 will equal in every particular, and excell in many, any previous issue of the paper, and this is saying a great deal.

* * *

While some people live in cellars, others live in $25,000 rented flats. Until lately no millionaire in New York could, if he wished, pay a higher rental than $20,000 a year for his flat. But that disability has now been removed. They are building in Fifth avenue a block of flats, seventeen in number, each of which is to be rented at $20,000 a year. Each flat contains eighteen rooms, of which the four principal rooms—salon, dining and living rooms, and gallery—cover an area of 2,500 feet, which can be converted at will into one immense hall for entertaining. Each flat has its own elevator, refrigerating plant, and incinerating apparatus for the destruction of refuse, as well as vacuum cleaners and electric laundry and ironing machinery. Of course the appointments of the living rooms are amazingly luxurious.



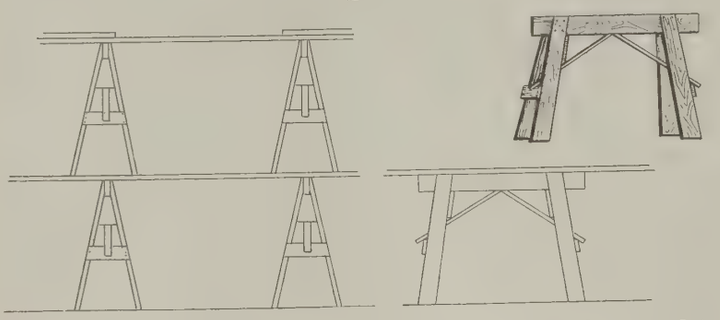
THE IMPORTANCE OF SAFE SCAFFOLDING

By OWEN B. MAGINNIS

AMONG the numerous auxiliaries employed in, or essential to safe and successful building construction, there is none more important than the scaffolding, so in this article it is my intention to consider it in its most practical sense and analyze some details.

The word or technical term "scaffold" is very ancient, like the trade or art itself, having been employed in building and engineering works from time immemorial, but as it is not the purpose

Fig. 1.



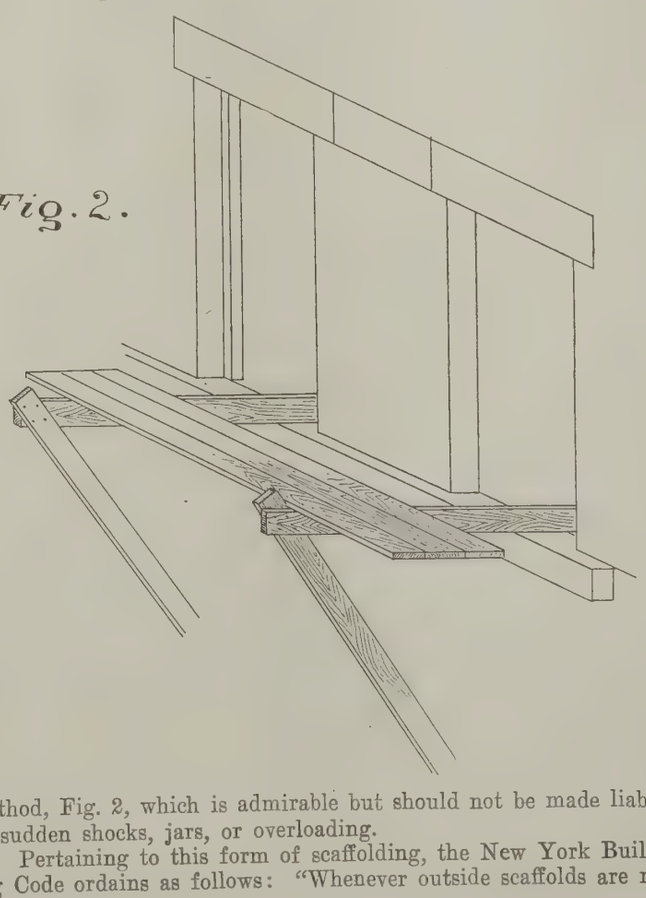
of this article to treat the subject historically, we will proceed to the actual modern practice.

Primarily of course, the first and perhaps the most useful appliance we meet with for ordinary heights, is the sawhorse, or mason's horse, familiar to all readers, but they can be built up to any height in tiers as shown at Fig. 1, where a series of two tiers is represented.

Assuming that one row of horses gives a height of 4 or 5 feet, two would give 8 or 10 feet 2 inches, the thickness of the planks being added, so 3 tiers would give 12 feet 4 inches or 15 feet 4 and so on, as required to the height desired.

The old form of pole and putlog scafford is rarely now used on the western hemisphere, having been superseded, either by a series of sawn square timbers framed or cleated together after the fashion of Fig. 3, or the adoption of the outrigger or thrust-out

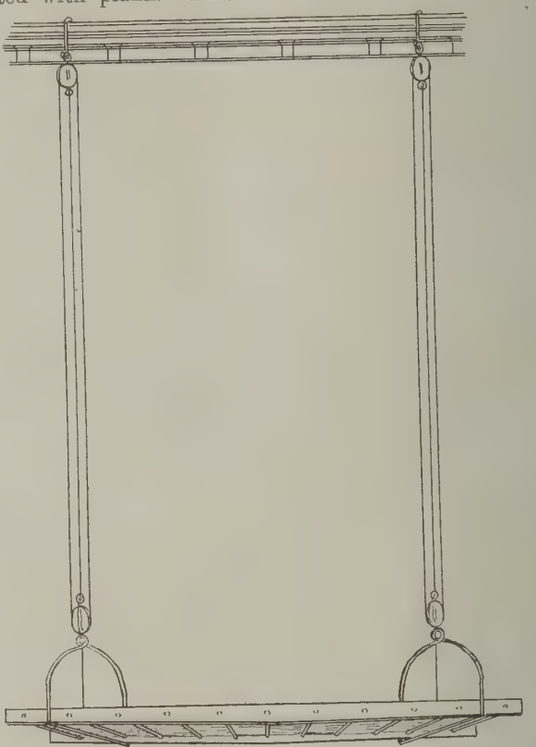
Fig. 2.

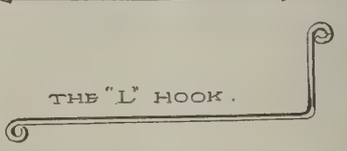


method, Fig. 2, which is admirable but should not be made liable to sudden shocks, jars, or overloading.

Pertaining to this form of scaffolding, the New York Building Code ordains as follows: "Whenever outside scaffolds are required to carry on the construction of buildings over eighty feet in height, whether the same be constructed by poles or thrust-out scaffolds, there shall be erected on its outer edge and ends an enclosure of wire netting of not over two-inch mesh, or of boards not less than three-fourths of an inch thick, placed not over one and one-half inches apart, well secured to uprights, not less than two inches by four inches, fastened to planks on timbers and resting on putlogs or thrust-outs. * * * The said thrust-outs shall be not less than three-by ten of spruce or yellow pine and to be doubled or trippled, as may be required for the load to be carried, and to be thoroughly braced and secured; or said timbers can be in one stick in proportion to the load.

The flooring on thrust-outs and putlogs shall be tightly constructed with plank. This said floor and enclosure shall not be





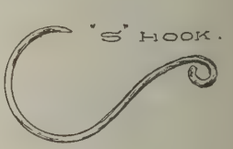
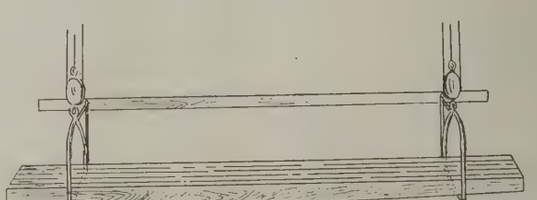


Fig. 4.



removed until a like floor and inclosure is already prepared and in position on the story above."

From the foregoing excerpt, builders will realize how the pedestrian public is protected, but those who are practical will note that the safety of this form of scaffolding is entirely dependent upon the strength of the timber, and as accidents have already occurred through the sudden fracturing of a thrust-out, it behooves both the foreman or whoever is directing the operations and the men also to examine each timber minutely, though to my mind

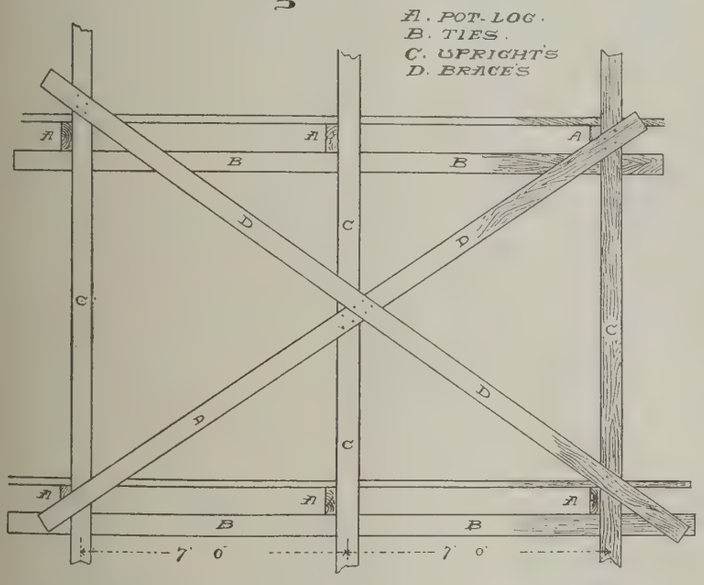
it would be better to add supporting braces indicated in the sketch, if a footing can be found for the bottom ends, which may be often obtained on the sills below.

At this juncture, we must take up the matter of nailing, when putting up the different parts of scaffolds together. This should be done most carefully, and not in the slipshod fashion in which I often see it done. If cut nails are used, they shoud have their flat sides running parallel with the grain of the wood, be dovetailed or driven in an oblique ar slanting direction, well in, until the head is buried in the woody fibre. It is a dangerous mistake not to drive them home, and I once, in the east, knew a buidler who was so anxious to save nails that a scaffold broke, a carpenter was killed, and $2,000 of the builder's money went to console the widow and children.

Similarly, it is not always wise to trust too much to the bearing value of nails, so when a scaffold is to be weighted with materials, it would be well to nail cleats, or blocks under the putlogs or ledgers to gain extra strength and safety.

For scaffolds for great height, there is no method which excels that represented in Fig. 3, which is, as all readers will note, simply the reliable, time-honored system of diagonal bracing worked out in elevation as a series of squares, oblongs or paralellograms, the uprights being the sides, the putlogs or bearing ledgers, the top and bottom lines, and the braces the diagonals. The nailing and bolting is as usual.

Fig. 3.



For outer or front wall scaffolds of this description, I would recommend that the outside, or street side line of uprights, be battered, or sloped from the edge of the sidewalk or curb line up, and that the whole structure be securely bound to each rising and succeeding tier of floor-beams, with cables or ropes.

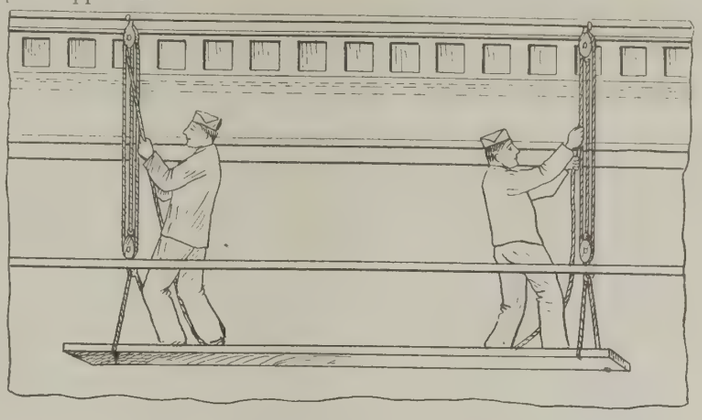


This cut shows two trusses and a plank used as a temporary stage. This arrangement is simple but very strong and firm.



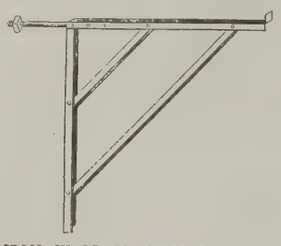
This Standard, or Parlor Truss, is usually made in sets of six or more. With a set of six and a few planks a scaffold for frescoing a room 15x25 ft. can be very quickly made. Height, 6 to 12 ft.

Coming now to the subject of swinging scaffolds which in these days of the construction of very high buildings play so important a part, I would draw the attention of readers to the illustration where a scaffold of this character is shown swung ready for the mechanics. It is used by masons and bricklayers for pointing up and washing down, in masonry and brickwork, by painters for their work, also for whitewashing or repairs, as the occasion demands, and it is therefore a very essential part of a builder's plant. In this sketch is shown also the necessary hook which combined with the blocks and tackle make up the whole complete appliance.

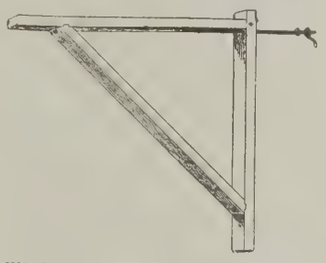


SCAFFOLDING.

Let me here dwell for a moment on the value of a knot Fig. 4, and readers will see that to be safe, and to be able to work

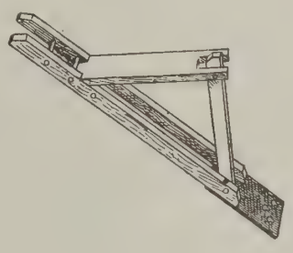


IRON WALL BRACKET FOR PAINTERS AND DECORATORS.



WOODEN WALL BRACKET FOR CARPENTERS, PAINTERS AND DECORATORS

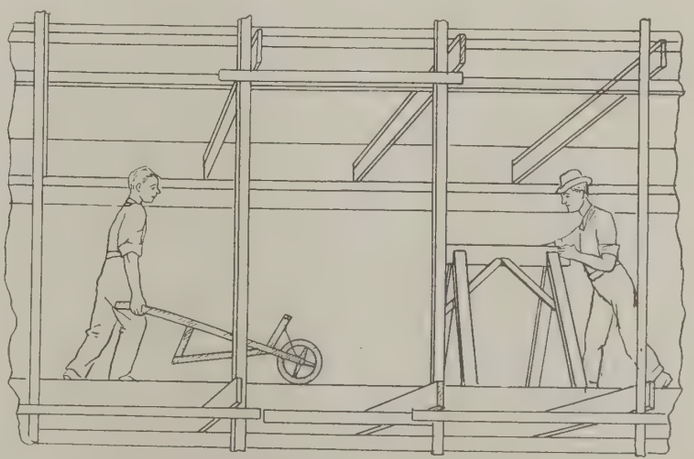
easily and without danger—each man must make his knot properly and thoroughly on either end of the scaffold platform lest it may drop and the mechanic be precipitated to the ground below. And



FOLDING SHINGLING BRACKET.

then how is this knot to be made?

It is simple enough, but must be sure. So many things are so simple and not always sure. A simple half hitch turned over the hook and it will hold, but hempen ropes are unreliable in wet weather and should be knotted with an 8-knot or a timber hitch.



The remaining illustrations show the best forms of scaffolds for modern work.

As under each caption and figure their value is explained, I do not deem them worthy of extensive description. Suffice that they are valuable and necessary are easily within the scope of the construction of the practical builder.

In connection with the swinging scaffold subject, I might state that there are in present use many forms of patented kinds, some being hung with wire ropes, and some by steel rods butted together. The former are hung from projected I beams, set on the roof tier of beams of the steel frame of the building. The cables are lowered or raised by means of endless chains as ropes working on a screw and pawl set on the beams. I regret that the inventors will not allow the publication of their designs, so readers must perforce use their own observation in the cities where these scaffolds are in daily use on high building construction.

Finally, as there is dependent so much on safe scaffolding and successful building, I would conclude this article by saying, "Surely the whole splendid cause of building construction has numbered enough martyrs, and surely it is not too much to ask that all scaffoldings should be safe, in order that craftsmen, artisans and laborers can execute their work with a sense of security and profit.

If this article can draw the attention of the building community in this direction. I shall have reason to be thankful.

ADVICE TO ASPIRING CONTRACTORS

By CHAS. ANDERSON

AS another springtime approaches with all indications of another record year for builders, there will no doubt be a large number of journeymen carpenters and other building tradesmen making their initial step as contractors. In the writer's opinion there could be no more opportune time to offer a few words of advice.

It is not my purpose to try to discourage any, but it is an undeniable fact that probably not more than 10 per cent of those who start into business succeed from the first. Some fail once and succeed on the second attempt; while a great many of the most prosperous business men of today have failed three times before they have succeeded.

It would seem that many must learn from actual experience how to overcome the many snares that lie in the path of the business man before they are able to steer around the dangerous shoals that cause wrecks.

The late P. T. Barnum once said that a man must fail three times before he knew how to succeed. The writer believes that business is being reduced more and more to a science year after year, therefore a great many business disasters could be averted if the inexperienced man would profit more by the advice of others who have made a success, instead of relying so much on his own individual judgment.

CONTRACTING VS. OTHER BUSINESS.

The contracting business is one of those peculiar undertakings that require very careful and judicious management; it is unlike almost any other business.

The merchant has his business concentrated in one place where he can watch it, while with the contractor his work is scattered, a job here, another there, etc. It is impossible for a man to be everywhere at the same time, he therefore is compelled to trust largely to hired help. There are a great many leak holes where the profits may be lost that the inexperienced contractor may never think of until too late. Perhaps one of the largest leaks is the loss of materials (stolen from the work). The writer knows of a case in an eastern city where a builder was erecting a row of dwellings recently who lost something like $1,000 worth of materials in this way, and finally was compelled to put on a night watchman. This is getting to be an item that the contractor must take into consideration when making his estimates. There is so much material that cannot be placed under lock and key, and many people seem to think that a few boards, a 2x4 inch, a bundle of lath or shingles, will never be missed from a large pile. Needless to say, many a contractor's profits are badly cut into in this way.

THE BUSINESS END.

There are many A-1 mechanics who make the mistake of thinking that their mechanical ability will carry them through. This is, indeed, a serious blunder; some of the best mechanics have made the greatest failures. Unless you have a fair knowledge of business tactics the writer would advise leaving contracting alone until you first take up a commercial course. In fact, the business end is the more essential of the two; you can hire good mechanics, but it is very difficult to hire the business head that will work to your interest. Business systems for contractors will be made the subject of a future article, as space does not permit dealing with it here.

SOME COMMON ERRORS MADE.

First, many take there first contract too cheap in order to get started, and never do the second.

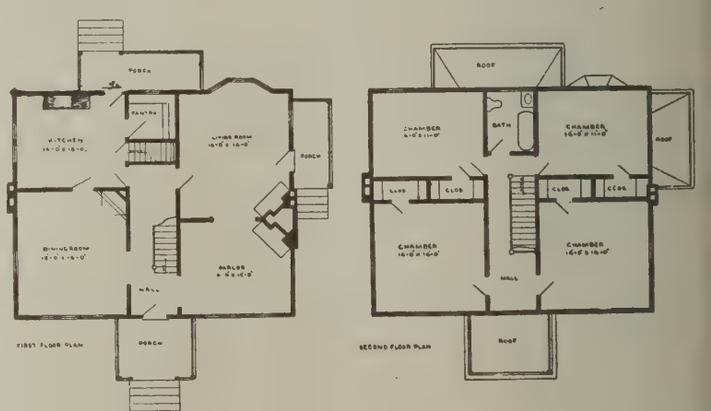
Second, some take too much work; more than they can properly attend to or perhaps finance. It must be remembered that there is more profit to be made out of one job well managed than out of two jobs neglected; it is not always the man with the most work on hand, employing the largest crew, that is making the most money.

When you have more work than you can take care of properly you cannot give satisfaction to your customers. (A satisfied customer is your best ad.) Do not try to get every job in sight in order to look big.

Third, improper and inexplicit plans and specifications are the cause of many failures; with such you are often called upon to do more than you figured on doing. Know exactly what you must do before you sign a contract; it is not wise to be too exacting in small matters, but many beginners are overzealous to please and allow themselves to be imposed upon. Diplomacy used in the right manner will usually let you out of such positions without causing friction. The contractor must always carry himself cool and collected; consider well before you act or speak.

Fourth, the purchasing of supplies, estimating, handling the prospective builder, handling help, etc., are very important considerations that will be dealt with later.

(To be continued.)





HOUSE OF MODERATE COST.



A HANDSOME PILE OF BRICKWORK.



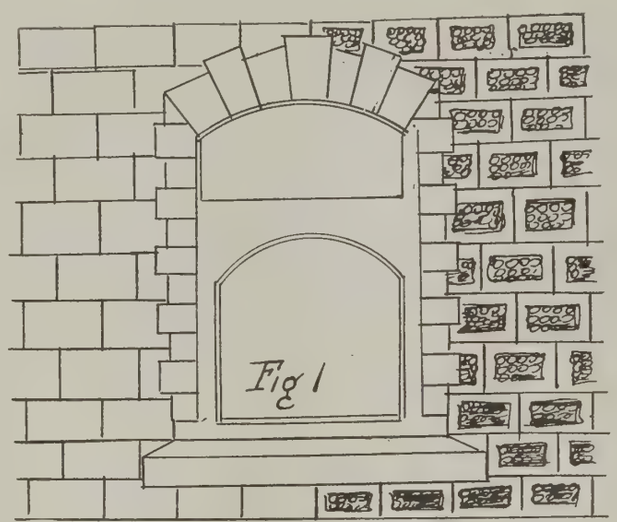
A BRICK BUNGALOW ON THE IRISH COAST.

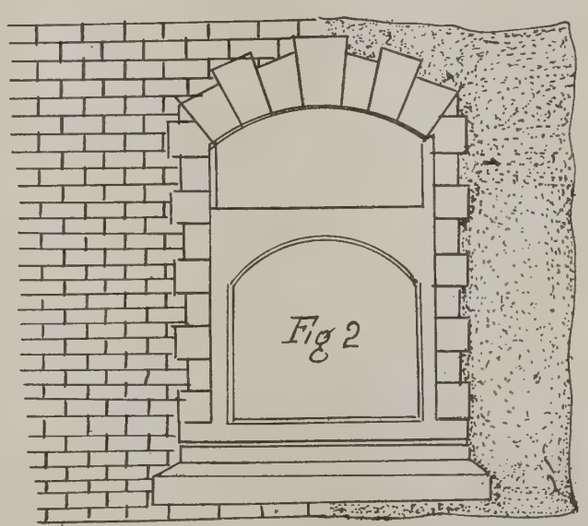
CASEMENT WINDOWS AND CEMENT BLOCKS

By GEORGE RICE

THE accompanying drawings were made from models of casement windows and cement blocks seen by the writer. The elevations are of the common type of mullion casement window with sash and fixed transom. In Fig. 1 the sash is set up in random coursed stone, on the exterior of which are the patterns of cement blocks. Each figure shows two styles of settings, one style on either side.

In some cases roughly squared ashlar is used in the frame. Dressed stone jams are required and a sill and segmental arch. But it is mainly of the cement wall we write in this article. There has been considerable progress in this line of work in all parts of the country in the past few years, as is well known to builders and contractors. Nearly all of the firms are obliged to put in apparatus for working with the stones of cement.





The draughting rooms of the architects are full of plans with hollow blocks as the center about which the work of building hinges. Wherever the writer visited he was confronted with plans of which the architects and builders are going to do with the ever-increasing designs of hollow blocks made from cement. Therefore in many of the offices I noticed sketches drawn up with various types of hollow block architecture as a part of the plan, as in the accompanying illustrations. One of the schemes for showing the effect of the cement block combination consists in erecting the casements in small size and building with the blocks, as in the cuts.

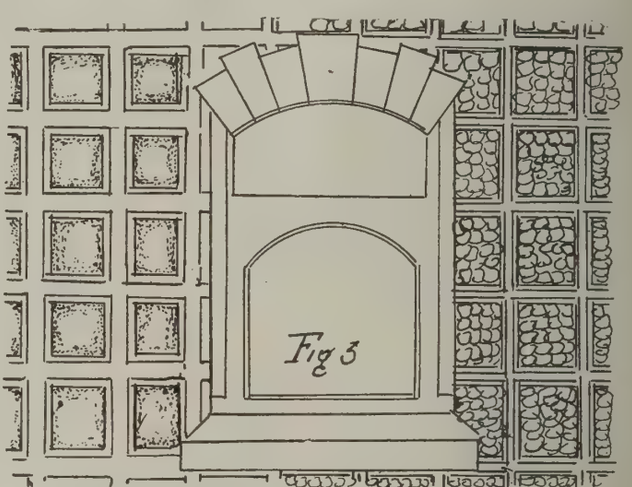
It is very easy to handle the little model blocks. Some very unique designs of architecture can be worked out in the office and the table of the architect. In one place they showed me a mill with very artistically patterned windows, set in hollow block designs.

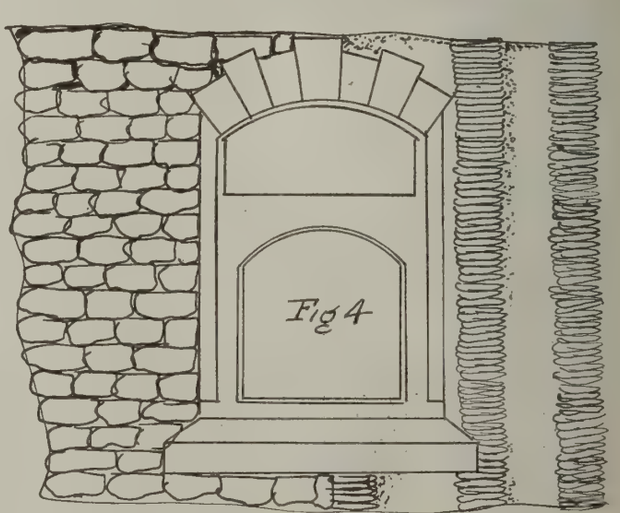
Undoubtedly the era of design in the hollow cement block is at hand. While the plain blocks are almost always preferable from a building standpoint, no harm is done in having the face of the blocks indented with floral or figure design, providing that the designs do not sink too deeply into the body of the stone. I saw some very much weakened blocks in one model of a building, due to the impressions and indentures which were necessary in order to model the figures on the front of the blocks. But for the common pattern which is used on blocks, no material weakness results. In the cut in question the blocks on one side of the casement are entirely smooth. The smooth block is always popular.

The users of hollow blocks select the smooth, firm, plain surfaces much oftener than they choose the patterned blocks. However, there are some builders who demand the face blocks with various impressions and figures defined thereon. The style of face blocks shown on the right side of the cut are in good demand.

Then there are some builders who require blocks finished off in representation of ordinary bricks. Just why anyone should demand a pattern of this nature is not known. But the makers of concrete blocks tell me that there are often calls for this class of work, a sample of which is shown at the left side of the sample in figure 2.

In the construction of the blocks with brick lines defined on them, the operation is the same as in the making of the smooth-faced blocks, except that the brick lines are impressed therein by the employment of the necessary risings at proper intervals on the face side of the mould. Occasionally you will find instances of hollow brick made and finished on the pattern of the hollow cement block, and the size no larger than the ordinary clay brick. Then there are people who want the smooth, speckled surface way across the front, such as is shown in Fig. 2 at the right. I have seen this requirement carried to the extreme of plastering over the





entire finished surface, so as to present a new and entirely smooth surface for the wall. The concrete block makers have introduced some blocks which can be set up with almost invisible lines, thereby creating what is apparently a solid front. But the lines at the juncture almost always reveal themselves in time. Therefore in order to fill the requirements of the odd taste of some folks, the contractors are obliged to go over the wall with a thickness of cement. This surface is then worked to make the proper concrete face representation. Another style of block is exhibited at the left side of the diagram No. 3. This is one of the styles in which the block is edged, and these smooth edges fit snugly, forming the effect as shown.

In recent years there has been quite a demand for a mottled style of block. There are calls for cement blocks set with broken bottle glass, and some set with stones, as at the right in Fig. 3.

I find that the manufacturers of concrete blocks do not encourage these odd schemes. The manufacturers believe in the simple, substantial, practicable grey block, properly finished for building purposes. But the manufacturers cannot have it all their own way. They are often called upon to make blocks with peculiar finish and form. Hence the pebble block may be seen in service as well as the block which requires some of the workmen of the plant to go to the junk shops and get old bottles. These old bottles are broken and the broken material is adjusted by hand in the soft block when the latter is first made. The workmen cut their hands and are otherwise annoyed.

Then there comes the man who orders concrete blocks made for his building in representation of common stones, as at the left side of Fig. 4. This is not by any means an exceptional order. Some of the concrete block makers refuse these bothersome orders on the plea that they are too busy with regular work, or that they do not have the proper moulds for shaping the odd patterns. Other manufacturers, desiring to build up their business and to accommodate, undertake the work, although there may be little money in the job. The new moulds have to be made, and this costs money and consumes time. However, from what I could learn by calling at a number of concrete block works, the majority of proprietors were willing to furnish whatever styles of blocks they could make, even though the margin of profit might not be large. As a whole the profits run high and are liberal. The cement block maker, whether he is turning out the regular run of blocks or special patterns, can always depend upon good prices and fair profits.

MILL CONSTRUCTION

By WARFIELD WEBB

MILL and factory construction, as well as residences and office structures, demand a material that will withstand the test of severe flames. There are several materials that will add to the possibility of this hope, and there is a more notable advance in this direction of late than has been noted in the past. While the subject of fireproof factory construction can become a matter of importance to every industry, naturally that of combustible materials, or materials that are easily consumed, should demand the most imperative consideration. Not alone does this demand apply to owners, but to contractors as well, and they should see to it that the matter is given a clearer understanding and more intelligent co-operation by both owner and builder.

The admirable qualities of concrete, for instance, are being generally appreciated for the building of many kinds of plants. For the manufacture of lumber, wood working specials, fabrics, and kindred lines, as well as for combustible materials, find in concrete a most desirable structural material. If we consider the immense losses each year from destruction by fire of such plants, it will bring quite forcibly to our minds the need for the adoption of some structural material that will prevent the onslaught of the flames. Aside from the danger, which is often immiment, from loss by fire in such plants, the increase in the hazard, making insurance difficult and well nigh prohibitive to obtain, only by paying the most exhorbitant rates.

The danger then, that a mill or factory operator incurs where the building is of frame or poor construction is a matter for his serious consideration. As is often the case these plants are isolated, and the protection that would otherwise be accorded them is impossible to obtain. The matter then assumes one of grave import for the owner, and is one that must not be overlooked by the builder.

There is a more careful inspection into this matter and it is becoming more properly understood and appreciated by a larger percentage of operators. For various reasons, primarily their unbelief in concrete, their hesitation to use other materials than those with which they have long been accustomed; the cost, which they believe would be far too great to permit of its adoption—it can be said that these are at least a few of the reasons why concrete has failed to impress itself upon the average factory man as it might have done in the past.

It is not saying too much to admit the fact that for ordinary factory construction concrete has been found a very admirable material. This includes its several forms, reinforced, brick and block. The one item of fire protection is of such importance that there should be no hesitation on the part of any one who operates a plant of the above description to look at it in this light. We recall an instance of where a frame factory building was consumed by fire that was very near the city limits, and still too far to be reached to any advantage by the fire department. The result was a total loss and complete destruction, simply from a lack of water being supplied to extinguish the flames. A concrete structure under like circumstances, would have withstood the flames, and the loss, at most would have been trivial. The outcome was that the company realizing its loss did not rebuild the plant.

As a contrasting incident to this there has recently been completed a large lumber manufacturing plant that is removed far from the city, and that would have no possible chance of escape from destruction, should fire start therein. However, to obviate this the company builded it of concrete, and is safe in feeling a relief from this danger. This is cited to show the forethought on the part of the owners, and as this happens to be a large lumber manufacturing company, it might seem a trifle strange that they would adopt this form of construction.

The fact that lumber is scarcer and naturally more costly than it was several years ago, is only another argument in favor of the erection of factories with some form of material other than wood. Durability is a vital consideration in this connection, and there should be more concern given the matter of permanency by manufacturing concerns. There is a saving too, in the concrete structure over a few years ago. Improvement in methods of construction, reduced cost of materials, and a greater knowledge about the industry have been factors that mean much to the prospective builder.

Contractors are giving more consideration to concrete as a structural material. So many builders, of all classes, are now being erected with concrete, either as a whole or in part, that it becomes a matter of more than passing interest to give concern to every progressive builder.

If we consider the matter of sanitation in the construction of many plants to-day, which becomes a vital factor, there is much to be found in favor of concrete. If there is to be heavy machinery installed the foundation and floor will assist in making the structure more durable, and the danger of damage to equipment in this respect less liable. These and many other points are of enough importance to interest every contractor, and are points that he can use in favor of mill construction of concrete. With more factories constructed in this way there will be fewer losses from fire, and a reduction in the insurance rates, two factors that are worthy to be borne in mind. With the fire danger reduced we will insure greater permanency to our buildings, and in other ways reduce the losses that have become so enormous in this country, and that must increase unless the proper remedy has been found and adopted to prevent them.

Seen and Heard on Long Island

A teacher tells me that at a Brooklyn school, not long since, the class in geography was asked: "What are some of the natural peculiarities of Long Island?" The pupils tried to think, and after a while a boy raised his hand. "I know," said he. "Well, what are they?" asked the teacher. "Why," said the boy, with a triumphant look, "on the south side you can see the sea, and on the north side you hear the sound."—Spare Moments.

NOTES ON BRICKWORK

WHERE possible every brick in the footings of a wall should be laid a header. The reason of this will be clear on a little consideration. The bricks laid in the outer course of footings, if put in stretchers, only lap in the wall two inches and there is a great tendency for them to become displaced, as indicated by Fig. 1. Where, however, they are laid headers, three-fourths of their length is bound into the wall, and they can scarcely fail, except it be by reason of the bricks themselves splitting into pieces. The general form recommended for footings is that shown in Fig. 2, and the arrangement will produce as strong footings as can be had. In the case of very heavy buildings the tendency of the brick to break may be overcome by building in two courses at the bottom, which is the weakest point.

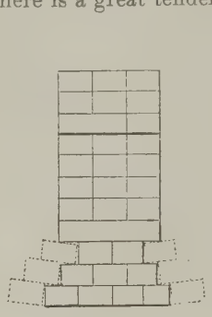


FIG. 1. DISPLACED BRICK.

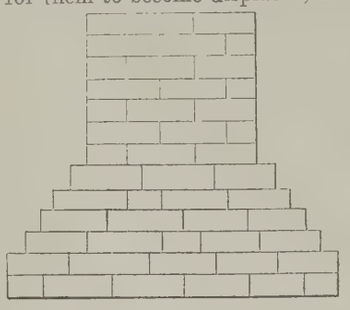


FIG. 2. FOOTINGS FOR HEAVY WALLS.

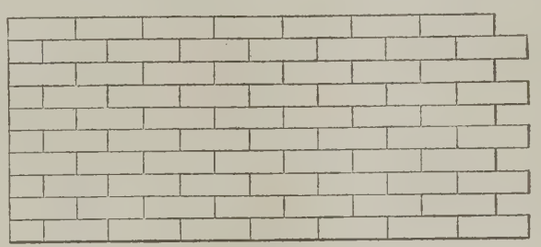


FIG. 3.

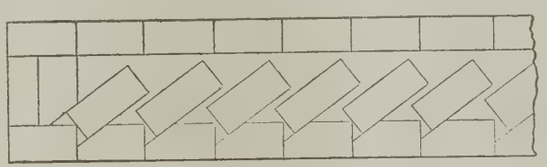


FIG. 4.

The diagrams, Figs. 3, 4 and 5, show the plans and elevations of an external wall in running bond. Fig. 4 shows plan or wall having diagonal bond. This style of bonding makes a very strong wall and is often used in front walls, particularly when the walls are faced with pressed bricks, or with stone or marble slabs—or tiles. Sometimes this bond, like the bond consisting of five, or less, courses of stretchers and one of headers, is called, wrongly, "American bond." It was used long before America was discovered, in Germany, England, Holland and Spain.

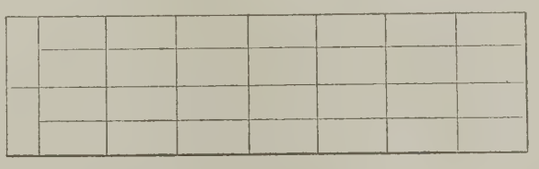


FIG. 5.

FINISHING HARDWOOD FLOORS

The efficiency of the hardwood floor depends very greatly on the character of its finish. Here are some suggestions for finishing oak, maple, and other hardwood floors, which will prove of service to the builder.

Oak floors require a filler, if good, smooth finish is desired in the natural, no matter what material is used. Maple does not require filling. For oak floors a good mineral paste filler and two light coats of grain-alcohol shellac varnish, or, in place of the latter, waxing often with a good floor wax will keep the floor from darkening.

AN ORDER OF INDUSTRIAL MERIT

"Fifty per cent of the accidents to American life and labor are preventable," according to an official of the American Museum of Safety, "and it proposes to show how this can be done, through its permanent exposition of safety devices in New York City."

At the exercises in connection with the formal opening of the new museum two gold medals offered by the Travelers Insurance Company and the Scientific American to the individual industrialist or corporation that has done the most for the safe-guarding of its machines and processes, and for the best safety device exhibited at the Museum, respectively, will be awarded by the trustees of the Museum, November 21, at the Engineering Societies' Building.

Among the exhibits already received are a series showing the work of the factory Safety Engineer and the Safety committees, another idea of the new thought in conserving human life, by establishing in the up-to-date plant an official whose sole work is the promotion of safety.

WHITE OAK VERY SCARCE

The so-called white oak timber of our markets is often a mixture, not only of various species of the white oak group, but also of other species, such as the red oak. This generally unknown fact is reported by the Department of Agriculture, which, as a part of its forestry work is often called upon to pass judgment upon the identity of market woods in dispute.

Foresters divide all the oaks into two distinct groups, the white oak group, and the black oak group. The black oak requires two years to mature its acorns, and the white oaks but one year. The woods of the two groups are structurally different. In the early days of its abundance, market white oak was derived almost entirely from Queros Alba, the true white oak. This species combines the utmost strength and toughness of any of the timber oaks. The immense inroads made upon what were regarded as the inexhaustible white oak forests, which stretched from the Atlantic seaboard to Missouri, gradually so reduced the supply that the use of other species became inevitable.

It is almost impossible, at the present time, to obtain a consignment of white oak that does not contain pieces of some other species. The species most used, in addition to the true white oak, are burr oak, chestnut oak, chinquapin oak, post oak, swamp white oak, cow oak, and overcup oak. Real white oak timber of No. 1 quality is usually cut into quarter-sawed boards, while a combination of one or more white oak and red oaks may constitute other cuts of "white oak." In many markets the term "cabinet white oak" is now understood to include a mixture of white oak and red oak, while it often signifies red oak only.

The Department of Agriculture affirms that, for the ordinary purposes for which true white oak is used, practically all the trees of the group yield woods that can be interchanged, and will serve equally well.

FIRST AID FOR THE INJURED

A large woodworking factory should have a special room set aside for the purpose of rapidly rendering assistance to employes who have sustained serious injury from the machinery installed in the workshops. Guards of all kinds have been devised, it is true, but still the risk with circular saws and cutters, revolving at a high speed, is very considerable. In these days of compensation it is in the interest of the employer to use every endeavor to prevent complications arising from a wound which may lead to a prolonged absence from work. Among two or three hundred workers someone is frequently getting injured, no matter how careful they may be nor what precautions are taken to ward off danger by means of safeguards and warnings.

The first-aid appliance need not be costly, but should be kept in a dust-proof cabinet or cupboard. The modern surgeon insists above all things on cleanliness, and before a cut is bandaged it should be thoroughly cleansed, and so it stands to reason that all the appliances should be spotless and aseptic.

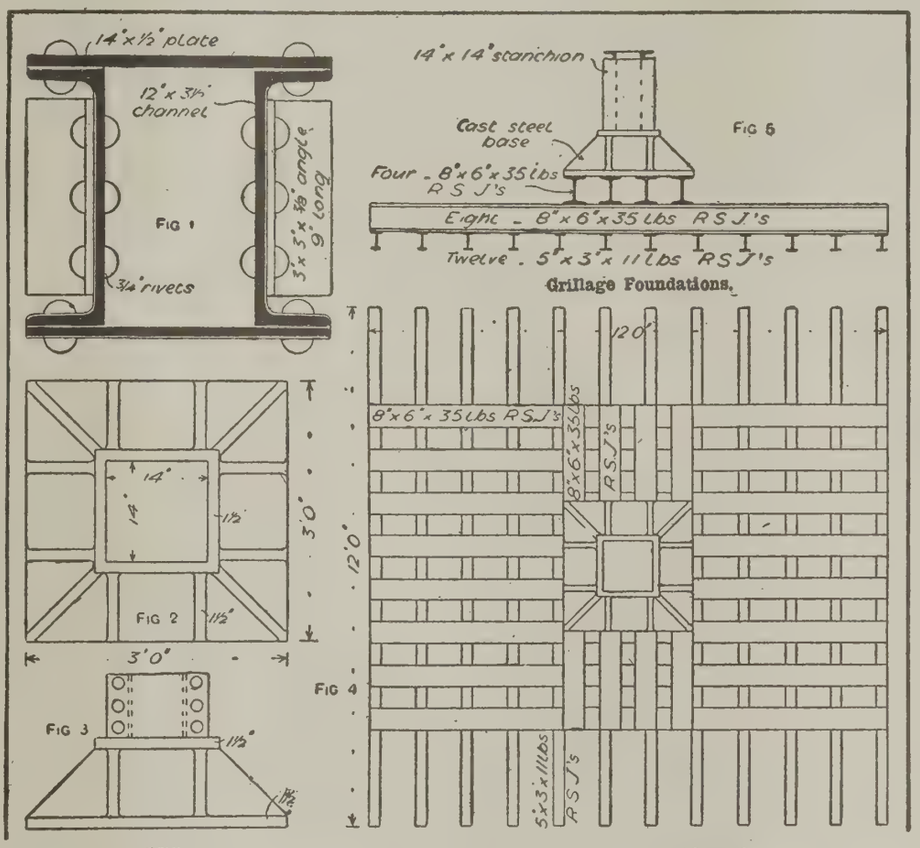
Splints, bandages, restoratives and glass bowls, with warm water for washing cuts or wounds, are essential, and there should be telephonic communication with the nearest medical man or club doctor.

There are times when the ability to stop a flow of blood by pressure on the artery may save a fellow-worker from succumbing from loss of blood before medical aid arrives.

CONSTRUCTION OF GRILLAGE FOUNDATIONS

A CORRESPONDENT, living in a large city, wishes to know what is meant by grillage foundations and asks us for a sketch and description of such that would carry about one and a quarter tons to the square foot. We reproduce the following, which is from a paper prepared by Mr. H. Adams, C. E., which we think covers the ground:

Grillage foundations are composed of rolled steel joists laid side by side under the base of a stanchion and resting upon another layer of rolled joists extending wider, and so on until the pressure per unit of area is reduced to that which the soil is capable of bearing safely. The joists are usually embedded in cement concrete. And the matter is of sufficient importance to readers of NATIONAL BUILDER to give a full answer. In designing a grillage foundation commences with the load to be carried and the safe pressure upon the earth. In this case the load is 175 tons, and the safe pressure



1.25 tons per superficial foot, then $\frac{175}{1.25} = 140$ sq. ft. area required at base of foundation, and $\sqrt{140} = 11.83$, say 12 ft. width of side, with twelve rolled-steel joists. The stanchion will be approximately as Fig. 1, composed of two 12-in. by 3½-in. by 32-lb. channels, and two 14-in. by ½-in. plates, with ¾-in. rivets, 4-in. pitch. The sectional area will be about 33 sq. in. and the stress $\frac{175}{33} = 5.3$ tons per square inch. The base may be built up of plate, gussets, and angles as for resting on stone or concrete, but a more usual method is to put a cast-steel base under the stanchion, as in plan (Fig. 2) and section (Fig. 3), allowing, say, 20 tons per square foot. $\frac{175}{20} = 8.75$, $\sqrt{8.75} =$ say 3-ft. side of cast-steel base. Placing the first layer of joists at 9-in. centers, there will be four required in the top row, projecting midway from the steel base to the outside of foundation, giving a length of $\frac{12-3}{2} + 3 = 7.5$ ft. The number of joists in the middle layer $= \frac{4+12}{2} = 8$. Then the plan of the foundation will be as Fig. 4, and section as Fig. 5. The next step will be to calculate the size of the rolled joists. Beginning with the lower ones, the distributed load pressing upwards is 1.25 tons per square foot, the joists twelve in number, their overhang $\frac{12-7.5}{2} = 2.25$ ft., so that they must be calculated as cantilevers under a distributed load, the maximum bending moment being $\frac{wl^2}{2} = \frac{1.25 \times 2.25^2}{2} = 3.164$ ton-ft. Then the equivalent distributed load on a beam supported at the ends would be found from $\frac{W\ L}{8} = 3.164$, whence $W\ L = 8 \times 3.164 = 25.312$, which is the load in tons 1 ft. would carry. Referring to tables, a B.S.B. 6, 5-in. by 3-in. by 11-lb. joist is found to be sufficient. Taking the middle layer, there are eight joists covering a width of 7.5 ft., say 12-in. center to center. Their projection will be $\frac{12-3}{2} = 4.5$ ft., and the load they will have to bear $4.5 \times 12 \times 1.25 = 67.5$ tons, or $\frac{67.5}{8} = 8.44$, say 8.5 tons each. Then, as before, $\frac{wl^2}{2}$ or $\frac{W\ L}{2} = \frac{8.5 \times 4.5}{2} = 19.125$ ton-ft. Then for an equivalent distributed load over a beam supported at the ends, $W\ L = 8 \times 19.125 = 153$, which is the load in tons 1 ft. should carry. Referring to the tables, it will be found that this value is given very nearly by a B.S.B. 14, 8-in. by 6-in. by 35-lb. joist. Next for the top layer, the projection is $\frac{7.5-3}{2} =$ 2.25 ft., and the load the joists have to bear will be 175 tons $= \frac{175}{4} = 44$ tons each on the length of 7 ft. 6 in. $= \frac{44}{7.5} =$ say 6 tons per ft. run $= 6 \times 2.25 = 13.5$ tons on the projecting portion. Then $\frac{W\ L}{2} = \frac{13.5 \times 2.25}{2} = 15.2$ ton-ft., and equivalent distributed load on beam supported at ends $W\ L = 8 \times 15.2 = 121.6$, which is the load in tons 1 ft. would carry, requiring a B.S.B. 14, 8-in. by 6-in, by 35-lb. joist as before. The joists would be bedded in 1:3:6 concrete to enable them to spread the pressure properly, and also for their protection against corrosion.

FRAMING THE RUSSEL HOUSE ROOF

By WM. C. A. STEVENSON

THE roof of the Russel House, published in this month's supplement, is perhaps the best example lesson in roof framing that we have published for a long time, there being only four common rafters in the main roof; it is made up of hips, valleys, jacks and cripples. Many mechanics who consider themselves good roof framers would find that this roof would start the wheels in their head working overtime.

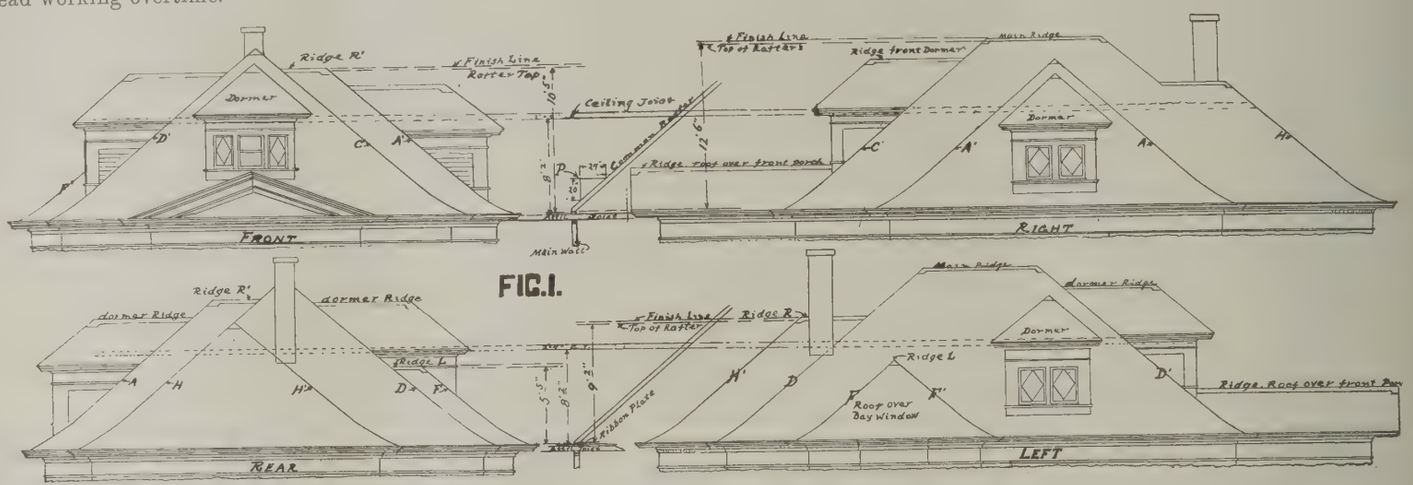


FIG. 1.

To explain this roof fully, illustrating every part, would take up more space than can be given to it here. I have, however, been as explicit as possible in the limited space allotted to it, so that the workman with any knowledge of roof framing at all will be able to understand.

For the benefit of the inexperienced, I will here define the five different rafters used in roof framing.

The Common: The straight, plain rafters running from the plate to the ridge.

The Hip: The rafter running diagonal from an external angle of the plan and forming an external angle of two sides of the roof.

The Valley: The rafter running diagonal from an internal angle of the plan and forming an internal angle of two sides of the roof.

Jacks: The rafters running from the plates and cutting against the hip.

The Cripples: The rafters cutting between hips and valleys, or valley to ridge.

Fig. 1 shows the four elevations of the roof lettered to correspond to the same pieces on the plan Fig. 2. (The valleys cannot be seen in the elevations.)

It will be seen at Fig. 1 that the pitch of this roof is 10 inch rise to the foot run (except the roof over the front porch, which is 5 inch rise to the foot run); the common run at the widest is seen to be 15 feet, half of 30 feet, the main ridge is therefore 15x10= 150 inches = 12 feet 6 inches high above the plates. Ridge R' is 25 feet ÷ 2 = 12 feet 6 inches x 10 = 125 inches = 10 feet 5 inches high above plates. Ridge R is 22 feet ÷ 2 = 11 feet 0 inches x 10 = 110 inches = 9 feet 2 inches high above plates. Ridge L is 13 feet ÷ 2 = 6 feet 6 inches x 10 = 65 inches = 5 feet 5 inches high above plates. (See dimensions given on Fig. 1.)

Before we take up the question of finding the lengths of bevels and cuts we will discuss the best method to frame this roof and where to begin, as this is where not a few find difficulty? If the reader will now look at Fig. 2 I will try to explain what I deem the best and most practical method.

The hip rafters marker D-D' and C' I would raise first, putting in the main ridge, which would require a temporary shore under it where D meets it, to hold it up until valley B and a few cripples are in place. Note.—Valley B is extended up to the main ridge as shown by the dotted lines, valley B' cutting to it at the intersection of ridge R, which is just 2 feet 1 inch on the level below the main ridge. Next raise hips H-H' and valley G, then the short hip C, and a few cripples from valley B to ridge R. The roof will now be self-supporting; the balance may be erected as desired.

In framing in the dormers cut a trimmer between the rafters marked s, which should be doubled, allowing the rafters in the main roof to extend down to this trimmer as shown by the dotted lines; the main roof is then boarded over and the dormer roof allowed to die onto it, thus forming the valleys for the dormers without cutting a valley rafter in, the framing of the dormer hips, etc., is the same principle of the main roof.

The same plan may be followed for the valleys E-E' over the bay-window, by running the ribbon plate through as the dotted lines show. Valleys I-I' are formed likewise.

It will be seen by the detail of the cornice on the supplement, that the cornice projection is formed by planting the rafter tails on top of the main rafters, thereby forming the bell-cove seen in the roof at the eaves, therefore, in cutting the rafters, we only require to cut them flush with the main wall plates.

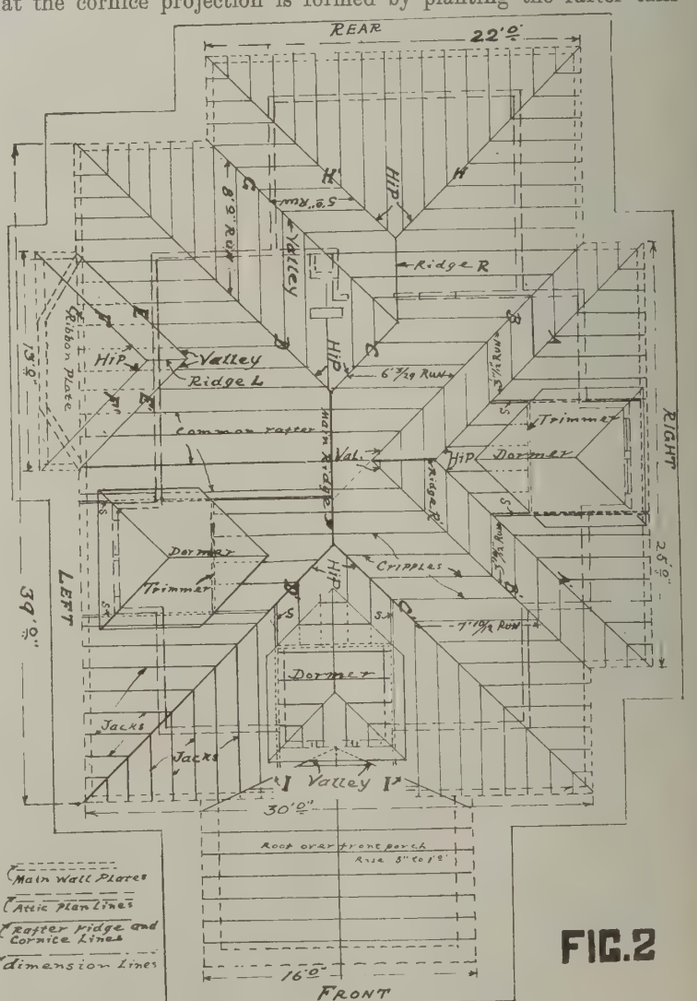


FIG. 2

At Fig. 3 is illustrated how to find the lengths of the various rafters with the square. Note.—The use of the side of the square graduated to twelfths. This enables us to work to a 1/12-scale, an inch representing a foot, and a twelfth an inch.

As the pitch of this roof is 10 inches to the foot run, to find the length of the common rafter we measure across the diagonal of the square from 12 on the blade to 10 on the tongue, which is seen to be 15 8/12-inch, the length of the common s, jacks and cripples, to each foot of run, the figures 12 giving us the foot or seat cut, and 10 the plumb cut. The jacks have a cheek cut also, where they fit to the hips, the cripples having a cheek cut at both ends to fit both hips and valleys, except when the one end extends to the ridge; then there is only a cheek cut at one end. (The method of finding cheek cuts was described in the December number. It will therefore not be necessary to take that up here, as the reader can refer to it.)

The first jack set 20 inches from the corner would also have a run of 20 inches = 1 2/3 feet, multiplied by 15 8/12 inches = 26 2/12 inches long; spacing them at 16 inch centers each one would therefore have 16 inches more run than the preceding one. Sixteen inches is 1 1/3 feet multiplied by 15 8/12 inches = 20 11/12 inches longer. (Each jack is therefore 20 11/12 inches longer than the last.)

The cripples in each run between hip and valleys would all be the same length. Example: To find the length of the cripples from valley B′ to hip C′ the run is seen to be 7 feet 10/12 inches x 15 8/12 inches = 111 8/12 inches = 9 feet 3 8/12 inches length on top edge—long to short point. The others can be found in like manner by multiplying the run as marked by 15 8/12 inches.

In order to find the length of a hip or valley the run must first be known, which is the diagonal of the square of the common run. Example: Fig. 2 shows the common run to the main ridge to be 15 feet 0 inches; therefore, to get the run of hips D-D′ and C′ we measure the diagonal of the square from 15 inches to 15 inches as at Fig. 3, and we find it measures 21 3/12 inches, the run for these rafters, and also the valley B as it extends to the main ridge.

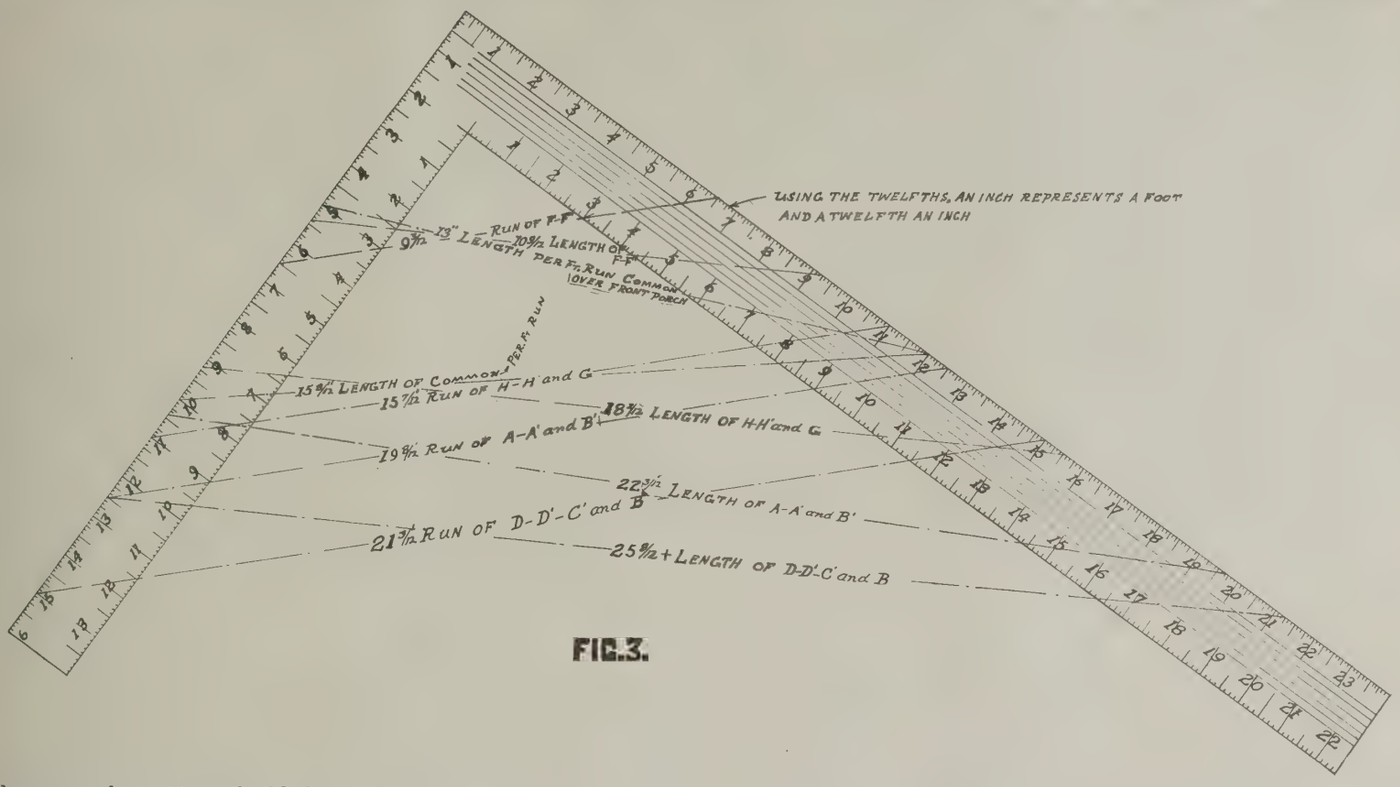


FIG. 3.

As before found, the main ridge is 12 feet 6 inches high above the plates, this will be the rise and 21 3/12 inches the run on the square, which shows us that these rafters are 25 8/12 inches = 25 feet 8 inches long.

Further explanation ought not to be necessary, as the diagrams show clearly how they may be found.

I have not made any allowance for the ridge boards, hips and valleys in calculating the lengths, having worked to the centers in each case; the workman would therefore require to allow for the wood taken up with these in cutting the rafters and cut them that much shorter. Thus, jacks would require to be cut half the thickness of the hips shorter; the commons half the thickness of the ridge; the cripples half the thickness of the valley at one end, and half the thickness of the hip at the other end.

The roof over the front porch is simply a common rafter roof, rising 5 inches to the foot run, which is seen to be 13 inches long to each foot run.

COST OF SAND-LIME BRICK

The following information shows the cost of producing sand-lime brick in a single unit factory, capacity up to 20,000 brick of standard size, per day of 10 hours:

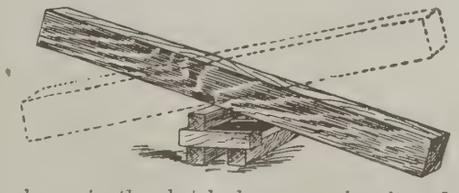
1 foreman.
1 engineer (to do his own firing).
1 engineer (night watchman).
8 common laborers.
2½ tons lime.
3 tons steam coal or equivalent.
Oils, waste, $2.00.
Repairs, wear and tear, $5.00.
Total for 20 M. brick.

Expense for management, insurance and incidentals are to be added.

If the sand has to be shipped in, add the cost of two cubic yards for each thousand brick.

RAISING A HEAVY TIMBER WITHOUT TACKLE

A heavy stick of green timber 12 inches by 14 inches and 48 feet long was raised to a height of 7 feet 6 inches in fifteen minutes without the use of tackle, and one assistant. The timber was



raised as is shown in the sketch, by see-sawing it and building up a crib of blocks beneath it. Each time one end of the timber went up a new block was placed, the work proceeding in this manner until the desired height was attained.—The Operative Miller.

STEEL A SUBSTITUTE FOR WOOD BEAMS

By S. VAN RAALTE

THE BEST modern practice, and the demands of municipal building laws, compel the use of fireproof beams for the support of all masonry walls, over openings of large span. While the calculation of these is more in the province of the architect and engineer, it often happens especially in alteration work, that our versatile friend, the contractor, finds he has it to do.

There are many methods of calculation more or less complicated, for steel beams supporting walls, floors, roofs, etc., all involving the use of a standard handbook, which comparatively few of us possess. Even if we do, and are not familiar with the use of it, we have a tedious problem with several liabilities of error.

The table in this article gives in the heading of each part the size of a beam, white pine or hard pine as the case may be. The left hand column gives the various spans, the next column being the maximum distributed load that the wood beam can carry, and not deflect or sag down more than one thirtieth of an inch for every foot of span.

The third column gives the depth and weight per lineal foot of the I beam which will safely carry the same load as the wood beam, and deflect no more than it. The fourth column gives us the same data but it deals with channel beams.

The fifth column gives the depth and weight per lineal foot of each of two I beams that will together safely carry the load with the same restrictions as before, and the last column gives the same particulars of each of two channels.

6-in. x 6-in. White Pine.

Span in Feet.	Safe Load.	I Beam.	C Beams.	2-I Beams, Each.	2-C Beams, Each.
6	4320	4-in.@7.5 pounds	5-in.@6.5 pounds	3-in.@5.5 pounds	4-in.@5.25 pounds
8	2652	4-in.@7.5 pounds	5-in.@6.5 pounds	3-in.@5.5 pounds	4-in.@5.25 pounds
10	1698	4-in.@7.5 pounds	5-in.@6.5 pounds	3-in.@5.5 pounds	4-in.@5.25 pounds
12	1176	4-in.@7.5 pounds	5-in.@6.5 pounds	3-in.@5.5 pounds	4-in.@5.25 pounds

6-in.x6-in. Hard Pine.

Span in Feet.	Safe Load.	I Beam.	C Beams.	2-I's Each.	2-C's Each.
6	6336	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	4-in.@5.25 pounds
8	3564	5-in.@9.75 pounds	5-in.@6.5 pounds	4-in.@7.5 pounds	4-in.@5.25 pounds
10	2280	4-in.@7.5 pounds	5-in.@6.5 pounds	4-in.@7.5 pounds	4-in.@5.25 pounds
12	1584	4-in.@7.5 pounds	5-in.@6.5 pounds	4-in.@7.5 pounds	4-in.@5.25 pounds
12	1164	4-in.@7.5 pounds	5-in.@6.5 pounds	4-in.@7.5 pounds	4-in.@5.25 pounds

6-in.x8-in. White Pine.

Span in Feet.	Safe Load.	I Beam.	C Beams.	2-I's Each.	2-C's Each.
6	7680	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
8	5760	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
10	4026	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
12	2796	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
14	2052	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
15	1788	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
16	1572	5-in.@9.75 pounds	6-in.@8 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds

6-in.x8-in. Hard Pine.

Span in Feet.	Safe Load.	I Beam.	C Beams.	2-I's Each.	2-C's Each.
6	11520	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
8	8640	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
10	5406	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
12	3756	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
14	2760	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
15	2400	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
16	2112	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
18	1668	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
20	1350	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds

6-in.x10-in. White Pine.

Span in Feet.	Safe Load.	I Beam.	C Beams.	2-I's Each.	2-C's Each.
6	12000	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
8	9000	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
10	7200	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
12	5466	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
14	4194	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
15	3498	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
16	3072	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
18	2480	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
20	1968	6-in.@12.25 pounds	7-in.@ 9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds

6-in.x10-in. Hard Pine.

Span in Feet.	Safe Load.	I Beam.	C Beams.	2-I's Each.	2-C's Each.
6	18000	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
8	13500	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
10	10800	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
12	7332	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
14	5400	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
15	4692	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
16	4128	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
18	3258	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
20	2640	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
22	2166	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
24	1830	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds

6-in.x12-in. White Pine.

Span in Feet.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	17280	7-in.@15 pounds	9-in.@13.25 pounds	5-in.@ 9.75 pounds	7-in.@9.75 pounds
8	12960	7-in.@15 pounds	9-in.@13.25 pounds	5-in.@ 9.75 pounds	7-in.@9.75 pounds
10	10368	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
12	8640	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
14	6936	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
15	6048	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
16	5310	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
18	4200	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
20	3402	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
22	2808	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
24	2358	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds

6-in.x12-in. Hard Pine.

Span in Feet.	Safe Load.	I Beam.	C Beam.	2-I's Each	2-C's Each.
6	25920	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	8-in.@11.25 pounds
8	19440	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	8-in.@11.25 pounds
10	15552	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	8-in.@11.25 pounds
12	12960	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	8-in.@11.25 pounds
14	9306	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
15	8106	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
16	7128	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
18	5628	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
20	4760	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
22	3768	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
24	3168	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds

8-in.x8-in. White Pine.

Span in Feet.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	10240	6-in.@12.25 pounds	7-in.@9.75 pounds	4-in.@7.5 pounds	5-in.@6.5 pounds
8	7680	6-in.@12.25 pounds	7-in.@9.75 pounds	5-in.@9.75 pounds	5-in.@6.5 pounds
10	5368	6-in.@12.25 pounds	7-in.@9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
12	3728	6-in.@12.25 pounds	7-in.@9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
14	2736	6-in.@12.25 pounds	7-in.@9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
15	2384	6-in.@12.25 pounds	7-in.@9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds
16	2096	6-in.@12.25 pounds	7-in.@9.75 pounds	5-in.@9.75 pounds	6-in.@8 pounds

8-in.x8-in. Hard Pine.

Span in Feet.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	15360	7-in.@15 pounds	9-in.@13.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
8	11520	7-in.@15 pounds	9-in.@13.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
10	7208	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
12	5008	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
14	3680	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
15	3200	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
16	2816	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
18	2224	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds
20	1800	6-in.@12.25 pounds	8-in.@11.25 pounds	5-in.@9.75 pounds	6-in.@8 pounds

8-in.x10-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	16000	7-in.@15 pounds	9-in.@13.25 pounds	5-in.@ 9.75 pounds	7-in.@9.75 pounds
8	12000	7-in.@15 pounds	9-in.@13.25 pounds	5-in.@ 9.75 pounds	7-in.@9.75 pounds
10	9600	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
12	7288	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
14	5352	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
15	4664	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
16	4096	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
18	3240	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
20	2624	7-in.@15 pounds	8-in.@11.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds

8-in.x10-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	24000	8-in.@18 pounds	12-in.@20.5 pounds	6-in.@12.25 pounds	8-in.@11.25 pounds
8	18000	8-in.@18 pounds	12-in.@20.5 pounds	6-in.@12.25 pounds	8-in.@11.25 pounds
10	14400	8-in.@18 pounds	12-in.@20.5 pounds	6-in.@12.25 pounds	8-in.@11.25 pounds
12	9776	8-in.@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
14	7200	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
15	6256	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
16	5416	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
18	4344	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
20	3520	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
22	2888	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds
24	2440	8-in.@18 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@ 9.75 pounds

8-in.x12-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	23040	8-in@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	8-in.@11.25 pounds
8	17280	8-in@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	8-in.@11.25 pounds
10	13824	8-in@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	8-in.@11.25 pounds
12	11420	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
14	9248	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
15	8056	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
16	7080	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
18	5600	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
20	4536	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
22	3744	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
24	3144	8-in@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds

8-in.x12-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	33560	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
8	25920	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
10	20736	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
12	17280	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
14	12408	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
15	10808	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
16	9504	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
18	7504	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
20	6080	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
22	5024	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
24	4224	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds

10-in.x10-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	20000	8-in.@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
8	15000	8-in.@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
10	12000	8-in.@18 pounds	10-in.@15 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
12	9110	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
14	6690	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
15	5830	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
16	5120	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
18	4050	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds
20	3280	7-in.@15 pounds	9-in.@13.25 pounds	6-in.@12.25 pounds	7-in.@9.75 pounds

10-in.x10-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	30000	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
8	22500	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
10	18000	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
12	12220	8-in.@18 pounds	12-in.@20.5 pounds	7-in.@15 pounds	8-in.@11.25 pounds
14	9000	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
15	7820	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
16	6870	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
18	5430	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
20	4400	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
22	3610	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds
24	3050	8-in.@18 pounds	10-in.@15 pounds	7-in.@15 pounds	8-in.@11.25 pounds

10-in.x12-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	28800	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
8	21600	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
10	17280	9-in.@21 pounds	12-in.@20.5 pounds	7 in.@15 pounds	9-in.@13.25 pounds
12	14400	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
14	11560	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
15	10070	9-in.@21 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 opunds
16	8850	9-in.@21 pounds	10-in.@15 pounds	7-in.@15 pounds	9-in.@13.25 pounds
18	7000	9-in.@21 pounds	10-in.@15 pounds	7-in.@15 pounds	9-in.@13.25 pounds
20	5670	9-in.@21 pounds	10-in.@15 pounds	7-in.@15 pounds	9-in.@13.25 pounds
22	4680	9-in.@21 pounds	10-in.@15 pounds	7-in.@15 pounds	9-in.@13.25 pounds
24	3930	9-in.@21 pounds	10-in.@15 pounds	7-in.@15 pounds	9-in.@13.25 pounds

10-in.x12-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	43200	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
8	32400	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
10	25920	10-in.@25 pounds	15 in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
12	21600	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
14	15510	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9 in.@13.25 pounds
15	13510	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
16	11800	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@10 pounds	9-in.@13.25 pounds
18	9380	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
20	7600	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
22	6280	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
24	5280	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds

10-in.x14-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	39200	10-in.@25 pounds	15-in.@33 pounds	8-in.@18-pounds	10-in.@15 pounds
8	29400	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
10	23520	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
12	19600	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
14	16800	10-in.@25 pounds	15 in.@33 pounds	8-in.@18 pounds	10 in.@15 pounds
15	15680	10 in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
16	14060	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
18	11110	10 in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
20	9000	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
22	6440	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
24	6250	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18-pounds	10-in.@15 pounds

10-in.x14-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	58800	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
8	44100	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
10	35280	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
12	29400	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
14	25200	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20-5 pounds
15	21460	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
16	18860	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
18	14900	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
20	12070	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
22	9980	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
24	8380	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds

12-in.x12-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	34560	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
8	25920	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
10	20736	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
12	17280	10-in.@25 pounds	12-in.@20.5 pounds	7-in.@15 pounds	9-in.@13.25 pounds
16	10620	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
14	13872	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
15	12084	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
18	8400	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
20	6804	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
22	5616	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds
24	4716	9-in.@21 pounds	12-in.@20.5 pounds	8-in.@18 pounds	9-in.@13.25 pounds

12-in.x12-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam	2-I's Each.	2-C's Each.
6	51840	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
8	38880	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
10	31004	12in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
12	25920	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
14	18612	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
15	16212	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
16	14256	10-in.@25 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
18	11256	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
20	9120	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
22	7536	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds
24	6336	10-in.@25 pounds	12-in.@20.5 pounds	8-in.@18 pounds	10-in.@15 pounds

12-in.x14-in. White Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-I's Each.	2-C's Each.
6	46040	12-in.@31.5 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
8	35280	12-in.@31.5 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
10	28224	12-in.@31.5 pounds	15-in.@33 pounds	8-in.@18 pounds	10-in.@15 pounds
12	23520	12-in.@31.5 pounds	15-in.@33 pounds	8-in.@18 pounds	10 in.@15 pounds
14	19160	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	10-in.@15 pounds
15	18816	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	10-in.@15 pounds
16	16872	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	10-in.@15 pounds
18	13332	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	10-in.@15 pounds
20	10800	12-in.@31.5 pounds	12-in.@20.5 pounds	9-in.@21 pounds	10-in.@15 pounds
22	7728	12-in.@31.5 pounds	12-in.@20.5 pounds	9-in.@21 pounds	10-in.@15 pounds
24	7500	12-in.@31.5 pounds	12-in.@20.5 pounds	9-in.@21 pounds	10-in.@15 pounds

12-in.x14-in. Hard Pine.

Span.	Safe Load.	I Beam.	C Beam.	2-Is Each.	2-C's Each.
6	70560	12-in.@40 pounds	15-in.@33 pounds	10-in.@25 pounds	12-in.@20.5 pounds
8	52920	12-in.@40 pounds	15-in.@33 pounds	10-in.@25 pounds	12-in.@20.5 pounds
10	42336	12-in.@40 pounds	15-in.@33 pounds	10-in.@25 pounds	12-in.@20.5 pounds
12	35280	12-in.@40 pounds	15-in.@33 pounds	10-in.@25 pounds	12-in.@20.5 pounds
14	30240	12-in.@40 pounds	15-in.@33 pounds	10-in.@25 pounds	12-in.@20.5 pounds
16	25752	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
16	22632	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
18	17880	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
20	14484	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
22	11976	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds
24	10056	12-in.@31.5 pounds	15-in.@33 pounds	9-in.@21 pounds	12-in.@20.5 pounds

The application of the table is direct, if the size of the wood beam is known, as it would be, if we were taking out an old beam and substituting a steel one for it, but there is a factor that must be kept in mind. It is this, steel beams are inclined to twist sideways when used for long spans and fully loaded. The usual handbook rule is that beams shall be braced against twisting, at spaces of 20 times their flange width or the load shall be reduced accordingly. In our table the loading has been cut down considerably in order that the vertical deflection shall not exceed one-thirtieth of an inch per foot of span, so the bracing against sideways distortion can be safely spaced at distances of thirty times the flange width.

From this it can be easily seen that each of the four arrangements of beams have more or less advantages over the others, or perhaps it might be better stated that each style of beam is best adapted for a particular purpose.

For supporting a wall load two I beams, or two channels used with cast iron separators between, form probably the safest and most convenient beam. In these, separators as shown in figure 1 should be spaced at distances of 30 times the flange width of a single beam, in order that the two may act together. The usual pipe separators should not be used unless the interior space is filled with concrete, or masonry.

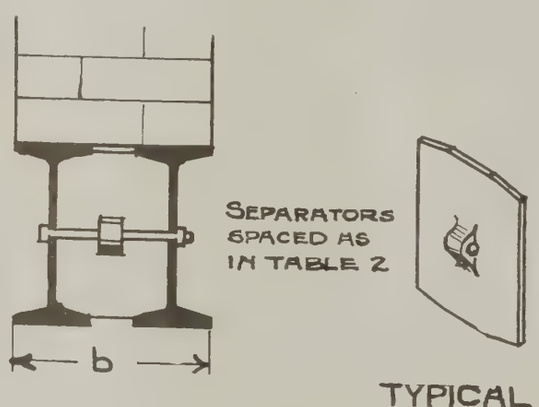


FIG. 1.

For the sideways distortion or twisting, the width out to out of the assembled beam may be considered as the flange width. By spacing the beams a sufficient distance apart any exterior bracing becomes unnecessary. In cases where either a double or single beam is used as a lintel, if the wall is anchored by the joists three feet or less above the top of the lintel, the twisting of the beam may be disregarded.

The I beam used singly is usually the most convenient support for roof and floor joists, and where the joists abut the web on both sides, the beam may be reckoned safe from twisting. If they simply rest on the top flange, some kind of clip must be used at the 30 times flange width spacing. This clip need only grip the top of the beam, and if it is not furred and cased, can be made so small that the ceiling plaster or boards will cover it.

Where the joists are on only one side, a clip must be devised to hold the top flange of the beam, and this is also good where a beam supports a wall and has the joists on one side only.

The channel used singly is best adapted for the support of floor joists against a wll, but it can be utilized for the same purposes as an I beam, keeping always in mind that it is narrower and must be braced against sideways distortion.

Summing up it can be generally said that a double beam should be used to support masonry, and the single beams to carry floor, ceiling and roof loads.

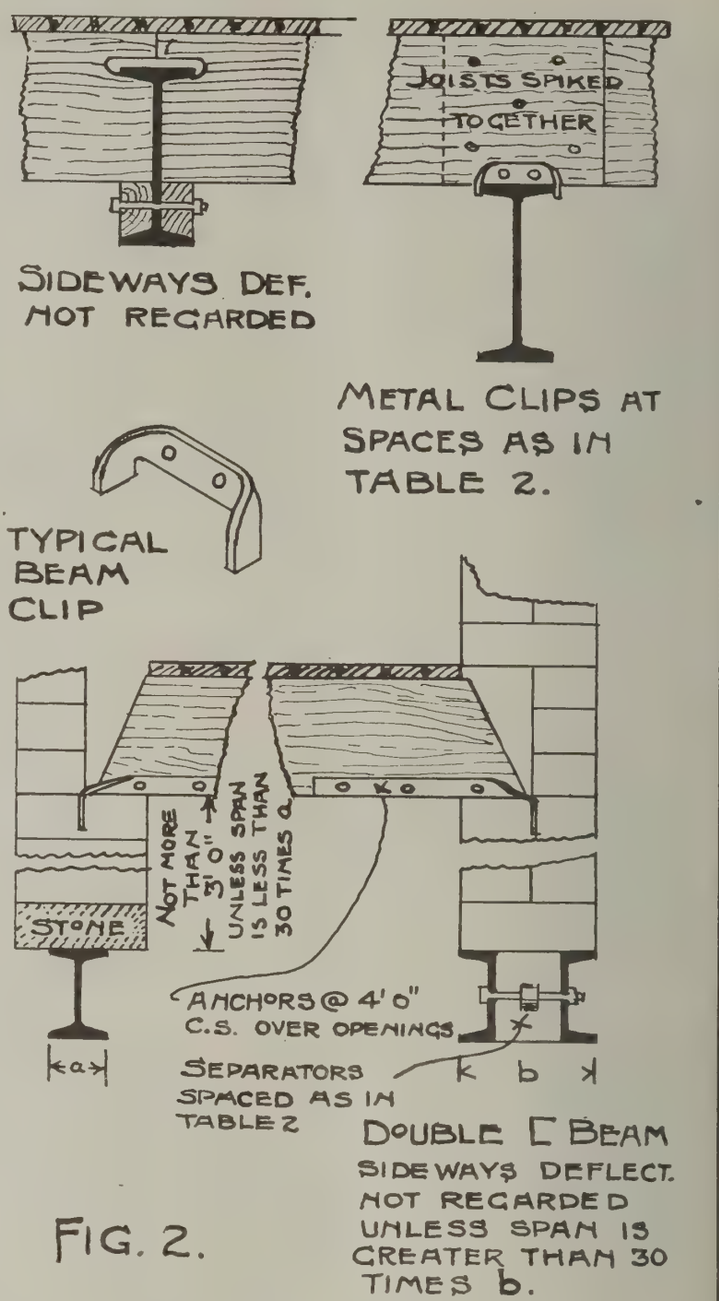


FIG. 2.

Below is a table giving the flange width and spacing of clips or bracing in single beams, and of separators in double beams, but it must be kept in view that this spacing only holds good where the load has been reduced for deflection.

Where this is not done, that is, where beams are loaded to the manufacturers tabular load, the spaces should be two-thirds of that given here.

Spacing of bracing or separators in Standard I beams and channels, loads being corrected for a deflection of 1-360 span.

I BEAMS.				CHANNELS.			
Depth of Beam.	Width of Beam.	Weight per Lineal ft.	Spacing of Bracing or Separators.	Depth of Beam.	Width of Beam.	Weight per Lineal ft.	Spacing of Bracing or Separators.
3-in.	2½-in.	5½ pounds	5 ft. 10-in.	3-in.	1⅞-in.	4 pounds	3 ft. 6½-in.
4-in.	2⅔-in.	7½ pounds	6 ft. 8-in.	4-in.	1⅝-in.	5.25 pounds	3 ft. 11-in.
5-in.	3-in.	9¾ pounds	7 ft. 6-in.	5-in.	1¾-in.	6½ pounds	4 ft. 4½-in.
6-in.	3½-in.	12¼ pounds	8 ft. 4-in.	6-in.	1⅞-in.	8 pounds	4 ft. 10½-in.
7-in.	3⅔-in.	15 pounds	9 ft. 2-in.	7-in.	2 1-10-in.	9¾ pounds	5 ft. 3-in.
8-in.	4-in.	18 pounds	10 ft. 0-in.	8-in.	2¼-in.	11¼ pounds	5 ft. 7½-in.
9-in.	4½-in.	21 pounds	10 ft. 10-in.	9-in.	2⅞-in.	13¼ pounds	6 ft. 0½-in.
10-in.	4⅔-in.	25 pounds	11 ft. 8-in.	10-in.	2 3-5-in.	15 pounds	6 ft. 6-in..
12-in.	5-in.	31½ pounds	12 ft. 6-in.	12-in.	2⅛-in.	20½ pounds	7 ft. 4½-in.
12-in.	5¼-in.	40 pounds	13 ft. 1½-in.	15-in.	3 2-5-in.	33 pounds	8 ft. 6-in.

Another point to bear in mind is that holes in the web of steel beams do not greatly reduce the strength, but holes in the flanges do, so that if lagging is required, it should be so arranged that all the holes are in the web.

The steel beams given in these tables are kept in stock by every manufacturer and kept while in some cases special beams would be more economical, the difficulty of obtaining them in small quantities prevents their use.

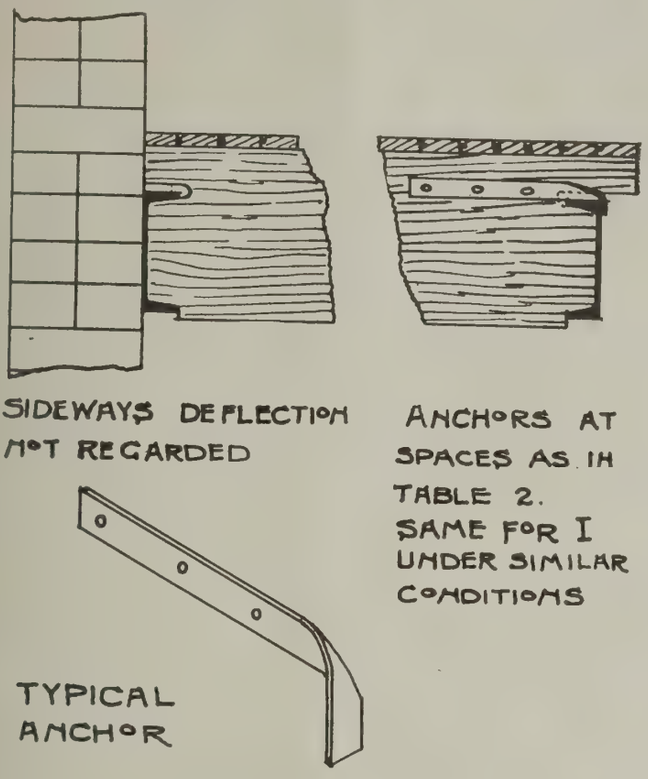


FIG. 3.

The various drawings give a few suggestions of good methods of using steel beams, with typical anchors and separators.

To the poet life's a song;
To the doctor life's a patient
That needs treatment right along.

To the soldier life's a battle,
To the teacher life's a school;
Life's a good thing to the grafter,
It's a failure to the fool.

To the man upon the engine,
Life's a long and heavy grade,
It's a gamble to the gambler,
To the merchant life is trade.

Life's a picture to the artist,
To the rascal life's a fraud;
Life perhaps is but a burden
To the men beneath the hod,

Life is lovely to the lover,
To the player life's a play,
Life may be a load of trouble
To the man upon the dray.

Life is but a long vacation
To the man who loves his work;
Life's an everlasting effort
To shun duty to the shirk.

To the heaven blest romancer
Life's a story ever new;
Life is what we try to make it—
Brother, what is life to you?

ZINC ROOFS

By H. M. SANDERS

THE rise of zinc for roofs of buildings is better known and more generally practiced in England and other European countries, than in this country. In view of thrs fact it may not be considered an inappropriate subject for us to consider at this time. It is true that the use of zinc for roofs in these European countries, is confined to the cheaper class of buildings, and rarely if ever used for buildings of a permanent character. It is also true that some years ago the Society for the protection of ancient buildings in England, issued a pamphlet characterizing zinc roofs as a "pest" spreading over the country. Still, England, like this and other countries, is constantly putting up a large class of cheaper buildings than those of the ancient order, and being of a more temporary character, seeks a cheaper material for the roofs, than lead or copper, whose value as to durability is measured by centuries of use and not by years. So that because of its cheapness as compared to lead or copper, it has thus become more or less a favorite as a roof material for a large class of buildings.

In this country the prevailing metal roofs for our cheaper class of buildings is tin-plated metal. Now how does a zinc roof compare with a tin roof, as to durability?

Not so much perhaps because of the simple fact that it was being used on the cheaper class of buildings, but rather because, realizing that great durability and lasting qualities was the one thing essential in a roof material for permanent buildings, and knowing something of the nature and character of zinc, that it was a short lived metal for roofs as compared to sheet lead or sheet copper whose durability for roofs, had become so well established by centuries of use they seemed to look upon the use of zinc on the cheaper buildings as a kind of menace in the future to what might become the roofs of the permanent buildings. This of course would depend very much upon conditions. What conditions? First, the comparative value of the metal used for the roof, not only as between the zinc and tin plate metal, but the comparative value of the roofing tin plate today as compared to that used 50 or 60 years ago.

Zinc roofs would compare favorably with tin roofs whose base plate was steel, as most of it is as manufactured today, but it would not compare so favorably with the tin plate, whose base is charcoal iron such as was manufactured 75 or more years ago. The tin roofs of this class has a record of 75 years endurance and durability on building. But since the introduction of the steel, as the base of our tin plate, it may be said with truth we believe, that the zinc roof properly put on is the most durable roof, for it will last from 25 to 30 years.

It is true, zinc may vary in value, but, we believe, all that which is made in this country is of a uniform grade of value. In foreign countries, where they use more of it for roofing purposes than in this country, there are more entering this field of its manufacture, and the competition has tended to cheapen the metal in localities both in price and quality. But the best and purest sheet zinc obtainable in Europe, we believe, is that known as the V. M., made by the Vilella Montague Zinc Company of Belgium, as the spelter from their sheet zinc is made is practically pure; as shown by the following analysis:

Zinc	0.995
Iron	0.004
Lead, etc.	0.001
	1.000

While absolutely pure zinc is not obtainable, commercially, the amount of alloy in this formula is so small that it is considered practically pure. So that from the very nature of the metal itself being practically pure like lead and copper, and as it is not a plated metal like tin plate, requiring a baser metal for its body plate, is not subjected to the same disparaging conditions as to value, as the tin plate.

The distinguishing feature of a good sheet of zinc, is in its light even color, whereas a cheaper grade would be of a darker hue, with more or less of a mottled appearance, caused by the presence of other alloys, and be more likely to crack when bent, or working it into shape and form.

(To be continued.)

BUILDER'S COURSE IN ARCHITECTURAL DRAWING

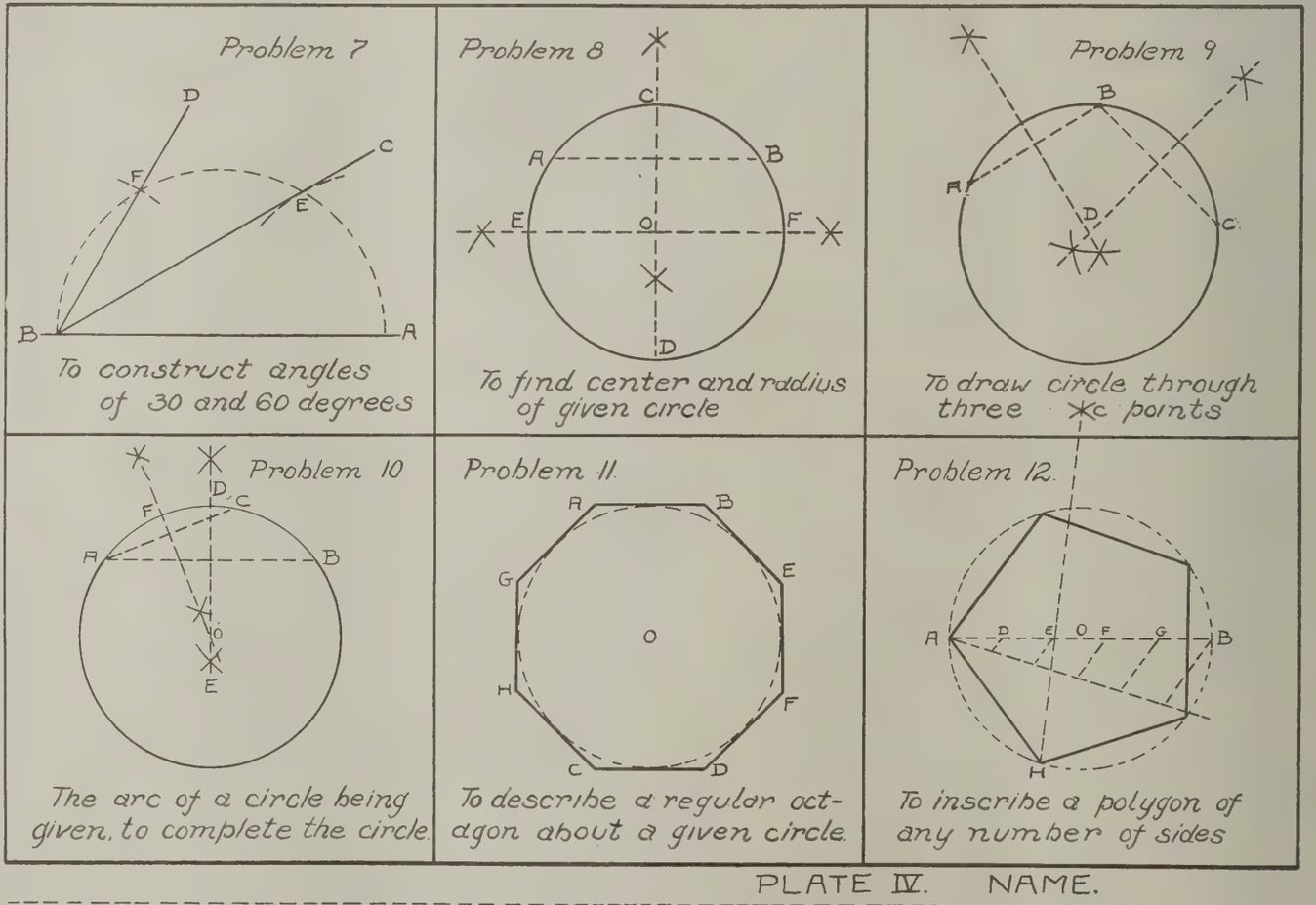
RALPH F. WINDOES.

(Continued from December.)

PLATE IV.

EXERCISES IN PLANE GEOMETRY.

LAY out this plate as you did Plate III, as there are six problems to work. Be careful as to where you place the figures in the squares, as you want room left for the lettering. Make your figures large enough, so they will look well, and above all, understand each problem as you work it out, as these exercises will be of great value to you in the future.



PROBLEM 7.

To Construct Angles of 30 and 60 Degrees.—Draw line AB and at any point on it strike a semi-circle. With A as center and radius equal to the radius of the semicircle, draw an arc intersecting at E. With B as center and same radius, draw an arc intersecting at F. Draw lines from B through E and F. Angle ABC is an agle of 30 degrees, and angle ABD is an angle of 60 degrees.

PROBLEM 8.

To Find the Center and Radius of a Given Circle.—Draw the chord AB and bisect it by the perpendicular CD. Bisect CD by the line EF and the intersection at O will be the required center, and OF the radius.

PROBLEM 9.

To Draw a Circle Through Three Points Not in a Straight Line.—Locate the points ABC and join them by straight lines. Bisect the lines AB and CD by perpendiculars meeting at D, and with D as center draw a circle through the points.

PROBLEM 10.

An Arc of a Circle Being Given to Complete the Circle.—Join the extreme points of the arc by the chord AB, and bisect it by the perpendicular DE. From A draw chord AC and bisect it by FO and where it meets DE is the center of the circle of which ACB is an arc.

PROBLEM 11.

To Describe a Regular Octagon About a Given Circle.—This method is purely a mechanical one, and strictly speaking should not be called a problem in plane geometry. Draw the circle whose center is O and the horizontal AB and CD parallel to each other and touching the circle. Next draw the verticals EF and GH parallel to each other and touching the circle. With the 45 degree triangle complete the octagon.

PROBLEM 12.

To Inscribe a Polygon of Any Number of Sides.—This is a very good method and should certainly be retained in the memory of the student. By it you can draw a regular figure of any number of sides. For example, we will draw a pentagon, or five-sided polygon. Draw the circle whose center is O and divide the diameter into the same number of parts as there is sides to the figure, in

this case five. To divide the diameter, use the method given in Problem 4. With A as center and radius AB, strike an arc at C, and with B as center and same radius strike an intersecting arc. Through C and the second division E, draw CH to the circumference. Then chord AH is one side of the pentagon. Step off the remaining sides with the dividers.

PLATE V.

EXERCISES IN PLANE GEOMETRY.

Lay out this plate as you did Plates III and IV, and finish it the same.

PROBLEM 13.

To Draw a Tangent to a Circle at Any Point.—Given circle whose center is O. To draw a tangent to it at point A. Draw OA and continue it. Lay off AD equal to AE. At E and D, strike arcs interesting at B and C. Connect these points and BC is tangent to the circle at point A.

PROBLEM 14.

To Draw a Spiral Composed of Arcs and Circles.—Produce a straight line through AB indefinitely both ways. With A as center and AB as radius, describe the semi-circle C; then with B as center draw the semi-circle D, joining C, and continue this operation, using the centers A and B alternately.

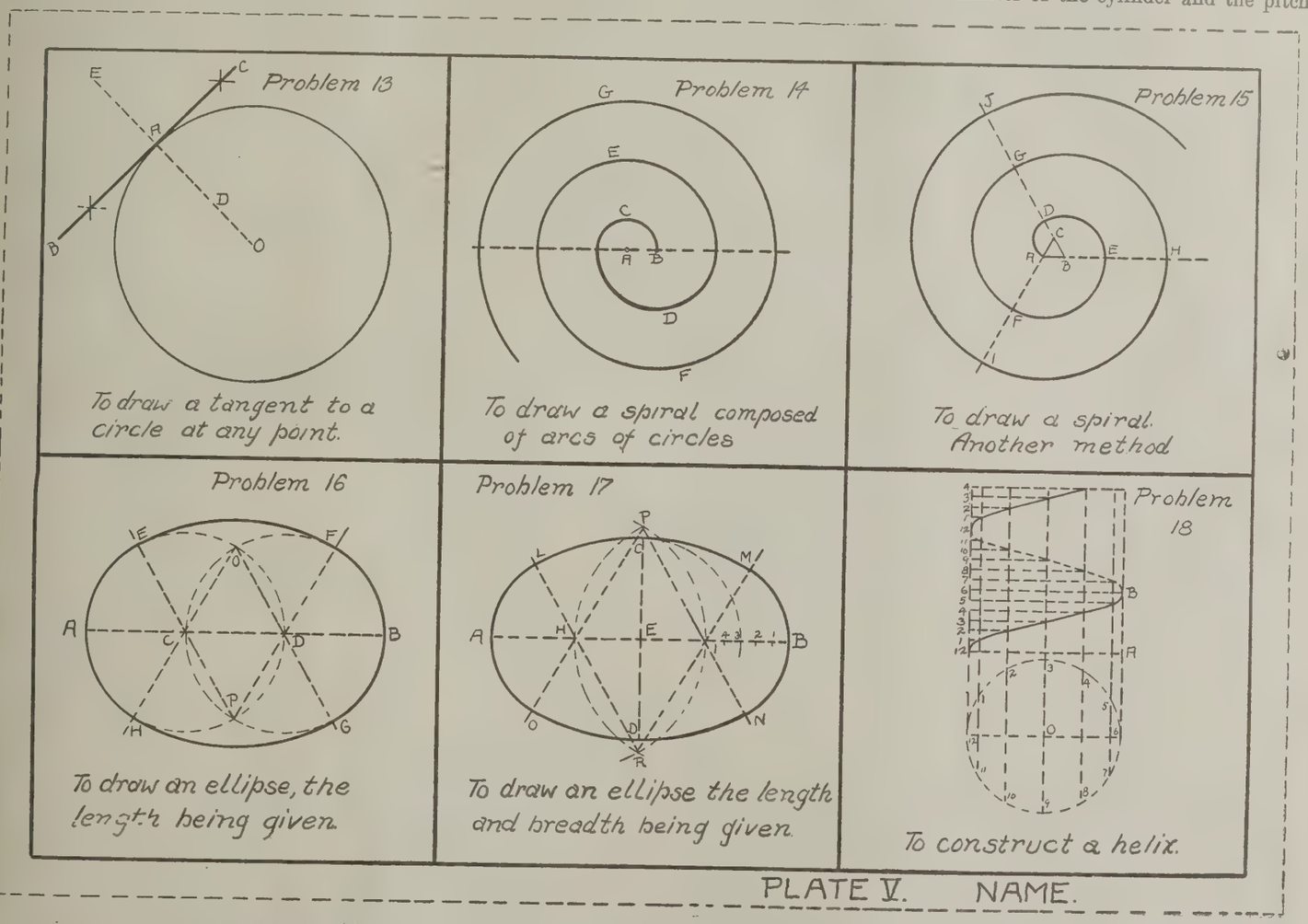
PROBLEM 17.

To Draw an Ellipse, the Length and Breadth Being Given.—This is also a false ellipse and should properly be called an oval. With E as center and EC as radius, draw arc cutting AB in F. Divide FB into three equal parts and continue another to 4. Take the distance B4 and set it off on each side of the center E, at H and I. With H and I as centers and radius equal to HI, describe arcs cutting each other at P and R. From these last points draw indefinite lines through H and I. With H and I as centers, and radius equal to HA, draw the arcs OL and MN. With P and R as centers and radius PD, describe the arcs ON and LM, to complete the figure.

PROBLEM 18.

To Construct a Helix.—If a point travels around and up, or down, a cylinder with a uniform motion, we say the path it describes is a helix. The screw thread is an example of this. The line of a winding stairway is a helix and not a spiral stairway as it is commonly called. The pitch of the screw thread is the distance between threads measured along the axis of length. The pitch of the helix is the same. In Problem 18, AB is the pitch.

To draw the curve the diameter of the cylinder and the pitch



PROBLEM 15.

To Draw a Spiral (Another Method).—Construct the small equilateral triangle ABC and produce its sides. With C as center and AC as radius, describe the arc AD. With B as center and BD as radius, describe the arc DE. With A as center and AE as radius, describe the arc EF. Continue this operation, using successively points C, B, and A.

PROBLEM 16.

To Draw an Ellipse the Length Being Given.—This is not a true ellipse, as it is composed of the arcs of circles, but it serves as one in nearly every case. Divide the given length into three parts, AC, CD, and DB, all equal in length. With C and D as centers, and AC as radius, describe two circles cutting each other in OP. From OP, draw lines through CD, cutting the circles in E, F, G, H. With O and P as centers, and radius equal to OH, describe arcs between HG and EF, to complete the figure.

must be known. Draw the circle whose center is O with the given diameter. Divide the circumference into an even number of equal parts, in this case twelve. Lay off a rectangle above the circle whose base is equal to the given diameter. On one side of the rectangle lay off the pitch. Divide the pitch into the same number of parts as the circle was divided. Number the points on the circle and on the rectangle. Draw vertical lines up from the points on the circle, and intersecting horizontal lines over from the points on the rectangle. Points of like number should intersect. Through these points draw a neat irregular curve, as shown. Where the line comes up on the other side of the cylinder, it is out of our view, so it is put in dotted.

(To be continued.)



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

STAIRS WITH WINDERS.

From One of the "Chips," Toronto, Ontario.—In answer to "Mechanics," of Rochester, N. Y., I send the inclosed diagram, which will show him how to set out his treads full size on the floor directly under where the stairs are to stand. Fig. 8 shows the plan for a stair in which both flyers and winders are seen, both in the plan and on the strings. P P P is the plan, A and B the strings, and E E the joint whenin place. The bevels are found at E E, and at the foot and top floor. M M shows the quarter cut, which is divided into three parts, and from the center C lines are drawn cutting the quadrant at the points of division, and continued through until the other side of the stair is reached. This division makes the lines for the winders. Another plan of stairs having four winders is shown at Fig. 9. Explanations are unnecessary. Another plan having seven winders is shown at Fig. 10. This has a circular well, as seen at A B C D E. Treads and winders are all numbered, so the whole is plain and easily understood.

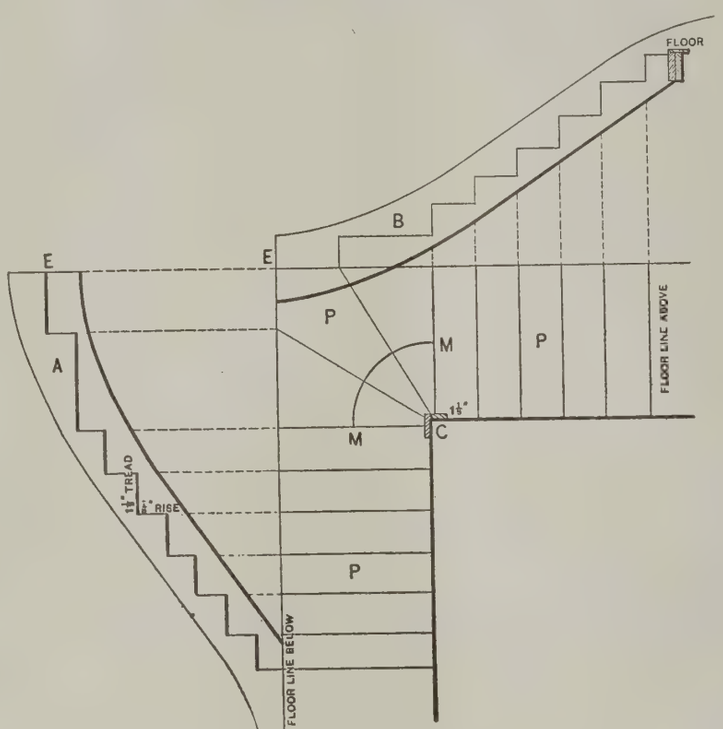


FIG. 8.

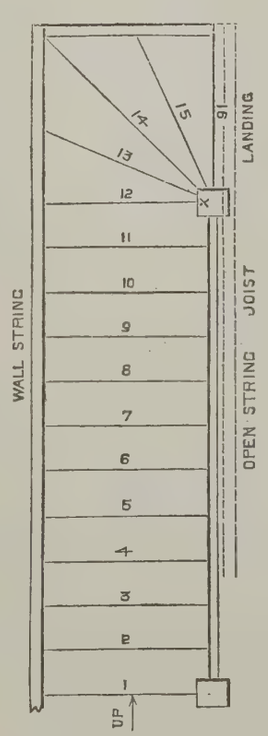


FIG. 9.

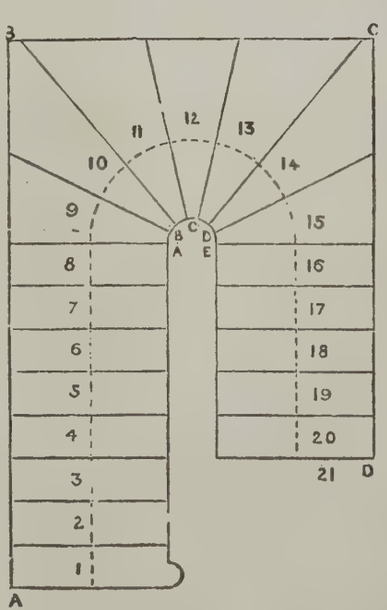


FIG. 10.

OCTAGON BAY WINDOW.

From "One of the Chips," Toronto, Ont.—In answer to this request I send you the following method of forming an octagon, and from this any window or other structure can be laid out. Let H J, Fig. 7, be the given side; at right angles to H J draw J S and H R indefinitely; on J as center with J H, as radius mark the quarter circle O K N; on H as center with the same radius, mark the quarter circle P L M; bisect the quarter circles K and L; connect J K and H L; draw K T and L Q parallel to J S and H R; make K T, T S, L Q and Q R each equal J K or H L; connect T S R Q and the figure is complete.

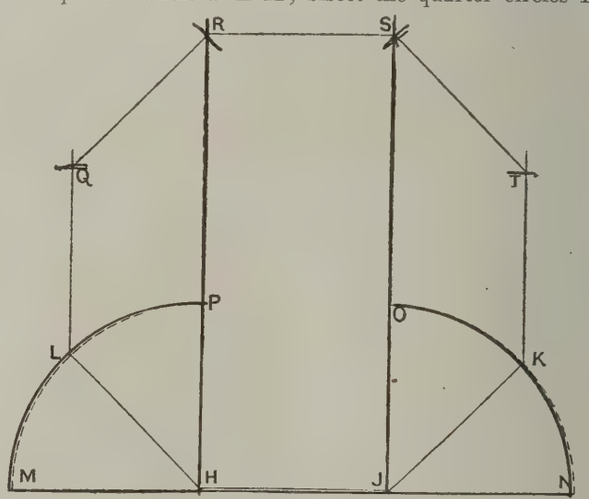


FIG. 7.

CUTTING PLATE GLASS.

From "A. Ashmun Kelly," Malvern, Pa.—The painter of Duluth, Minn., who wishes to know how to cut plate glass, as his diamond will not cut deep enough, is advised to secure a heavier diamond, one made for the purpose. I have seen men cutting the heaviest plate glass with a heavy diamond, and as easily as a painter will cut an 8x10 window glass. He will draw the diamond steadily along the straight-edge, then take it up in both hands and give it a slight knock on his knee and the piece cut off will break away nicely. Having had some little experience with cutting window glass, as a painter, I was surprised to see how apparently recklessly the professional cutter did his work, and I asked him if he did not feel nervous or fearful of breaking the glass, as that was always my feeling. He replied no, that if he should happen to break a light or plate, even, there were plenty more on hand. It requires nerve or confidence to become an expert glass cutter, and the man who hesitates when cutting glass is usually lost.

CUTTING PLATE GLASS.

From "J. A. B.," Lake Megantic.—In answer to question relating to the cutting of plate glass, I have done the cutting very easily, in making a line with the diamond on both sides of the plate to be cut. I have not experienced any difficulty in separating the glass. I think if Mr. Painter of Duluth, Minn., makes a trial of it he will be pleased with the results.

RUBENS.

From "G. M. L., Ontario, Canada.—Replying to "Clam Digger," Norwalk. Rubens painted his great picture, "The Descent from the Cross," in 1608. This picture is considered his masterpiece, and is now in the Cathedral of Antwerp.

BIRD'S EYE MAPLE.

From "C. H. R.," Hutchinson, Kans.—I am comparatively a new subscriber and I am quite pleased with THE NATIONAL BUILDER. Some months ago I noticed an inquiry regarding "bird's eye maple," and up to date I have not seen it properly answered, so I send you the following: "Bird's eyes, or the similar marks, are formed by the circular inflections of the fibers formed around spicules, or small sharp points, which protrude from the inner surface of the bark into the soft woody tissues. A plank is covered with numerous small spots, like minute knots, looking like 'bird's eyes,' hence the name."

INSIDE FINISH AND CABINET WORK.

From "Joiner," Chicago, Ill.—Before being able to reply intelligently to the query asked by "C. M. K.," Modesto, Cal., I would require more particulars of what he really wants. If he will ask again and say whether it is moldings, door trim, window trim, stairs, base or what, and I will try and answer and send for publication. I will leave to others acquainted with cabinet work better than I to submit designs in this branch of woodwork.

CABINET WORK.

From "Wm. R. W.," Toledo, Ohio.—Replying to "C. M. K.," Modesto, in part, I submit the following designs, which I think



FIG. 4.

may prove useful. Fig. 1 shows designs for bedroom furniture which are not expensive, and may be made of oak, mahogany, cherry or birch stained. Fig 2 is "a buffet" of simple design and construction. Fig. 4 shows a mission table in simple lines. Fig. 5 is a kitchen cabinet, and so designed that any ordinary workman will be able to make one. These pieces are designed mostly for oak, but they may be constructed of almost any wood material and stained to suit. I might say that real good works on modern cabinet-making are published by "The Popular Mechanics" of Chicago, and by The Manual Training School Publishing Company, Peoria, Ill. These books do not cost much. They run, I think, from 50 cents to one dollar each. I daresay they could be obtained through the publishers of THE NATIONAL BUILDER like other books they advertise.



FIG. 2.

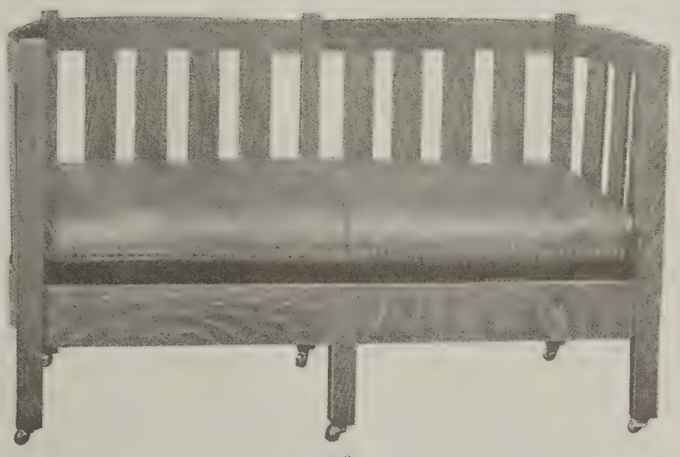


FIG. 3.



FIG. 5.

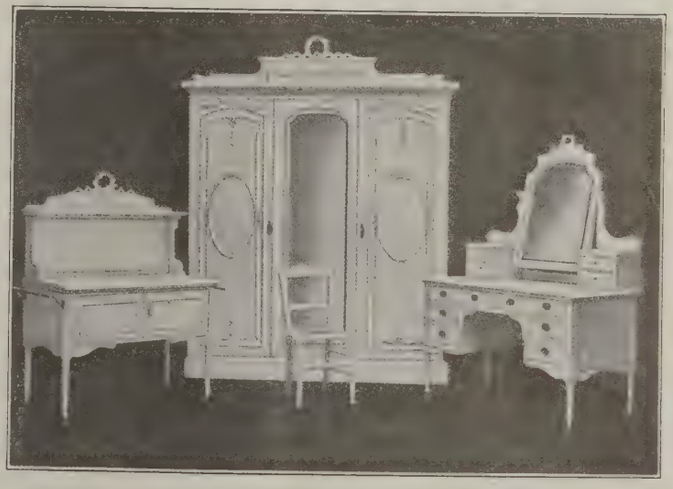


FIG. 1.

SPECIFICATIONS.

Answering C. W. C., Vancouver, B. C.—We are preparing just such a set of specifications as you ask for, and will begin their publication shortly.—(Ed.)

BUFFETS AND SIDEBOARDS.

In reply to D. H. J., Syracuse, N. Y.—We have published from time to time designs of furniture such as you ask for, and will continue to do so, and will bear you in mind when choosing designs for publication in future issues.—(Ed.)

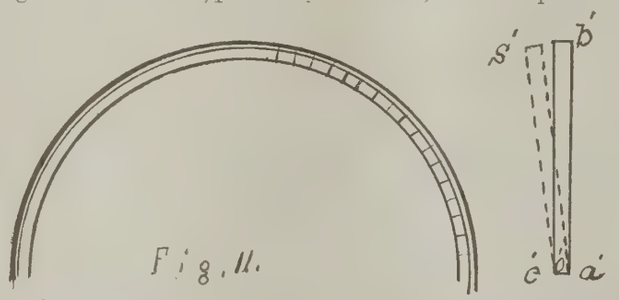
INLAYING.

From "A. D. A.," Chicago, Ill.—Answer to question on inlaying from J. C. O. L., Milwaukee, Wis.: It took me a long time to find out where I could get a book on inlaying or marquetry. The only book of this kind was written by Wm. Bemrose, and is published by Bemrose & Sons., 23 Old Bailey, Derby, London, England.

That is where I sent for one. The book shows how to do the work fully and has ninety colored plates and designs. The price is $3.00. I learned to do the work from my book, and will sell it to you at much less than cost. I am not in the book business, but always willing to help a reader of THE NATIONAL BUILDER.

KERFING.

From "T. A. F.," Washington, D. C.—If G. F. H., San Francisco, Cal., will first find the radius of his circle, then take a piece of stuff of a suitable length and equal to the thickness of that which is to be bent, as at c a, and let a b be equal to the radius of the curve around which it is to be bent; make a saw kerf at c' o' having a thickness of ¼ of an inch uncut; nail the piece below

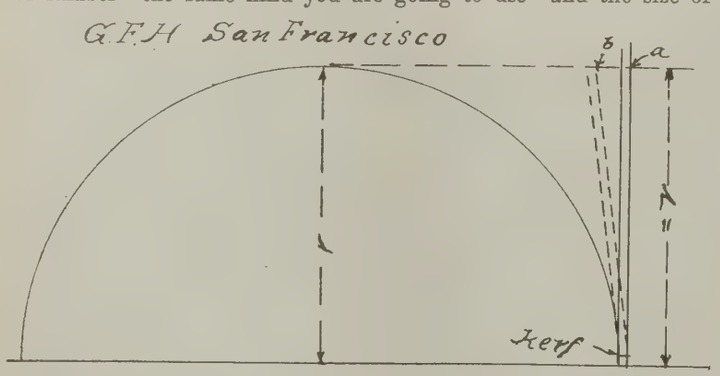


c' a' and move it from b' to s', or enough to close the saw kerf at c', then b' s' will be the given distance between two saw kerfs. Use the same saw for all the kerf.

NOTE.—The editor has fully a dozen answers to this inquiry which have been sent in to him, and there is a sameness in them all. Those given are all that are required, but we thank our readers for their answers, although we may not use them.

KERFING.

From "J. W. S.," Los Angeles, Cal.—In order to get proper curves it may be necessary to experiment a little to get the proper number of saw cuts, and the proper distance of them. Take a piece of lumber—the same kind you are going to use—and the size of



ANS. TO NO. 428. FIG. 6.

the piece you are going to bend; it need not be longer than radius of your circle. Saw a kerf near the end, place it in the vise and screw tight, then bend over until the kerf closes; the distance the top moves, as from A to B in Fig. 6, will give the distance between kerfs. Use the same saw all the time and saw to the same depth, leaving about a quarter of an inch solid wood below the kerfs.

QUESTIONS

BAY WINDOWS.

From "Joel Winder," Manitown, Wis.—I would like to see a few designs for bay windows, with or without transoms, and having small lights on top. I would like also to see a design for a step-window for a hall running up the incline of the stairway. Would like three sashes, or three sheets of glass in the bays, and in the step-window. Such designs would be very much appreciated by one of your oldest subscribers?

TIN ROOFS.

From "R. O. N.," Scranton, Pa.—Is it good policy to paint tin roofs, and if so, what kind of paint should be used?

SHINGLE ROOFS.

From "Michael Z.," Green Bay, Wis.—How long should ordinary shingles hold good? Does painting a shingle roof add to the life of the roof? In painting a roof, what kind of paint is the best to employ for the purpose? Any other information on the question of shingle roofs will, I am sure, interest many readers beside the writer.

FIREPROOF ELEVATOR SHAFTS.

From "Chicago Man," Chicago, Ill.—I am about to build a "Skyscraper" in which there will be several elevator shafts, and I would like to find out if there is any method of making the shafts fireproof, or nearly so, and of preventing the shafts from becoming a flue in case of fire? I am somewhat confused on the question owing to getting so many conflicting opinions on the subject. I will draw my own inferences from whatever you may say, and I think, judging from past experiences, that I will get some good pointers from you and your subscribers.

TAPER FRAMING.

From "John W. K.," New Ontario, Ont.—How are the bevels obtained for framing tapered work, such as the shoulders on posts, the bevels on braces, etc.?

TAR AND GRAVEL ROOFS.

From "A. J. C.," Erin Springs, Okla.—Will some kindly disposed reader please inform me of the best method of putting on a tar and gravel roof, and the best materials to use for the purpose, and oblige an old reader?

HIPS AND VALLEYS.

From "J. A. B.," Lake Megantic.—I would be thankful if some reader would send to this department of "our favorite paper" if there is a way of finding the lengths and bevels of hip, valley and jack rafters without the need of making a drawing. Any answer on the subject will be greatly appreciated.

REGISTER DESK IN WALL.

From "Davis," Sacramento, Cal.—I am to make a register desk and would like some information as to the way it should be made. I give the conditions as near as possible. The register book is 18x20 inches when open, and it must be made to hold the book when closed, and the desk or cabinet must not project beyond the wall to which it is fastened more than 3 or 4 inches, as the space is limited. Any information will be thankfully accepted.

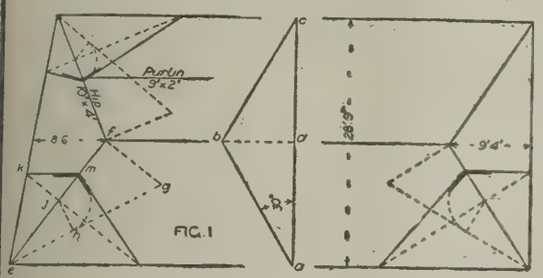
From F. H. R., Buffalo, N. Y.: I have been a subscriber to the NATIONAL BUILDER for the last three or four years and like it very much. I would like to see some designs of houses of about 24x38 ft., or 26x40 ft. in size and of true Colonial design published in the BUILDER soon. I would appreciate this very much.

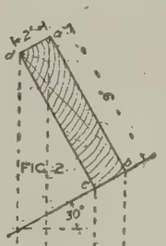
From J. B. R., Palestine, Texas: Can't find information. Have any of the brother contractors used what is called Beaver Board, made by the Beaver Board Company at Buffalo, N. Y.? It is made to take the place of plaster on the inside and to decorate with. This country is damp and I think it will go and come to the weather. I have tried from leading architects to get this information but have failed. It seems new to them. If any contractor has used it please answer through the BUILDER'S columns his experience with it and I will appreciate same.

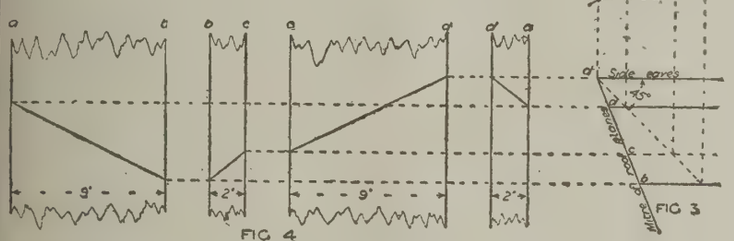
OUR PRACTICAL COLUMN

BEVELS FOR HIPS AND PURLINS MAY BE OBTAINED AS FOLLOWS:

Draw the plan of the roof as in Fig. 1, and the outline section a b c d. For the backing of hip rafters draw f g at right angles to c f and equal to b d. Join g e, and from any point h in e g draw h j at right angles to e g. Through j draw k j l at right angles to e f, cutting the end and side eaves in k and l. With center j and radius j h describe an arc cutting e f in m. Join k m and l m, and the angle k m l gives the backing of the hip rafter; but it must be observed that the backing is not uniform for the two sides, being e m l for one side and e m k for the other. The backings of the other hip rafters may be found in a similar manner, as shown in Fig. 1.



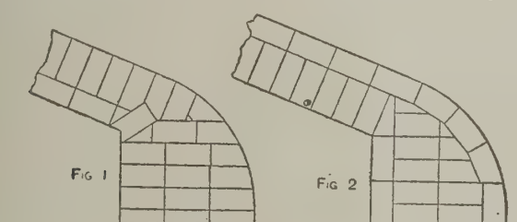


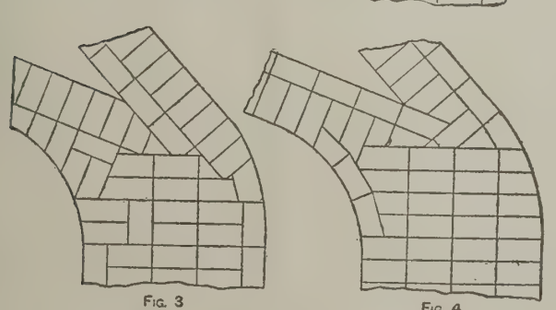


To find the bevels of the purlins draw sectional elevation of the purlin marked in Fig. 1 at its proper angle, as in Fig. 2, and the plan as Fig. 3, where a line of 45 degrees is drawn from d to receive the projections from Fig. 2. Lines are then drawn parallel with the eaves through the intersections to meet the mitre line of roof planes. Then from the points a b c d on the mitre line project across to the corresponding elevations of the four faces of purlin in Fig. 4. Join the two points on each face of purlin, and the required cuts will be obtained. The same process may be adopted for the other purlins.

FLUES.

The bonding, of which many different arrangements might be given, for outside wall of flue at the point where it meets bedroom or other inside wall, is shown in Figs. 1 and 2, while the bonding for the two middle walls of the flues at their junction with





the middle wall of the bedroom is shown in Figs. 3 and 4. The width of the flue is marked 5 feet on the pencil sketch sent, but this makes no difference in the bonding of the walls, but affects the setting out of the work and requires careful attention.

COST DATA FOR APPROXIMATE ESTIMATES AND APPRAISALS.

The cost is based on per cubic foot of Building Contents exclusive of Scenic or other features, Lighting Fixtures, Mural and Art Painting, Incidentals, etc., and are charged at from 6½ to 7 4-5 cents per cubic foot.	TYPES OF CONSTRUCTION			
	ORDINARY	FIRST CLASS	HIGH GRADE	ELABORATE
Architect's Fee	1⅛	1¼	1⅜	1¾
*Brick and Brick Work	4	4½	5¾	6⅝
Bronze and Brass Work	1/4	1/4	½	⅞
Carpenter Work	4⅛	1⅙	2⅞	3¼
Cast Iron	¾	⅞	1⅛	1⅞
Composition Flooring		⅛	¼	⅝
Concrete	1/16	2/3	⅞	1¼
*Concrete Block Work	3	3	3⅛	4¼
Concrete Reinforcement		½	⅝	1¼
*Cut Stone and Cut Stone Work	3 1/16	6	6⅝	8½
Electric Work	¼	2/3	⅞	1½
Elevator Work	2/3	1	1¼	1¾
Excavation	¼	¼	⅜	⅜
Foundation Work	¾	1¼	1⅝	2¼
Gas Fitting	1/16	⅛	1 1/16	1¾
Glass and Glazing	5/32	5/32	¾	⅞
Hardware	⅛	1/16	1/16	⅝
Heating and Ventilating	1⅛	1¼	1¾	1⅞
Lathing	¼	¼	⅜	⅜
Ornamental Metal Work	¾	1⅛	1⅛	1⅞
Painting	½	¾	1⅛	2⅝
Plastering	1⅞	1⅞	1⅞	2¼
Plumbing	½	¾	1⅛	1⅛
Power Plant	¾	¾	1⅛	2⅛
Roofing and Accessories	½	¾	1⅛	1⅜
Sheet Metal	⅛	½	½	⅞
Skylights	1/30	1/30	1/16	¼
Structural Steel and Iron	⅞	2½	2½	2½
Stucco Work	⅞	1¼	1¼	1¾
*Terra Cotta and Faience (Trim)	½	⅞	⅞	1¼
Terra Cotta Blocks	⅛	2/3	2/3	⅞
Tiling and Mosaic	¼	⅜	⅞	⅞
Waterproofing and Dampproofing	⅛	¼	⅜	¾

Note.—These items are alternates for exterior work and are used or omitted as design may determine. For interior work the averages are approximately correct. Prepared by Duncan M. Robertson.

QUATRE-FOIL.

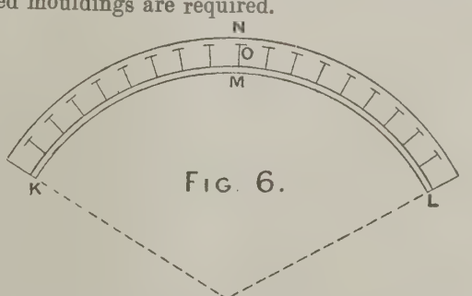
Fig. 3 shows a method of forming a quatre-foil, which is often used in gothic work.



KERFING.

The method of kerfing shown in Fig. 6 is not valued very highly, yet occasionally it is made use of to good advantage.

For bending mouldings, saw kerfing was once in general use in this city; now no superintending architect will allow it; solid or laminated mouldings are required.



Let K M L be a thin veneer bent over the required form. Clean the dust out of the saw kerfs and put plenty of glue in and on the face, then lay the saw kerfed stuff on the veneer as shown—braces should be screwed over the whole at intervals, to keep them snug to the form till the glue is set. The form may be built so that N, the convex surface, or M, the concave, may be face-side. Saw kerfed work without the veneer glued on the kerfed side, as here shown lacks strength and is good for nothing.

BOOK NOTICES.

PRACTICAL STEEL CONSTRUCTION.—Dealing with all phases in the construction of our modern steel buildings. With illustrations, drawings and valuable tables. Compiled and edited by Fred T. Hodgson, F. R. I. C. A., author of "The Steel Square and Its Uses," "Practical Carpentry," "Estimators Guide," "Light and Heavy Framing, etc., etc., published by Frederick J. Drake & Co., Chicago, Ill. Cloth, 105 pp. Price, postpaid, $1.00.

This is a valuable little book for steel constructors—men who do the work—as it gives many hints as to the various methods, and the tables will be found quite useful in determining the ditch and place of rivets, and many other things that a foreman or workman ought to know. It is simply a manual of an advanced kind, and informs the student regarding live and dead loads. What floors in houses, shops, factories, and warehouses should carry per square foot, and how to calculate for this strain; along with many other items of useful and necessary information.

DUSTMAN'S BOOK OF PLANS AND BUILDING CONSTRUCTION.—Consisting of drawings, plan drawing, figuring and estimating, specifications, building bungalows, farm buildings, concrete work, Joiners finishins, and building work generally. By U. M. Dustman, licensed architect. 240 pp., 8x12 inches, over 300 illustrations. Published by The Chas. C. Thompson Co., 545-549 Wabash avenue, Chicago, Ill. Canvas bound. Price, $2.00.

This is somewhat of a pretentious book in appearance, but its contents do not belie its looks, as it is really a "big book," in fact as well as in looks, containing as it does, an immense amount of really useful and practical information for the general builder, the carpenter, the bricklayer and the mason. Its chief value, however, lies in the large number of house plans, bungalow plans and plans for barns, stables, garages and other farm and domestic buildings. The book also cotnains articles on the arrangement of rooms, conveniences, method of planing, and on many other live subjects; also a very full treatise on carpenter's geometry, and methods of laying out work of various kinds. Another good feature is the showing of working details in the latest style. It is a good all around book for the general workman, and its low price puts it within the reach of everyone. It is well bound, and is printed on fine heavy calendered paper.

We note that our popular Cotem., "Woodcraft," of Cleveland, Ohio, has invaded the British Empire and opened a publishing office in London. We congratulate Brother Clegg and wish it may bring them all the success they deserve.

STANDARD PRACTICAL PLUMBING. By R. M. Starbuck, author of Modern Plumbing, etc. 450 pp. and upwards of 340 illustrations, specially made for the purpose and drawn in such a manner the reader will have no difficulty in understanding. The work is published by the well known firm of Norman W. Henry Publishing Company, New York, N. Y. Cloth bound, heavy paper. Price $3.00.

We have gone over this work at greater length than usual and have no hesitation in stating that we are satisfied it is equal, if not superior, in both quantity and quality of matter presented, to any work we know of, on the subject of plumbing, and the style of text and manner of presenting it seem to be well adapted to the readers for whom the work was prepared—i. e., the operative plumbers. It is a plainly written book, in the simplest of English, and each page bristles with good sense and profitable instructions. The drawings are practically presented and suited to practical men having practical wants.

Of the three hundred and forty-seven illustrations contained in the book, one hundred of them are full page illustrations. The illustrations, all being drawn expressly for this work, show the most modern and best practice in plumbing construction.

Plumbing in all its branches is treated within the pages of this book, and a large amount of space is devoted to a very complete and practical treatment of the subject of hot water supply and circulation and range boiler work.

Another valuable feature is the special chapter on drawing for the plumber.

The book is well made, is strongly bound in boards, and the paper used is of fine quality, while the press work is beyond reproach. The type is large and clear, and the diagrams and illustrations are fine and clear, every line being distinct and well defined.

BROOKS' AUTOMOBILE HAND BOOK. By L. Elliot Brooks, M. E. Revised and enlarged by Calvin F. Swingle, M. E., and other experts, 1911 edition, brought to date and includes all recent inventions and improvements. Over 700 pages and between three and four hundred diagrams and illustrations. Published by Frederick J. Drake & Co., Chicago, Ill. Limp leather covers, well bound. Price, prepaid, $2.00.

To those having anything to do with the making, repairing or managing a motor car of any kind, this book is an indispensable requisite, as it deals with every item that goes into the "make-up" of a complete machine. It is a strictly up-to-date treatise, and deals in a thoroughly practical manner with all the various questions relating to the construction, care and operation of gasoline, electric and steam motor cars, with diagrams of each part, together with clear, concise explanations of the principles governing their action; correct methods are also given for dealing with road troubles, motor troubles, carburetor and ignition troubles of every kind. It also contains valuable information regarding ignition systems, carburetors, magnetos, valve setting, indicator work and other important matters. There are also a number of useful tables, rules and formulas, which add much value to the work and make it an exhaustive compendium of automobile knowledge; and the text is laid before the reader in a style that is at once simple and understandable. The book is nicely gotten up, printed in medium sized type on good, strong paper, well bound, and may be used as a pocket reference book if desired. Every motor car should carry one of these books in a waterproof case in some corner that would be handy to reach. It would often be found useful in emergencies.

LATEST LEGAL DECISIONS

Under St. 1890, p. 370, c. 418, requiring the execution of a formal contract for the erection of a public building for a city in addition to the acceptance of the proposal, and providing that every proposal shall be accompanied by a deposit for the performance of the proposal, a bidder for the erection of a schoolhouse, who agrees that if, within 20 days after a specified date, notice that his proposal is accepted be given him, he will deliver a contract for the work, and that the deposit shall be the property of the city on his failure to carry out the proposal, must stand by his proposal, at least until the expiration of the specified time, and the acceptance by the city of a lower bid is not a rejection of his bid, and a subsequent acceptance of his bid within the specified time, after refusal of a lower bidder to enter into a contract, is binding on the bidder, and on his failing to execute the contract the deposit is the property of the city.—Wheaton Building & Lumber Co. v. City of Boston, 90 N. E. (Mass.) 598.

Property cannot be subjected to a mechanic's lien for material furnished under a contract with one who is not the owner's agent.—H. C. Behrens Lumber Co. v. Lager, 125 N. W. (S. D.), 574.

A building contractor could not recover for work done till it was approved and accepted by an architect, as the contract provided.—Papot v. Barbour, 51 So. (Ala.), 725.

A carpenter engaged in the construction of a building and a man operating a freight elevator in a retail store are engaged in different departments of labor, and are not "fellow servants," under Civ. Code, Sec. 1970, as amended by St. 1907, c. 97, limiting the fellow servant rule to cases of servants of the same master engaged in the same department of labor.—Morgan v. J. W. Robinson Co., 107 P. (Cal.), 695.

The owners of an amusement park and contracting plumbers doing work on the premises might be held jointly liable for an injury to an employe of the plumbers as wrongdoers acting independently, whose tortious conduct concurrently contributed to the injury, where the injury resulted from the servant slipping on oil on the floor from a defective oil cup in a building in which he had been sent in the night time.—Bagley v. Sonderland Co., 91 N. E. (Mass.), 317.

While a waiver must be made with knowledge of all the facts by the party waiving it, the agent of a company which was surety on a construction contract by accepting the balance of the contract price after the contractor had abandoned the work, and stating that the owner need not worry as the matter would be settled up, waived notice to the surety of the contractor's defaults, as required by the surety contract.—Boppart v. Illinois Surety Company, 126 S. W. (Mo.), 768.

There was testimony that plaintiff was discharged successively by two employers, because each of these employers were successively warned by an agent of the defendant, a labor union, that, if the employer kept the plaintiff in his service, all members of the union would quit his employment in a body. The purpose of this warning was to impress upon the employer the danger that he would be stripped of his ability to complete certain contracts unless he discharged the plaintiff, and the purpose was ultimately to coerce the plaintiff, who was a member of a local in another union, to join the defendant union. Held, that the finding of the court sitting as a jury that the plaintiff was entitled to recover against the union for inducing his discharge was not error.—Ruddy v. United Association of Journeymen Plumbers, Gas Fitters, Steam Fitters and Steam Fitters' Helpers of the United States and Canada, Local No. 24. 75 A. (N. J.), 742.

Plaintiff, a carpenter, employed to do certain work in an elevator shaft, was injured by the sudden operation of the elevator by another of defendant's servants without warning. Plaintiff and the elevator man had agreed that, before the elevator was moved, the operator would call out to plaintiff, and should not move the elevator until answered, "All right." He did move it without calling out and plaintiff was injured. Held, that, though plaintiff assumed the risk of injury involved in working in the shaft, he did not assume the risk of the negligent use of the elevator by defendant, under the rule that an employe by voluntarily putting himself in a place of danger does not thereby necessarily assume the risk of injury from his employer's want of care.—Morgan v. J. W. Robinson Company, 107 P. (Cal.), 695.

The mechanic's lien act (Laws 1897, c. 418) provides for enforcement of such liens in a court which has jurisdiction in an action founded on a contract for a sum of money equivalent to the amount of the debt, and provides that the lien may be enforced "against such property and against the person liable for the debt," and required the filing of a lis pendens when the action is brought, whether in a court of record or not, and provides that failure to do so shall not abate the action as to any personal liability for the payment of the debt. The Municipal Court act (Laws 1902, c. 580) gives municipal courts jurisdiction of "an action to enforce a mechanic's lien on real property in which the court shall have power to render judgment for the sum due with interest * * * and to declare the amount a valid lien against the interest of the defendant in the property described in the complaint * * * where the amount does not exceed $500," but provides that such court cannot render judgment for the foreclosure and sale of the property. Held, that the meaning of the statutory provisions relating to the jurisdiction to enforce a mechanic's lien must be ascertained from all the provisions considered together, and from the general scope of the statutes and purpose in view, and that the Municipal Court has jurisdiction to enforce a mechanic's lien.—Nelson v. Hajek, 121 N. Y. S., 1018.

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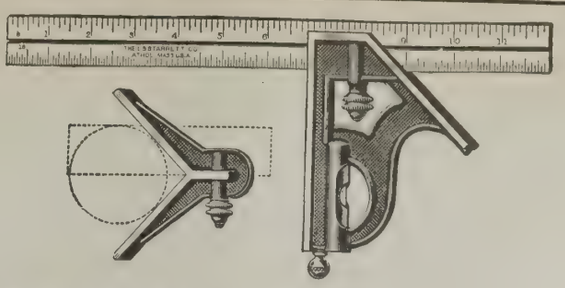
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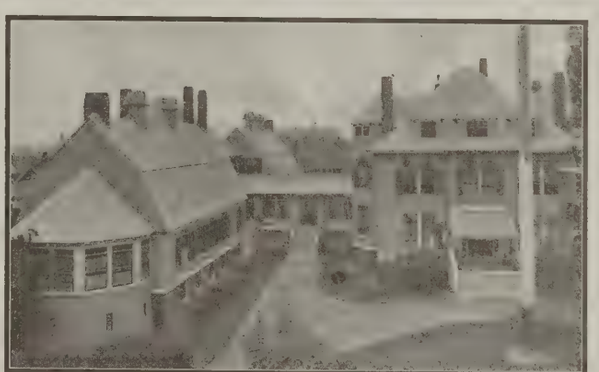
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TRADE REVIEW

A GOOD CARPENTER SHOP AND FARM TOOL.

A new grinder, made of Carborundum, the abrasive which is said to be displacing emery wheels and other grinding wheels in all large manufacturing plants, is now being offered. At experiment stations, where this grinder has been tried out, it has given the utmost satisfaction, and in a very short space of time it has sprung into very pronounced popularity. This popularity is due to its perfect fitness for carpenter shops and farm tool equipments, and to the fact that all the grinding and polishing wheels are made of Carborundum.

Carborundum is made in a mammoth furnace at Niagara Falls from the same elements that go into the making of diamonds; it is 25 times as hard and will cut 25 times as fast as the ordinary grindstone. It cuts into the hardest steel, as if it were chalk. No matter how long it is used, a Carborundum wheel never becomes smooth or has to be dressed, as other wheels must. Mower sickles, plow shares, cultivator blades, scythes, axes, corn knives, kitchen cutlery, chisels, hatchets, pocket knives—in fact nearly every tool used can be sharpened and polished bright as new, on the Luther Grinder. It has nine Carborundum sharpening devices and three other attachments.

Carborundum is made in large electric furnaces at Niagara Falls. This new substance has all the chemical properties of the real diamond—the immense electric energy developed at Niagara Falls makes the manufacture of it possible and now within the reach of all. At first it sold at $550.00 a karat. The mechanical world recognizes it as the greatest sharpening substance in the world.

The Luther Grinder Manufacturing Company, 55 Madison St., Milwaukee, Wis., are the oldest and largest makers of grinders in the world and they give a five-year guarantee on this machine. In putting this machine out they have announced that it will be sent to a limited number in every locality on free trial, merely to secure universal introduction as quickly as possible. The offer made by the Luther Grinder Company is very liberal, and as many of our readers are already acquainted with the Company, on account of several years of previous advertising in THE NATIONAL BUILDER, it is safe to say that a large number are already using this grinder and are perfectly satisfied with them. Those who have never tested the merits of this good grinder, can easily do so now with every assurance of liking it.

THE MILKS FRAMING INSTRUMENT.

The Milks Framing Instrument is claimed by the manufacturers to be one of the most remarkable and wonderful inventions in the building field. The claims for this framing instrument are as follows:

It will do the figuring work instantly and with absolute accuracy without mental calculation; gives the length and cuts of hips, valleys, common rafters, jacks and cripples, on any width of building or any pitch of roof, roofs out of square or different pitches of roof; figures stairwork in all its branches, straight or circle, giving the proper number of steps to go in the space; the exact width of treads and rises and all other measurements necessary; divides distances, figures octagons, circles and braces of all kinds. It can be used by anyone who can read and write. It lasts a life-time. In nineteen seconds it will do the work that it takes an ordinary mechanic from two to three hours to accomplish. It will give the answer to puzzling problems, even to a fraction, in less time than it would take to get pencil and paper ready, preparatory to figuring them out. Gives correct answers quickly and accurately, thereby saving expense, worry and mistakes. It is the only instrument ever invented that figures stairwork with absolute accuracy, giving the proper number of steps, and the exact run and rise of each.

Mr. Milks, the inventor of this instrument, also claims that lengths of all rafters used in the construction of building could be figured in less than one minute. In proof of this statement a test was made that demonstrated his contentions were correct.

The signed statement which follows is a copy of the original on file at the office of the Parsons Mfg. Company:

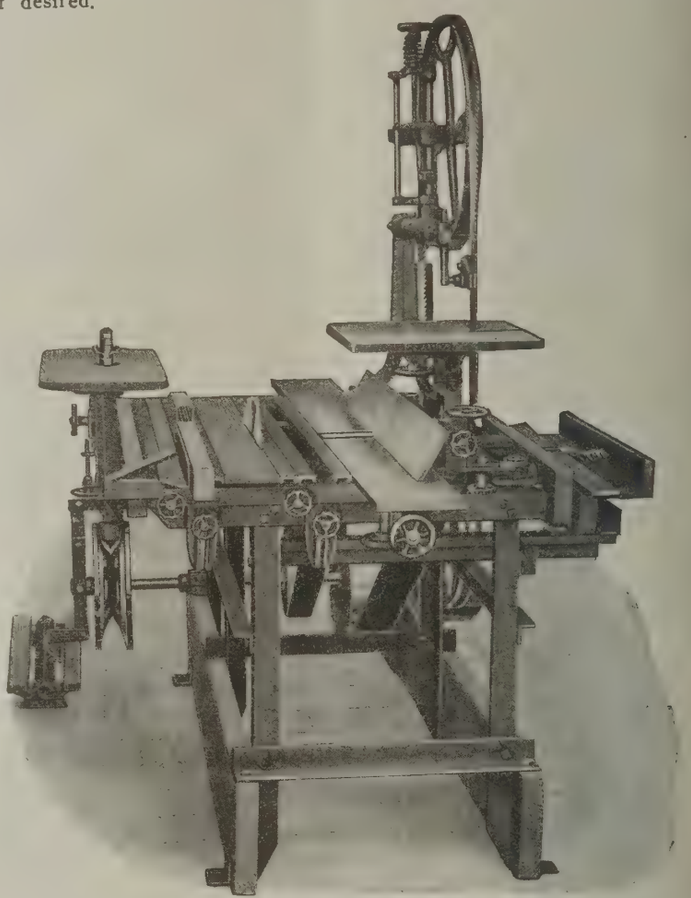
"We timed Mr. Milks in giving the answer to the following problem: What would the lengths of all the rafters be for a hip roof to be placed on building 26 ft. 8 in. square? In 30 seconds Mr. Milks gave correct answer to the problem, including lengths of hips, jacks and common rafter. Geo. S. Lynd, Pres.; J. H. Kent, Treas.; P. A. Morrison, Rec. Secy.; S. A. Speas, member, U. B. of C. & J. of A., Local No. 1022.

The Milks Framing Instrument is manufactured by the Parsons Manufacturing Company, Parsons, Kas, who also manufacture the Milks $1.00 Pocket Miter Box. Reading matter fully describing both framing instrument and miter box will be sent on request.

PARKS COMBINATION WOODWORKING MACHINE.

One of the latest additions to the already extensive line of woodworking machinery turned out by the Parks Ball-Bearing Machine Co., Knowlton and Fergus streets, Cincinnati, Ohio, is the combination circular saw, 6-inch jointer, band-saw and reversible spindle shaper with boring or mortising and rabbeting attachments, which we show in the accompanying illustration. The machine is really six in one, and cannot fail to prove interesting to carpenter contractors, builders and others operating woodworking shops. The frame is made of extra heavy angle iron strongly braced and securely bolted together. It is mounted on a long, substantial base, which it is claimed greatly increases the steadiness of the machine, as it gives more foundation and distributes the strain over more of floor space. The length of base is 4 feet, 2 inches, and the width 24 inches.

The saw table is made of heavy iron and channel steel and the top surface is finished by grinding on special machine. The hight is 2 feet, 10 inches, the width is 22¼ inches, and the length, 3 feet. The heavy angle steel on each side makes a substantial support to which to bolt wood extensions any width or length desired. The shaper spindle is made to reverse by means of two friction disks which slide on the countershaft and driven with a key in the shaft. The table is raised and lowered by means of a hand screw in order to adjust the depth of the cut. It is furnished with shaft, bearings and pulley so that it can be used independent of this machine if desired.



PARKS COMBINATION WOODWORKING MACHINES.

The jointer has hand-wheel incline adjustment for both front and rear plates. The band saw has all the necessary adjustments and tilting table. The machine will do ripping, cross-cutting, band sawing, boring, planing, straightening, squaring, beveling, grooving, rabbeting, etc. The machine is equipped with a 22-inch band saw set in the rear wheel. The boring attachment has adjustable sliding support and takes bits with ½-inch straight shank.

THE CANTON ART METAL COMPANY'S CONVENTION.

Progressive business concerns are alive to the benefit that comes from the free exchange of ideas among their business associates and employees. This fact has led the Canton Art Metal Company of Canton, Ohio, to hold conventions at stated times to promote the interests of the salesmen, the employer and the trade. In a handsome souvenir program the company announce their second annual Sales Convention of branch houses and representatives held at the main office, December 27 to 31.

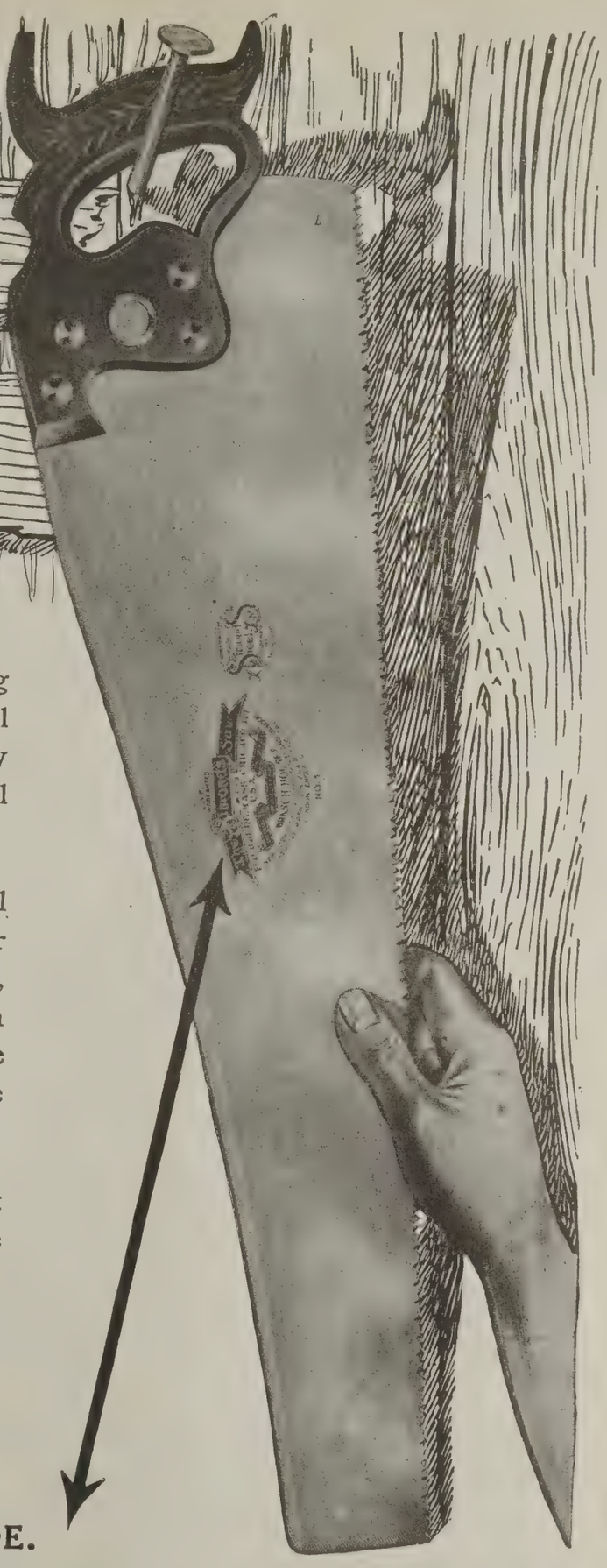
This convention was attended by some thirty representatives. The portraits of a number of these, besides views of the company's extensive plant, appear in the souvenir. It is evident from the portraits that the company's organization embraces a force of men of high efficiency.

During the thirty-four years of the company's existence the products have increased from the more common lines to include metal furniture and filing devices, embracing office, bank, court house, library, school and vault equipment; improved metal ceilings, side walls and wainscoting; cornices, skylights, ventilators, crestings, finials, ornaments, building fronts and special work; formed and roll roofing, siding, shingles, paints, sheet copper, zinc, black sheets, galvanized sheets, corrugated sheets, "Toncan" metal, tin plate, tin roll roofing, solder; eaves trough, gutter, ridge roll, conductor pipe, formed valley, conductor heads, cut-offs, elbows, hangers.

As the lines manufactured were multiplied and found to meet the approval of the trade, increased facilities for manufacture were necessary, and although the plant is now extensive in size and equipment, plans are under way for a still further enlargement. The company has always followed the policy of making quality the first consideration, and attributes much of its success to this practice.

The company's metal ceiling with punched nail holes and repressed joints has had a sale beyond all anticipations. The metal furniture department is equipped to handle all contracts. Among the contracts on hand for this line are entire equipments for many court houses.

Simonds Saws



THE very first step taken toward making a Simonds Saw—the making of the steel—is specialized under a Simonds Process. By it we produce Simonds Special Crucible Steel—for Simonds Saws only.

No other process produces a better steel for Saws. It is tough, flexible, with a temper taking quality that makes it when treated, tempered, ground, finished, and made into a saw blade, in the Simonds way, in the Simonds shops, the best saw that can be bought at any price.

Another thing: should even the slightest defect crop up in a Simonds Saw, while in the process of making, that condemns it to the scrap heap. Remember you can always be sure of buying high grade quality when you buy a **SIMONDS.**

To buy the right saw, let it be rip, hand or panel, see that the Simonds (Si-monds) name is on the **BLADE.**

Let us send you a free copy of Simonds "Guide for Carpenters." Tell us what kind of a Saw you will need soon.

Simonds Manufacturing Company
Fitchburg, Mass.

CHICAGO, ILL. NEW YORK CITY | NEW ORLEANS, LA. PORTLAND, ORE. | SAN FRANCISCO, CAL. | SEATTLE, WASH. LOCKPORT, N. Y. | MONTREAL, QUE. LONDON, ENG.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

VANADIUM STEEL SAWS AND MACHINERY.

BY GEORGE E. LEES.

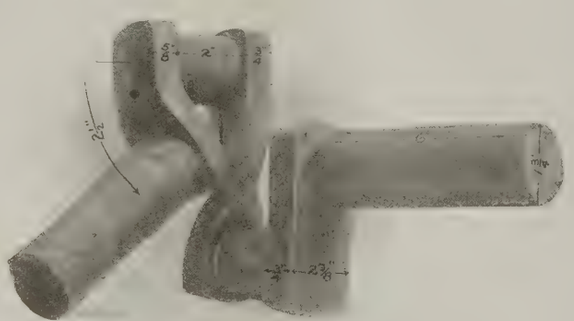


TYPE "H" VANADIUM STEEL SAW WITH BLADE COILED.
After remaining thus for thirty days, the blade was released, and returned to perfect alignment.

Ten years of the new century have just closed. Looking back over the accomplishments of its first decade, we can credit it with more wonderful and useful results than have ever come to us before in the same period of time. The automobile has been made practical for business and pleasure; wireless telegraphy has linked the intelligence of ships with ships and land over miles of empty space; radium has been harnessed into useful service and the age of steel has been revolutionized by the application of a new element, Vanadium.

Ten years ago the metal Vanadium was a curiosity of the laboratory; it was used in a small way for tinting glass and giving beautiful colors to expensive porcelain. It was first discovered in a piece of remarkably ductile and excellent Swedish iron that had been made from the ores of Tabert in Sweden. It was also found in these ores, but in very small quantities. Owing to the extremely high melting point of Vanadium, it could not be introduced directly into steels and irons during the process of manufacture, but it was soon found that an alloy made of one part Vanadium and two parts of iron melted very readily and could be dissolved in molten iron and steel in the crucible or the open hearth furnace. Irons and steels of the most remarkable qualities resulted, but the supply of Vanadium was so small that Vanadium steels could not be placed on the open market.

Some five years ago, however, the engineers of the American Vanadium Company of Pittsburg located a rich and extensive Vanadium deposit about three miles up the Andes mountains in Peru, and a factory was built near Pittsburg for the commercial reduction of the ores and the manufacture of a suitable alloy known as "Amervan" Ferro Vanadium.



BENT UNDER 2,500 LB. STEAM HAMMER BY REPEATED BLOWS WITHOUT ANY SIGN OF FRACTURE. A HIGH GRADE ORDINARY STEEL FAILED UDER THE SAME TEST.

A revolution in steel then began and the results today are little short of amazing. Before the period of Vanadium steel, a one-inch square steel bar could scarcely be made to support a vertical load of 100,000 pounds,



ONE INCH BAR OF VANADIUM STEEL TIED INTO A KNOT COLD. ELASTIC LIMIT 100,000 LBS.

but today Vanadium steel bars of this size can be seen holding weights of 225,000 pounds.

Vanadium steels have been very largely employed in railroad and automobile work; locomotives are now built around Vanadium cast steel frames, with Vanadium iron cylinders and all the forged parts of Vanadium steel.

The advantages of using small quantities of Vanadium appear in the remarkable increase of strength and elasticity given to the steel and in the fact that Vanadium steel won't crystallize or "get tired" and break unexpectedly. It is not brittle and possesses the most surprising wearing qualities.

About three years ago the American Vanadium Company made some carpenters' saws and had them coiled up and locked with a steel band as shown in the engraving. After thirty days one of the saws was released and returned to a perfectly straight line; after a year another was released and showed no signs of curvature. The same result was obtained after two years with a third saw and the one shown in the engraving is going on its third year and will be released in Atlantic City at a large convention next June.

One of these Vanadium saws taken at random was bent from point to handle in both directions and returned to its original condition. Two twenty penny steel spikes were then driven in a plank and the plank was sawed in two, straight through the spikes, without any perceptible injury to the teeth. After that a 2-inch steel gas pipe was sawed in two pieces by the same saw. With a hammer one of the teeth was then bent at right angles to the blade, and then again bent in the opposite direction till it came to a right angle, when it was returned to its proper position unharmed. In sawing concrete molds covered with cement, this saw has a record of two weeks against an ordinary saw's three days without resharpening.

The demand for Vanadium steels in railroad and large engineering work has been so great that its use in small tools has been somewhat neglected, but with this surprising proof of the absolute superiority of Vanadium steel over all other types of steel, the carpenter and builder has now come into his own and is able to hold a saw that saws.

[Editor's Note.—Mr. Lees' address is 324 Frick Building. On request, Mr. Lee will mail full particulars about Vanadium steel, hand saws, etc., and will also place your name on his list for a free copy of a new book he is making up on the subject.]

THE ASHLAND FOLDING SCAFFOLD BRACKET.

Everyone knows that in placing a new building device or material on the market the manufacturer generally find his hardest work in making sales right at home among his friends. So when he does find his friends coming to him and ordering the new folding scaffold, and that is what this article is about, it is a pretty good indication that the buyer is getting the best. When re-orders are placed again and again by the first customers, it is a stronger indication that the folding scaffold has unusual merit. The Ashland Folding Scaffold Bracket, although only on the market a short time, is used by nearly all the carpenters and contractors in the city it is manufactured in. The makers claim unusual strength for it, unusual convenience in folding up and taking from job to job and it is especially easy to put on any kind of siding, without



SHOWING ASHLAND FOLDING SCAFFOLD BRACKETS IN USE ON SIDES AND FOR CHIMNEY WORK.

damaging it. The Ashland Folding Scaffold Bracket is made of metal, and is folded and unfolded instantly without the use of pins or bolts. Each bracket weighs only 17 pounds. No holes are bored in the siding, but instead just drive four ten penny nails and it is claimed that each bracket will safely hold up at least 1,000 pounds. When placed upon the siding the Ashland Bracket is so arranged that swaying or wiggling of the scaffold from side to side is impossible. While the bracket is especially adapted for carpenters' use, it is said to be the most practical bracket made for painters. tinners, and brick masons. For scaffolding on the roof for building chimneys, etc., they are also most useful.

A special discount is being made on this bracket to introduce them in every town. The manufacturers are the Ashland Folding Scaffold Company, 17 Washington st., Ashland, Ohio.

The guarantee given by the Company on their bracket is very liberal. Circular "N" will give further particulars and prices will be quoted also when writing for it.



How a New York Contractor Made a Barrel of Money on 150 Suburban Houses!



The Gordon-Van Tine Catalogs OPENED HIS EYES!

Here's just **one example** of the way our business grows. A New York Contractor, conducting extensive building operations in the suburb of Far Rockaway, Long Island, noticed an advertisement of the Gordon-Van Tine Co. of Davenport, Iowa, offering high-grade, guaranteed Millwork, Lumber and all other Building Material—**direct from the mill**—at a big saving over retail dealers' prices. It interested him. He wrote for our Catalogs. When they came, the low prices opened his eyes to the enormous savings offered.

Comparison of Our Prices With Local Dealers' Made Him "SIT UP AND TAKE NOTICE"

He said to himself, "Great Scott, if there's as big a saving as that, **me for Gordon-Van Tine!"** He made careful comparison of our quotations with the prices asked **on the same class of stuff** by local retail lumber dealers and millwork men. He decided to risk a trial order, as he found our bank references O. K. and our rating in Dun and Bradstreet satisfactory.

Sent Us a "TRIAL ORDER"—Goods Shipped Quick and Proved to be HIGHEST QUALITY

We filled the order in the usual way—**promptly, carefully, conscientiously.** We didn't know he had "150 houses up his sleeve." It wouldn't have made any difference even if we had. The contractor was delighted with our stuff.

It was not only better than he expected, but everything came through "shipshape"—due to our extreme care in packing.

He saved so much money on the "trial order" that he felt like he had tapped a "pay streak."

Orders Material for 150 HOUSES and Becomes a STEADY CUSTOMER of the Gordon-Van Tine Co.

The pictures at the top show the class of houses which this wide-awake contractor built from our materials exclusively.

He made a barrel of money on those 150 houses and is a steady buyer of our materials. There are over half a million fellows throughout the country who have also "seen a great light" out in Iowa.

Honestly, MR. CONTRACTOR, Why Not Investigate?

Our immense concrete warehouses are packed and with bargains in sash, doors, millwork, stair and porch material, flooring, roofing. Everything ready for quick shipment anywhere; **quality, safe delivery and satisfaction guaranteed.** Get the Free Catalogs. Compare prices, note the big saving, and send us a **trial order.**

GORDON-VAN TINE CO., 555 Federal Street, Davenport, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



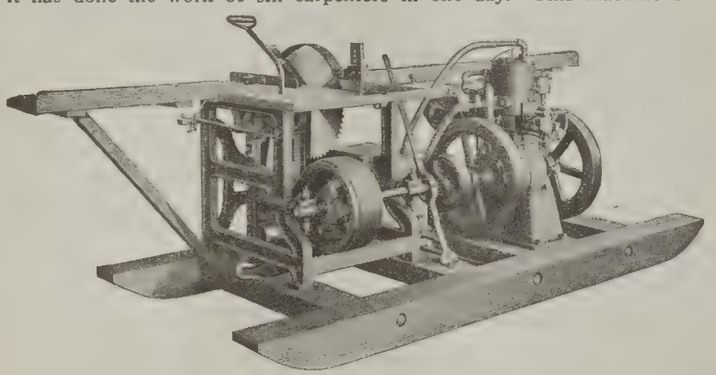
OSHKOSH PORTABLE SAW RIG.

The Oshkosh Logging Tool Company of Oshkosh, Wis., are manufacturing a portable rip and swing cross saw rig, which will be of interest to our readers. This machine is manufactured with either a gasoline engine or electric motor for power and is mounted on heavy hardwood skids, so bolted and mortised together as to afford a base practically as solid as a permanent foundation, thus insuring perfect and permanent alignment of shaft, boxes and belts, an extremely important consideration in the constitution and operation of a portable saw rig.

The machine part of this rig, it is claimed, is the only one of its kind on the market today, and is fully covered by patents. The feature of this machine is the swinging arbor which is made to swing for cross cutting and held rigid for rip sawing and is controlled by a lever on the side of the machine. A lever is placed in a suitable position for operating the saw when cross cutting. These machines are equipped with sliding scale for sawing various widths, also miter device for all kinds of miter sawing. The saw is covered by an adjustable saw guard which may be set to any height. Iron saw tables are made amply large enough. Attached to the iron tables are two side tables which make the sawing of long and heavy lumber much more handy. A hook is fastened on each end of the skids which allows the handling of this rig by team of horses and may be hauled to any desired place.

The portable saw rig is made in two sizes. Size No. 1 carries 14-inch saws and weighs 1,800 pounds and has a 6 horsepower gasoline engine; with the same saws and with a 5 horsepower electric motor weighs 1,400 pounds. Size No. 2 carries 20-inch saws with a 10 horsepower gasoline engine, weighs 2,400 pounds; with the same size saws and 10 horsepower electric motor weighs 1,600 pounds.

Contractors will find this machine a great help to them as they may haul this machine to the place of construction. As a letter below states, it has done the work of six carpenters in one day. This machine can



OSHKOSH SAW RIG.

also be used to great advantage for contractors in the construction of concrete forms. Retail lumbermen have been using this machine to a large extent in their yards for sawing up broken, warped and defective lumber and have found it to be a money maker in their line of business. With this saw they cut out the bad places in the lumber, thus turning a low grade of lumber into a more profitable grade which would ottherwise have gone into the waste pile.

We print below a letter from the Deatherage Lumber Company, which we think fully backs up this statement. The following will give a good idea of the high qualities and money making advantages of the Oshkosh portable saw rig:

Sioux Falls, S. D., September 26, 1910.

Oshkosh Logging Tool Company, Oshkosh, Wis.

Gentlemen: In reply to yours of the 23d would say that we have one of your portable saw rigs on this job.

We have ten buildings here on this contract for the John Morrell & Co. packing plant, most of which are reinforced concrete.

We would say that we have a carpenter and a helper on this saw and that they work practically eleven hours every day. We have never lost any time on this work on account of the saw rig being out of order except from changing dry cells.

We can recommend this machine as a money saver on any job, large or small, and would say that if we had this job to do over again that we would buy two.

A carpenter and a helper on this saw easily do the work of six carpenters. Thus you will see that we consider this machine has already paid for itself on this job, although it is yet as good as new.

We can heartily recommend this saw rig to all contractors as it fills a long-felt want in our business.

Yours truly,
COLLINS BROS., General Contractors,
Office, Rock Island, Ill.

A Copy.

Chicago, October 4, 1910.

Oshkosh Logging Tool Company, Oshkosh, Wis.

Gentlemen: Replying to your letter of September 23, would say that the portable saw rig purchased from your company some six weeks ago and placed on our work at Kansas City has given excellent service and has proven its efficiency under all conditions.

Yours truly,
GEO. B. SWIFT COMPANY,
General Contractors.

Kansas City, Mo., December 5, 1910.

Oshkosh Logging Tool Company, Oshkosh, Wis.

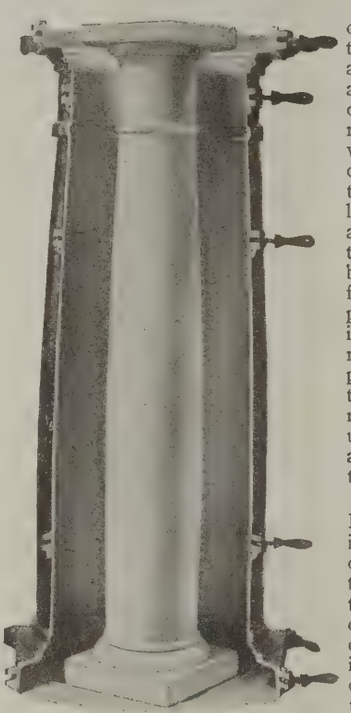
Gentlemen: We are in receipt of yours of December 13 and are pleased to inform you that the portable saw rig has been in operation since September and the saving in time and the utilization of what would, without the use of the machine, be waste or low grade material, has been a source of constant satisfaction and profit to us.

In one day it saved us the net amount of twenty-two dollars ($22). It has been operated throughout by the regular yard force, among whom there is not one making any pretention of mechanical knowledge.

Yours very truly,
DEATHERAGE LUMBER COMPANY.

The Oshkosh Logging Tool Company, Oshkosh, Wis., manufacturers of this portable saw rig, have been making a high quality of logging tools for over twenty-five (25) years, and their reputation in financial standing is such that contractors and lumbermen are assured of the fairest treatment. They guarantee their saw rig for good hard usage and plenty of it, and they will replace any parts that may be defective one year after delivery. A catalogue, fully describing and illustrating their rig, will be mailed upon request.

HOOSIER COLUMN MOLDS.



The tendency of the property owner is to have not only an attractive home, but one that has as many conveniences for comfort as possible. The roomy veranda or porch, is rightfully becoming more popular every day. When well designed and built, the veranda or porch should add to the attractiveness of the house. The Colonial Column is being specified and used in nearly every part of the country by owners desiring a building material which seldom fails to add greatly to the fine appearance of the home. The Hoosier Molds now being placed on the market by the Hoosier Mfg. Company, Goshen, Ind., will give contractors and cement workers a mold which makes a Colonial Column of cement, complete with top and base, without flutings or sections, all in one solid piece.

The Hoosier Porch Column Mold makes a column 54 and 60 inches high. The top is nine and one-half inches; base, eleven and three-quarters inches square and the diameter is nine inches. Two or three of these cement columns can be made each day with a Hoosier mold. The Hoosier Mfg. Co. claims that a cement Colonial Column made in their mold retails from $3.50 to $7.50 each. The cost of manufacturing is said to be 50 cents, or where made of Medusa Portland cement and White Silica sand about $1.00. Only two buckets of cement, five buckets of sand and one hour's time is required for each column. From this, it presents a very attractive proposition as a money maker, for the man who wants to manufacture his own porch columns, or for the cement workers who desire to make them to sell. Everyone knows that a well made cement column has many advantages—and there ought to be a ready market for cement colonial columns. The Hoosier Mfg. Co. gives a very strong guarantee on their molds, and one that is worth investigating, especially as the price seems mighty reasonable.

THE NEW IMPROVED SEBO SCREW ANCHOR.

A radical departure from the usual run of fixture fastening devices is now being put on the market by the Star Expansion Bolt Company, of 147-149 Cedar street, New York City, makers of the famous Star Expansion Bolts.



The Sebco Screw Anchors, constructed on an entirely different principle than the star Screw Anchor, consists of a lead composition, anchor corrugated and cut in the form of a star at the screw end.

This star adds to the inner expansion and is also a formidable preventative against the fracturing of the two jaws.

In the old types a too great expansion would quickly split the jaws. The Sebco also allows a deeper and more even expansion.

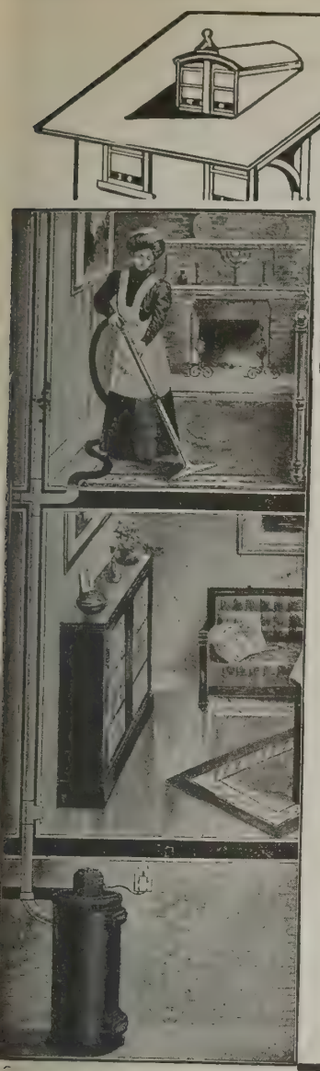
Free samples and a beautifully bound 70-page catalogue will be mailed to any inquirer addressing catalogue department 30.

PATENTS.

976,777. Gravity sash-lock. Edw. N. Brown, assignor of one-half to J. R. Peterson, and one-half to J. M. Bostick, Canton, Ohio.

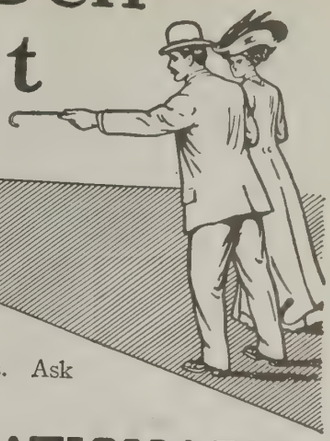
976,652. Device for handling cement blocks. R. L. Hensley, Terre Haute, Ind.

976,182. Reinforced concrete column girder and beam. John A. Jones, Cincinnati, Ohio.





Helps you Sell or Rent



It is conveniences that count.
Add to the lighting, heating and plumbing systems in your houses a cleaning system of equal efficiency and convenience and you'll have more people after them and at better prices. Ask now about the

TUEC-170 STATIONARY Air Cleaning System

The illustration shows how it is installed. To clean any room attach end of hose to pipe-opening on that floor, press the electric button and a suction of 170 cubic feet or 300,000 cubic inches per minute draws in all the coarse dirt and all the fine dust from carpets, curtains, walls, etc, and all the germ-laden air from the house.

Down the pipe it goes to the cellar, the dirt remaining in the machine, the tainted air passing through the chimney-flue outdoors. Complete with aluminum tools for every purpose.

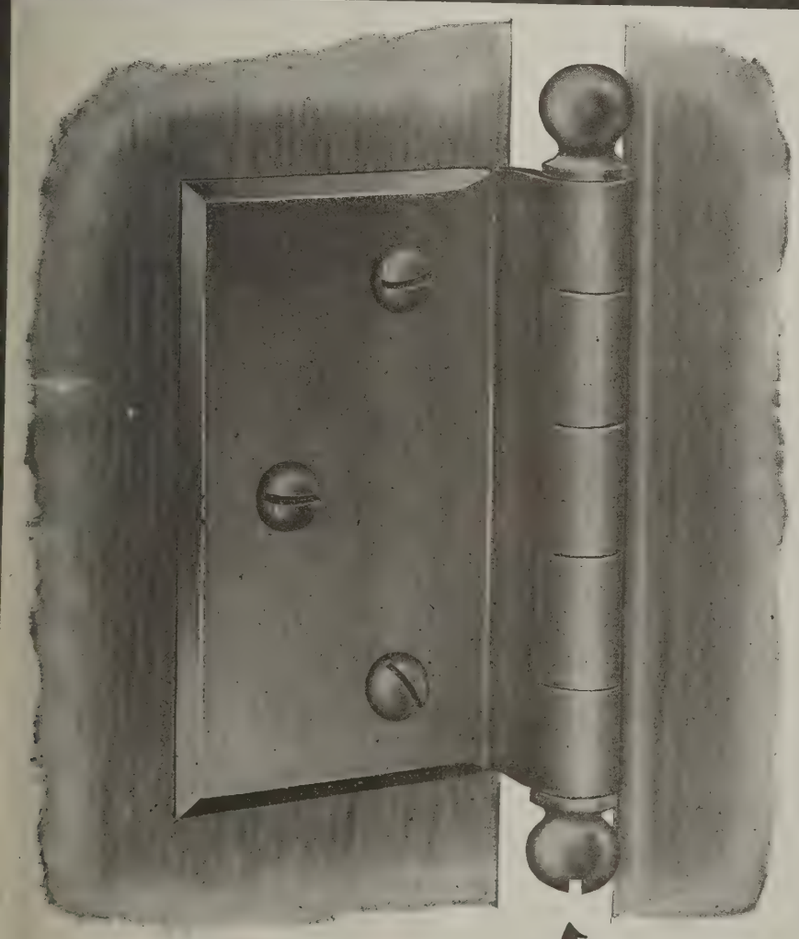
Not a rotary or diaphragm pump system but a powerful centrifugal fan protected by patents owned by The United Electric Co. No complicated parts to make trouble or wear out. Absolutely guaranteed.

Easy to install in any house now built or under construction. A great investment—increases the value of your property far more than the cost of the system. **Write today for free booklet.**

THE UNITED ELECTRIC CO., 3 Hurford Street Canton, O.

Agencies in All Large Cities

We make larger sizes of the TUEC Air Cleaning Machines for hotels, schools, apartment houses, public buildings, etc. Write for further information.



Design No. 450 B.

WE INITIATE—NEVER IMITATE

A Good Tip

All "National" Butts are now equipped with the new tip.

AN EXCLUSIVE "NATIONAL" FEATURE

The tip is threaded and screws into the butt. It is also slotted for a screw-driver, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt.

Catalog "A" tells all about the most attractive line of butts you can get anywhere. Ask for it and give your dealer's name.

NATIONAL MANUFACTURING COMPANY

STERLING, ILLINOIS

SEE THE SLOT

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LADDER ELEVATORS.



Masons, stucco workers and painters should be interested in ladder elevators shown in accompanying cut. For working on stucco houses particularly they are practically invaluable. Every contractor knows how much it costs to scaffold these houses. Using the ladder elevators, a couple of men can erect their scaffold and be at work on it in ten minutes. Afterwards they can raise or lower themselves by easy stages, at will, for the elevator can be operated either from the ground, from the scaffold, or any place nacessary on the ladder; it locks automatically and positively every foot.

On stucco houses the scaffold must not touch the work for fear of marring; just the narrow steel brace touches the house, and that at two points only. A broad, comfortable platform is provided for the workmen to stand on, and the second narrower platform holds tools and material within easy reach. This is a great help in getting work done quickly and well, for it saves strength as well as time of the workmen, in that it takes away the necessity for stooping down from time to time, which is the heaviest part of the work.

A scaffold erected on a pair of these elevators is absolutely safe. There is nothing about them to break or get out of order, and with proper care they will last a lifetime. The runways of channel steel more than double the strength of the ladders, and there is no strain on the rungs, for they are used for support. Elevators are run on and off while ladder is up, and after removing two wing nuts they can be folded for shipment.

Contractors who study into it will quickly appreciate the returns possible from an investment in this equipment. With these elevators in a given time a man will do several times the work possible from any other kind of scaffold.

James L. Taylor Manufacturing Company, the manufacturers, at Bloomfield, N. J., will be glad to furnish full particulars and prices on request.

A GREAT TRIUMPH FOR CABOT'S SHEATHING QUILT.

The North Pole having been discovered by an American, other nations are hatsening toward the South Pole. From England Capt. Scott sailed last June on an expedition which has been carefully planned to follow up the great progress made by Lieut. Shackleton, and from Japan another start has been made.

Capt. Scott has the most complete outfit ever carried on such an expedition, including ice-automobiles and especially made portable houses which can be quickly set up to protect his men from the terrible cold.

These two items were worked out under Capt. Scott's personal supervision. The houses must be as absolutely cold-proof as possible, and yet must be light in weight for ease of handling. After careful investigation Cabot's Sheathing Quilt was chosen for insulating these huts. and the illustration shows a truckload of Quilt on its way to the steamer for shipment to England for this purpose.

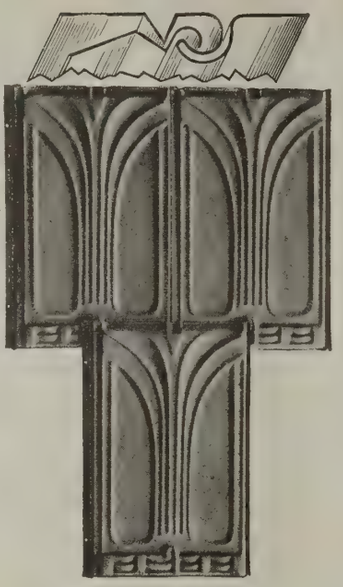
Some Comments of the English Press Follow:

"The British Antarctic Expedition.—As a protection against extremes of temperature, the living huts and observatory for Capt. Scott's Antarctic Expedition. all of which were made by Messrs. Boulton and Paul, of Norwich, have been lined throughout—walls, floors, and roofs—with two layers of the double-ply Cabot's Quilt." —London Times, June 29, 1910.

"It is interesting to learn that the living huts and observatory for Capt. Scott's Antarctic Expedition have been lined with two layers of Cabot's double-ply Quilt. This is a fine feather in the cap of Arthur L. Gibson & Co., of Twickenham, by whom the Quilt was supplied.—The Architect (London), July 1, 1910.

"We have been informed that the living huts and observatory of Capt. Scott's 1910 Antarctic Expedition have been lined throughout with two layers of the double-ply Quilt.—The Engineer (London), August 26, 1910.

NEW INTERLOCKING AJAX SHINGLES.



The Edwards Manufacturing Company have a new metal shingle that they are placing on the market, known as "Edwards Interlocking 'AJAX,'" and which promises to be as popular among architects, carpenters and property owners as Edwards Spanish Tile and their other metal roofings.

The particularly perfect embossing and sharpness of pattern makes this shingle unusually attractive. The manufacturers claim it is the most perfect metal shingle on the market.

The Interlocking Device, which provides for expansion and contraction and conceals all nails from the weather. These shingles, when properly applied, are absolutely guaranteed to be wind, weather, storm, fire and lightning proof. The patented Interlocking Device is so constructed that it is impossible for the hardest rain or driving snow to penetrate. They are manufactured from best quality Worcester Grade Terne Plate, furnished painted or galvanized (regalvanized after formation, size 10x14 inches.

The universal use of Edwards Interlocking "AJAX" metal shingles would prevent, it is claimed, such disasters as the Chelsea conflagration, and at the same time give the property owner a very attractive roofing material.

Full particulars, prices, etc., can be had by writing the Edwards Manufacturing Company, 430-450 Eggleston Ave., Cincinnati, Ohio.

RICHARDS-WILCOX MANUFACTURING CO.

Thousands of practical builders are now acquainted with the Richards Manufacturing Company's line of trolley hangers. But not many know that scarcely more than a half a dozen years ago this company employed only a few men, had a very small plant and was competing against larger and stronger companies.

The Richards Manufacturing Company have just announced the consolidation of their interests with the Wilcox Manufacturing Company, making door hangers, etc. The business will be conducted under the name of the Richards-Wilcox Manufacturing Company, with the following officers: W. H. Fitch, president and general manager; Lee Mighell, vice president; Milton D. Jones, secretary and treasurer; P. L. Hoffman, superintendent.

From the small beginning made about six years ago, this consolidation is a fitting climax of an unusually rapid and substantial growth developed strictly upon the merits of a type of trolley hangers for barns, warehouses, garages and residence doors which is said to have no equal.

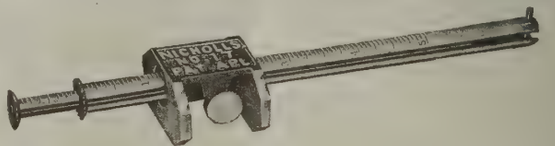
Richards trolley hangers are easy running, easy to put up and adjust and do not jump the track. They have proved so satisfactory to architects, contractors and property owners that hardware dealers all over the country carry, as a rule, the complete line.

A great deal of attractive and instructive literature will be sent out to builders wanting full details on door hangers. The location of the factories and office of the Richards-Wilcox Manufacturing Company is Aurora, Ill.

NEW MARKING GAUGE WITH SAWTOOTH WHEEL.

The Nicholls Manufacturing Company, Ottumwa, Iowa, are placing on the market a new improved Roller Marking and Mortise Gauge, called the "Nicholls No. 17 Sawtooth."

This gauge is made entirely of metal, nickel plated or white metal finish, double faced and has a sawtooth wheel at end of both bars in place of a pin or straight roll. This makes a gauge which will not run out with the grain of wood. The tracing wheel runs true with edge of board, regardless of knots or cross-grain wood.



This is claimed to be the only gauge on the market which will mark true at all times.

Another feature is, the line made by a pin is very hard to see on some kinds of wood, but with this true gauge the marks made are like punch marks, and reflect the light from all sides.

It is also made so that one rod slips inside of a hollow tube, making the same appearance as a single gauge; and, by slipping the inner rod out, you have a perfect single marking gauge. Both rods are graduated. Very near the end of the outside rod they have placed a steel point pin to admit of being used close up into a rabbet or corner.

This gauge is strongly made and will last a lifetime and will be found a desirable addition to the carpenter's kit of tools.

It actually costs less to lay a Slate Roof and to **keep it in perfect condition** during the whole life of any building—than to get similar results with any other roofing material.

Sea Green and Purple Slate

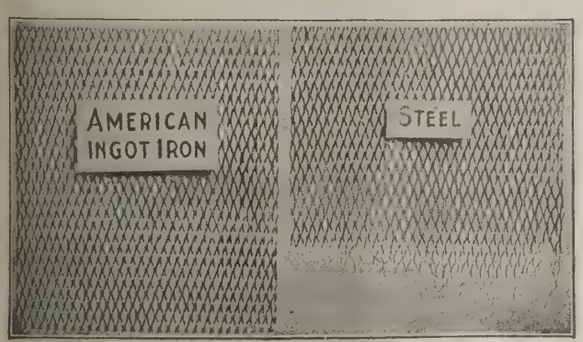
is the toughest and best roofing slate ever quarried. It is easy to handle—easy to lay—outlasts any building. Its first cost is the only cost—there are no paint bills—no repair bills. It is fire-proof—lightning proof.

Let us give you the **proofs**—tell you why it will pay you—how it will please your trade—and send you our book "Roofs" giving interesting facts on comparative roofing costs and values. All free for the asking.

American Sea Green Slate Co.
150 Clark Street, - GRANVILLE, N. Y.

TO ARCHITECTS AND BUILDERS

WHAT DOES THIS SIGNIFY?



COMPARE THE RESULTS OF THIS TEST

WHY NOT SPECIFY THE BEST?

Subjected to Same Acid Test

IT IS PROOF THAT

"Imperial Spiral Expanded Metal Lath"

MADE FROM

PURE "AMERICAN INGOT IRON" RUST RESISTING SHEETS

Will last **LONGER** than any Steel Lath on the market. Approved by the U. S. Government. Furnished in Nos. 27-26-24 Gauges. Samples and Prices cheerfully furnished on request.

WRITE DEPT. "A"

AMERICAN ROLLING MILL CO.

MIDDLETOWN, OHIO

How About YOUR ROOFS?



—be they NEW or OLD, Ready-to-Lay

Burmite

FLEXIBLE-CEMENT-BURLAP INSERTED MATERIAL

(PATENT APPLIED FOR)

WILL BE FOUND NOT ONLY

THE MOST DURABLE AND INEXPENSIVE BUT THE HANDSOMEST AND MOST PRACTICAL

FOR THE

ROOFING AND SIDING

Of Factory, Residence and Business Buildings, Churches, Warehouses, Summer Homes, Bungalows, Outbuildings, Garages, Barns, Etc.

MADE IN TWO SURFACES—

BIRD-SAND and *"Twolayr"* SLATE-CHIPS

TO MEET EXTREME WEATHER CONDITIONS

Sparks, Hail, Sleet, Sliding Ice, Rain, Snow or the **Extremes** of Cold and Hot Weather do not affect the **Storm-Resisting** and **Fire-Retardative Qualities** of BURMITE.

CAN BE APPLIED IN COLD WEATHER

For the *"Twolayr"* **Slate-Surfaced Material,** Natural colored Slate of **Unfading Quality** is used, the fine slab-shaped Slate Chips being imbedded into the **Pure Asphalt Composition** so thoroughly—**and put there to stay**—that a smooth, even upper mineral surface (there being two layers of the Slate Chips) is the result, thus securing the well-known **imperviousness and Weather-Resisting Qualities of Slate, at One-fourth the Cost.**

2 Permanent Natural Slate Colors—SLATE-RED and SLATE-GREEN



Uniform Solid Slate Surface Requires no Painting Kept Clean and Bright by the Rain

*Natural size of the Slate Chips

DURABLE ECONOMICAL ARTISTIC

A **practical roofer, with thirty years' experience** in selling and applying other makes, **recently used our BURMITE for roofing his own building**—which, by the way, was a **flat roof**—although he had on hand at the time a large stock of the other kinds he had been selling. In speaking of the many advantages of "Burmite," he writes us:

"It is not necessary to take off your shoes for fear of damaging the storm-resisting and fire-retarding surface of a "Burmite" Roof—the strongest and most durable made."

THE BEST BY TEST

SOLD ON ITS MERITS AND LASTING QUALITIES. THE FIRST COST—THE ONLY EXPENSE.

As a rule, other grades must be coated at least three times in seven to ten years; and if the cost of paint and labor is added to the original cost of the material and applying, it will be at once apparent that "Burmite" will be found not only the **Most Durable** but **More Economical than others.**

Architects, Contractors, Builders, Roofing Experts, Owners and Occupants will find our **Samples and Booklet,**

"BURMITE QUALITY COUNTS"

Illustrated with buildings, beautifully printed in colors, showing effect of BURMITE MATERIAL, **applied** as a Roofing and Siding, both interesting and instructive. Mailed free of all charges and obligation. WRITE TODAY.

Bermingham & Seaman Co.

ROOFING MANUFACTURERS

GENERAL OFFICES 1208-1226 Tribune Building
PLANT, 56th, Armitage and Grand Avenues

CHICAGO

BEAVER BOARD, COATING for Prepared Roofing.
PAINT for Structural Iron Work. **ROOFING BRUSHES.**

CHICAGO BUFFALO, N. Y. CINCINNATI, O. GREEN BAY, WIS.
GRAND RAPIDS, MICH. PITTSBURGH, PA. ST PAUL, MINN

CUT AND USE THIS COUPON

Bermingham & Seaman Co., Tribune Building, Chicago.
Mail to my address, Samples and Booklet. This places me under no obligation.

Name .....

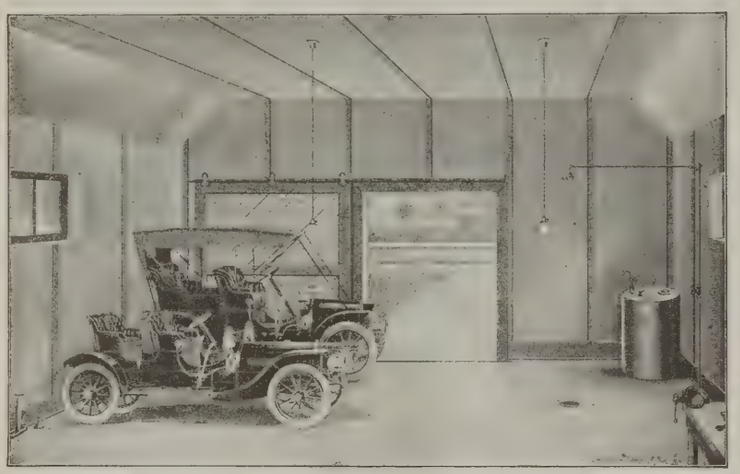
Address .....

Business ..... N. B. 1-11

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UTILITY WALL BOARD.

The contractor or builder visiting Chicago who is fortunate enough to see the process of making Utility Wall Board will go away convinced that the day of lath and plaster is limited. While wall board will not take the place of lath and plaster at once in certain kinds of buildings, still it can be used to splendid advantage even now in a great many places and in rooms of the finest residences. Its use in both new building and repair work is now acknowledged to be growing at a rapid rate. Utility Wall Board is made in sheets 30 inches wide and 8, 9, 10, 11 and 12 feet long. It is claimed to be cheaper and better than lath and plaster. Wall board can be put on by the most inexperienced workmen in a very satisfactory way. Carpenters, however, are especially fitted to get unusually fine results from it. Being easy to handle, easy to decorate, easy to put on and a good material in every way, it offers the builder an unusual opportunity in specifying Utility Wall Board for many places in his work.



UTILITY WALL BOARDED.

The Heppes Manufacturing Company, 4502 Fillmore street, Chicago, are the originators and manufacturers of Utility Wall Board. They offer to send samples and literature on request.

REFRACTORY CONCRETE.

Mr. E. R. Stowell, Portland, Ind., is the patentee and owner of United States Patent No. 819467—"Refractory Concrete," a composition of Portland Cement and Carborundum. Mr. Stowell states that he will make contracts with reliable contractors and cement workers on very liberal annual rentals for using this process. This does not mean that Mr. Stowell will sell the material itself, which can be had in any quantity from 100 pounds to carload lots from Niagara Falls or from the many company branch stores located in different parts of the United States.

Pavements, floors, stair treads, or any surface that is finished with Mr. Stowell's Cement-carborundum finish will never wear out, it is claimed, and the material will become so hard that it will grind steel or glass. At the same time, it will have a fine, live, sparkling surface and will be anti-slipping and dustless.

In addition to "Refractory Concrete" being invaluable for use in pavements, floors, etc., the composition will make an absolutely fireproof concrete. The patentee claims that a concrete can be made with it, which can be heated to white heat repeatedly and it will not disintegrate. Besides, it will not expand or contract in heating or cooling. Neither can this wonderful material be affected by oils or acids. Mr. Stowell states that his cement-carborundum material can satisfactorily take the place of fire clay products and terra-cotta for many uses and that the cost is much less.

As a proof of what cement-carborundum is already doing, attention is called to the runways in the Hudson Terminal Buildings, to the floors in the Hudson Tunnel Cars and in 325 of the Interborough Subway Cars, New York, all being finished with cement-carborundum finish. There are also a number of important buildings in the East having floors, stair-treads, walks and vault lights finished with the same material.

With such evidences to see, it would seem that Mr. Stowell's proposition was worth investigating. It is these new materials that offer the architect, contractor and cement workers opportunities of increasing their business and at the same time making more money.

ROOFING OF QUALITY.

A unique folder in the form of a house with the invitation printed on the roof to "have one on the house" has been circulated by the H. W. Johns-Manville Company, 100 William street, New York. The invitation, while a well known phrase to the convivial, refers in this connection to the company's J-M Regal roofing, which can be depended upon to protect the building from the severest attacks of rain, snow, sun, etc. The wool felt used in J-M Regal roofing is made to exactly suit the very dense saturation it must receive. It is long-fibred, pliable and strong. This felt is thoroughly coated on both sides with specially prepared genuine Trinidad Lake asphalt. It does not melt, dry out, harden, rot, crack or crumble with time. It remains pliable and retains its water and fire-resisting properties indefinitely in any climate. Every roll of J-M Regal roofing is absolutely warranted against leaks due to defective roofing material. And the warranty is signed by a $3,000,000 company which has been making roofing for more than half a century.

A roof of J-M Regal roofing is to your building what time tested armor plate is to a battleship.

A NEW HAND BOOK ON CONCRETE.

A new hand book on concrete brick and block making is just coming from the press. This book is a regular standard text book on concrete and is right up to the minute with information on the following subjects and many others:

The field for concrete.
Various building systems.
How to proportion them.
How to cure it.
Plant arrangement.
How to estimate.
Comparative tests.
Table of compression working values.
Ways of making product.
Selecting materials.
Forming the product.
Steam curing.
A waterproof building system fully illustrated.
Weights of materials.
Hints on selling.
Profits in concrete.

It has cost a lot of money and time to gather this valuable information, but this book is being mailed absolutely free to all who ask for it, as it is designed to assist those now in the concrete business and those who contemplate it in putting their concrete plants on the best possible basis.

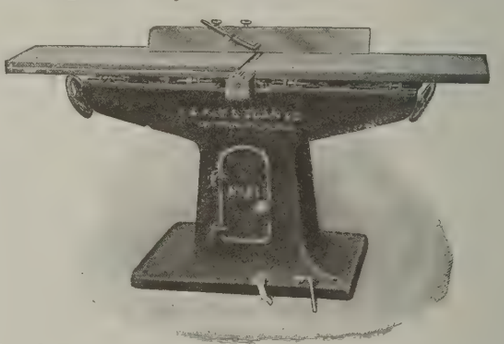
This book is being mailed free by the Queen City Brick Machine Company, 381 Bank Bldg., Traverse City, Mich. These people are the manufacturers of the well known line of Helm presses for making Dry Wall blocks and pressed cement brick. The Dry Wall block system saves the cost of furring and lathing for the builder and the blocks meet with a ready sale wherever introduced. Full information pertaining to this improved line of machines for hand and power operation will also be mailed free to anyone interested.

A POPULAR TOOL.

The great popularity of Fay & Egan Company's No. 61 hand planer and jointer is evinced by the fact of its general introduction into the best woodworking shops in the land.

This machine is said to be remarkably simple. The accuracy, precision and superiority of work performed, together with the immense saving effected over hand labor, has made it a universal favorite among carpenters, contractors and retail lumbermen.

The manufacturers designed this machine for general jointing and rabbeting, planing straight or out of wind, cornering, chamfering, making glue joints, and a great variety of similar work.



J. A. Fay & Egan Company's No. 61 Hand Planer and Jointer.

In its construction the manufacturers have given special attention to the frame, casting it sufficiently heavy, making it perfectly free from vibration.

Tables are planed perfectly true, and are each vertically and horizontally adjustable, independent of each other. They are mounted on inclines tongued into each other. Each incline has an independent micrometer adjustment for perfectly aligning the tables. They can be instantly drawn away from cutter head on each side to facilitate the setting and sharpening knives and for swinging large cutters.

Cylinder is of forged steel, four sided and slotted, running in reservoir self-oiling bearings. The manufacturers furnish their safety cylindrical cutter head with this machine when ordered.

Fence bevels to 45 degrees and is equipped with spring post for holding down material while passing over head.

For further information regarding this machine you are invited by the manufacturers to write for large illustrated circular. The proper address of the manufacturers is 327-347 West Front street, Cincinnati, Ohio.

PATENTS.

976,183. Reinforced concrete floor slab. John A. Jones, Cincinnati, Ohio.

976,575. Window operating and locking mechanism. F. Karsitz, assignor of one-half to W. Ehous, Bridgeport, Conn.

976,198. Metallic window-sash. A. W. Merritt, Lynch Station, Virginia.



Amatite ROOFING

Buy It—and You'll Never Need Roof Paint

When a man is under the necessity of using a lot of roofing, he is pretty sure to study the subject with great care. That is why Amatite is so often used on the big ready roofing contracts. A man who has only a few hundred feet of roof will often be careless in his choice of roofing, but when it comes to thousands of square feet (as above), Amatite is sure to be used.

The following is a typical instance:

Waterbury, Conn.,
Nov. 19th, 1909.

Barrett Manufacturing Company:

DEAR SIRS:—We wish to inform you that the "Amatite" Roofing which we have used on our office, storehouse, lumber shed and barn has given most satisfactory service. The area that these roofs cover is about 15,000 square feet. The roofing is unusually attractive in appearance, and in our judgment is the most durable and satisfactory made. The fact that it requires no painting appeals to us very strongly, and this feature makes it by far the cheapest ready roofing on the market.

Yours truly,
CITY LUMBER & COAL COMPANY.
[Signed] F. B. Boardman, Treasurer.

The economy of Amatite is not only in its durability and its price (lower than any other mineral surfaced ready roofing on the market), but also in the fact that *it requires no painting.*

You may be sure it would cost something to paint their big roofs if they used a roofing that needed painting. All that is saved with Amatite.

A sample of Amatite and further information will be sent you for inspection, free, if you will send name to the nearest Barrett office at once.

BARRETT MANUFACTURING COMPANY

New York Chicago Boston Philadelphia Cleveland St. Louis Cincinnati Minneapolis Pittsburg
New Orleans Seattle Kansas City London, Eng.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



E. C. S.
KEEN KUTTER
Special Slim Taper Files

Particularly adapted for filing fine saws. These files are cut with a very thin edge and are in every respect the equal in quality and cutting of the larger sizes.

Every one guaranteed, and, if not entirely satisfactory, money refunded. If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY (Inc.)
Div. No. N. B. St. Louis and New York
U. S. A.



SEE THAT

Compo-Board

IS IN YOUR SPECIFICATIONS

It is the most satisfactory wall lining yet devised. It will last longer than lath and plaster.

Compo-Board is easily and cheaply put on, and the walls will look well as long as the building lasts. They will never be disfigured with ugly cracks or blemishes from moisture accumulating on the walls. Will not crumble, crack or fall off. Cannot be marred by jamming furniture into them. ¶ Compo-Board makes dry, warm, moisture-proof, fire-resisting walls, ceilings and partitions. The rooms will be free from draughts, warm in winter and cool in summer. ¶ Not only is Compo-Board a superior wall lining, but it has many uses around the house, in offices and factories. ¶ It is made of thoroughly seasoned, kiln dried strips of lumber well glued together. They are covered with a thick coat of cement on either side and an outside covering of thick paper.

You can buy it in strips four feet wide and one to 18 feet long, any length you want in even feet. **Send for BOOKLET and SAMPLE.**

It explains the many uses and advantages of Compo-Board and you can get an idea of what it is from the sample.

NORTHWESTERN COMPO-BOARD CO.
5776 Lyndale Ave. No., Minneapolis, Minn.

The border of this advertisement is a cross section view of Compo-Board

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but **one coat of paint.**
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

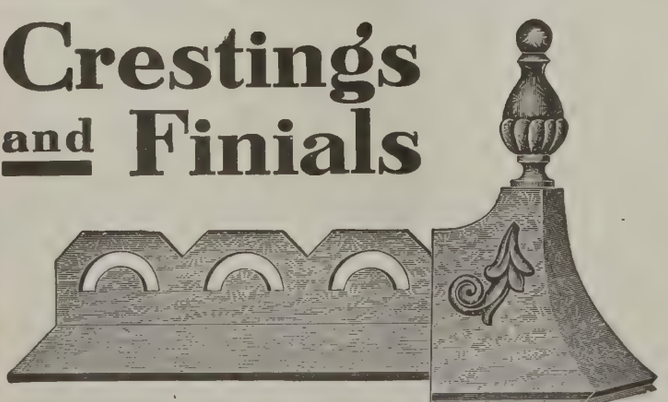
The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instruction for laying
BAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.

Crestings and Finials



CRESTING No. 107. FINIAL No. 97

WRITE TO

Willis Mfg. Co.
GALESBURG, ILL.

FOR CATALOGUE No. 5, ILLUSTRATING A FULL LINE OF

Crestings, Finials, Store Fronts, Bay Windows, Cornices, Skylights, Deck Crestings, Gable Ornaments, Ventilators, Willis Hip Shingles, Steel Ceilings and Side Walls, Fireproof Windows and Doors, Steel Roofings and Sidings, Ornamental Stamped Work.

SEND US YOUR PLANS FOR AN ESTIMATE ON THE SHEET METAL

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Will You Answer This Advertisement

And get these samples Delivered Free?

RIGHT by actual test we want you to know all about Johnson's Wood Dye and Under-Lac. A single trial will prove their superior merits. We will gladly bear the expense of sending samples that you may be familiar with the quality of our goods. There's a great difference between

Johnson's Wood Dye

and a mere stain. It is a real deep-seated dye that penetrates the wood, giving a rich, permanent color that will not raise the grain in the slightest. Johnson's Wood Dye is made in fourteen standard shades as follows:

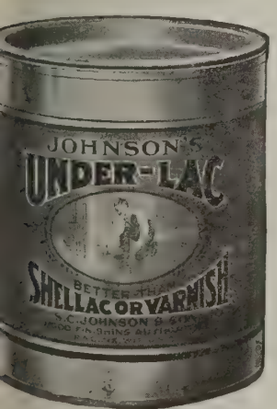
No. 126—Light Oak
No. 123—Dark Oak
No. 125—Mission Oak
No. 140—Manila Oak
No. 110—Bog Oak
No. 128—Light Mahogany
No. 129—Dark Mahogany
No. 130—Weathered Oak
No. 131—Brown Weathered Oak
No. 132—Green Weathered Oak
No. 121—Moss Green
No. 122—Forest Green
No. 171—Flemish Oak
No. 178—Brown Flemish Oak

Half Gallons—$1.50 Each.

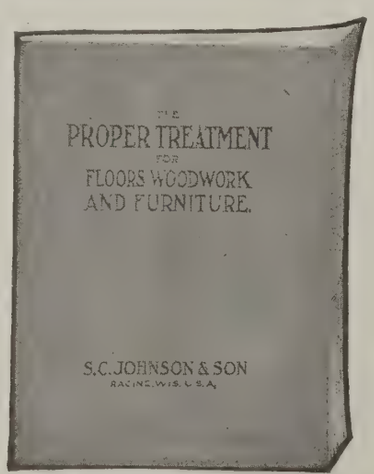
Johnson's Under-Lac

is a spirit varnish which will not chip, mar or scratch. It is better than shellac or varnish, as it can be easily applied and does not raise the grain, nor is it thick and sticky like varnish—dries in half an hour. Gallons $2.50. In answering use attached coupon for samples of Johnson's Under-Lac and Dyes. State carefully the number of shades wanted. With samples we will also send a copy of our booklet, "The Proper Treatment for Floors, Woodwork and Furniture" showing all shades of dye.

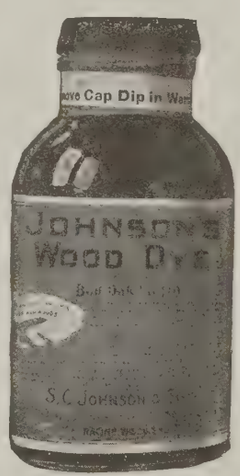
S. C. Johnson & Son
"The Wood Finishing Authorities"
Racine, Wisconsin, U. S. A.



Free Sample of Under-Lac



Free Book



Free Sample of Dye

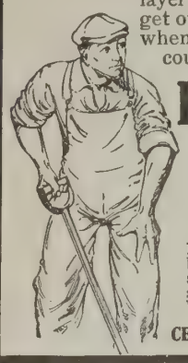
Please send FREE samples of Johnson's Under-Lac and Wood Dye No. 000 Also booklet, "The Proper Treatment for Floors, Woodwork and Furniture." I agree to test the samples and if they are satisfactory will use and recommend them in my work.

Name .....
Address .....
N. B. 1 .....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Get Out of the Shovel Class

Some men dig, dig, dig, all their lives and never get out of the rut. Always striving—never succeeding—they need but a helping hand to point the way. Are you doing the same? Every carpenter, bricklayer or any man in the building trades who wants to get out of the rut should devote his idle time this winter, when work is slack, to a course in DRAFTING. The course is short, but complete, and includes



Estimating, Plan Reading

Building superintendence, building materials, carpentry, stair building, re-enforced concrete, masonry, estimating, contracts and specifications, the law of contracts and liens, hardware, plastering, painting, heating, ventilation, steel construction, elevators, sheet metal pattern drafting, mechanical and architectural drawing and blue printing.

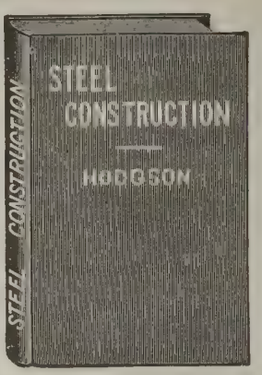
Most practical course ever planned. Hundreds of plans of buildings in actual course of construction at disposal of students. Individual instruction. Personal attention given each student. Classes now forming—students can enter any time. Write for catalogue—not to-morrow, but to-day. DO IT NOW!

CHICAGO TECHNICAL COLLEGE, 605 Athenaeum Bldg, Chicago, Ill.

PRACTICAL STEEL CONSTRUCTION

BY FRED T. HODGSON, F. R. I. C. A.

12-mo, cloth, 120 pages, fully illustrated. Price $1.00



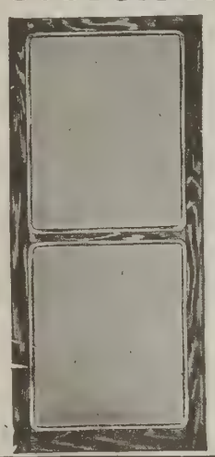
A COMPLETE guide for the architect and erecting engineer in the design and construction of steel superstructures, in which the elements of strength depend upon the framework of steel. Specifications are given concerning what shall constitute the "Dead Load" and also the "Live Load" per square foot, for each of the following types of buildings, viz: city dwellings, country dwellings, theatres, churches, school rooms office buildings, assembly halls, ball rooms, drill halls, factories for light or heavy work, warehouses, etc. The weight per cubic foot of various kinds of materials is given. Foundations of all kinds are thoroughly treated upon in every detail. This includes pile foundations, also steel beam grillage, all being clearly illustrated by line drawings. Cantilever foundations are also described and illustrated, and formulæ given for the calculations to be employed in determining the reactions, and the bending moment on cantilever girders. Formulæ are also presented for determining the properties of usual rolled steel sections. These formulæ are simple and practical, while at the same time they thorougly cover the subjects, being clearly illustrated by accurate dimension drawings. Careful instructions are given regarding the selection of steel column sections, outline sketches being given of the various shapes. The Gordon or "straight line" formulæ for figuring the strength of columns, are given in detail, also data for calculating stresses. Specifications are given concerning the proper sizes of rivets to be employed on all parts of the structure. All the various styles of bracing are described and illustrated, and rules given for calculations. Girders and their classification, dimensions, etc., form the subject matter for discussion in one section of the book, numerous formulæ and rules for calculating strength, etc., being given, the whole being explained and made plain by means of dimension drawings.

The construction of roofs and trusses is also ably discussed, a large space being given to the subject of rivets and riveting.

The bending moment and bending stresses are two subjects which are thoroughly handled, and discussed at length, and in such a manner as to make the meaning plain and easily understood. The book is also well indexed.

This book sent postpaid on receipt of price. Address **Hodgson Book Co.** 358 DEARBORN STREET CHICAGO, ILL.

CUSTOM MADE FLY SCREENS



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS.

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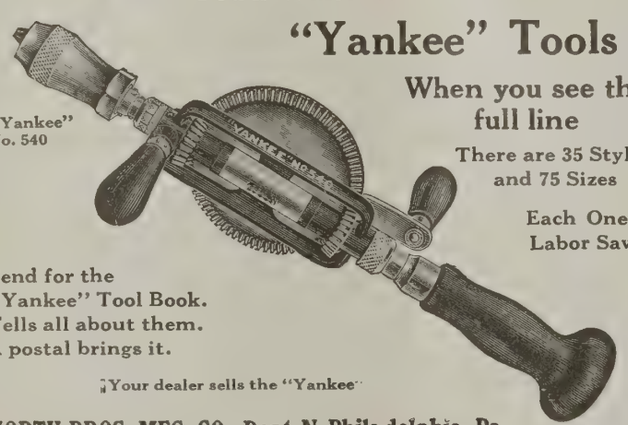
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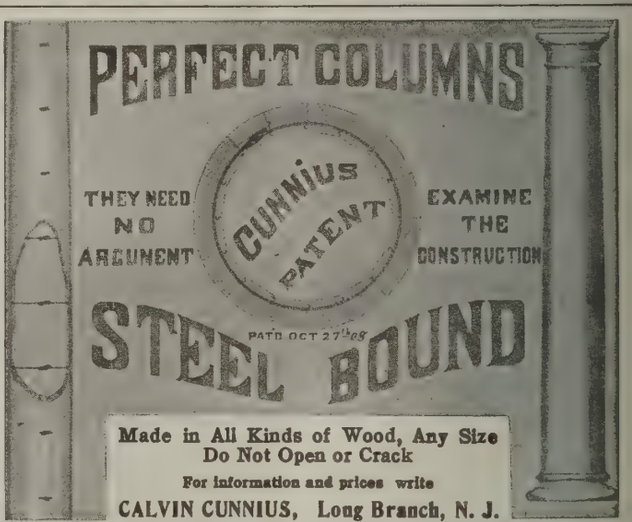


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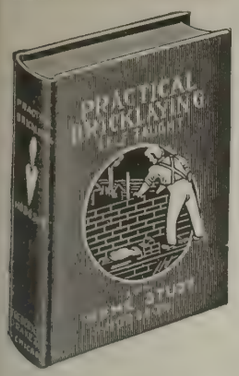
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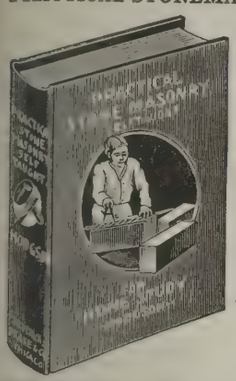
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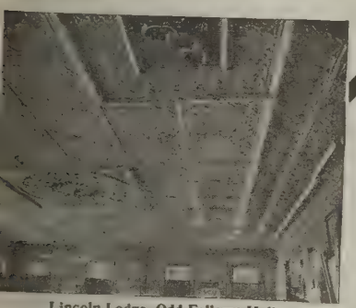
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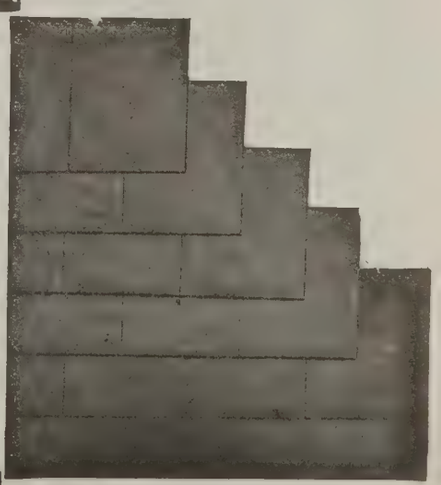
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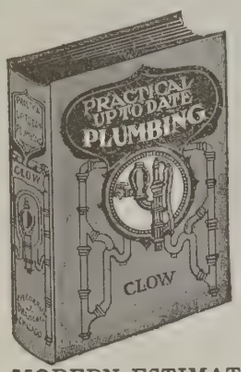
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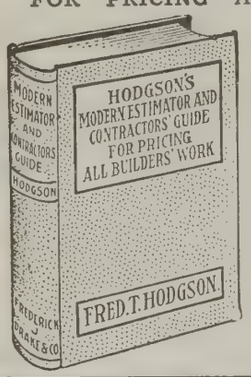
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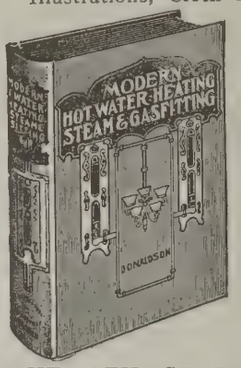
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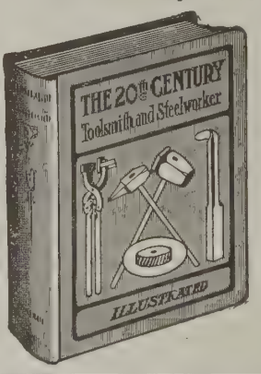
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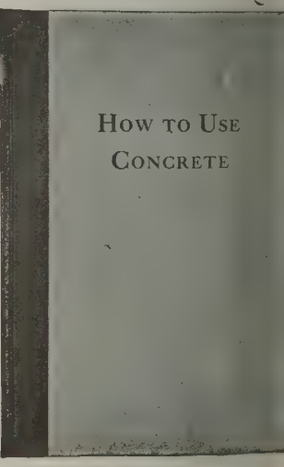
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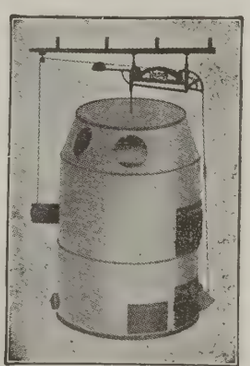
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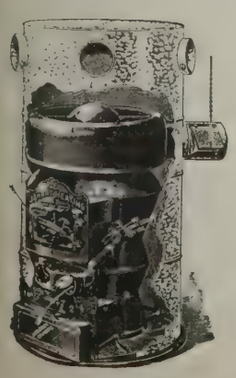
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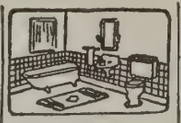
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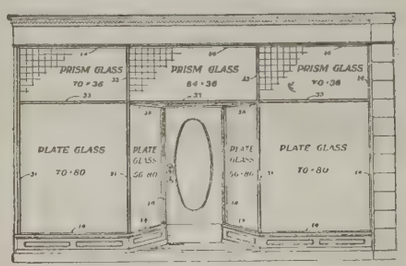


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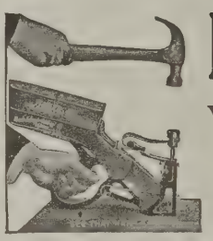
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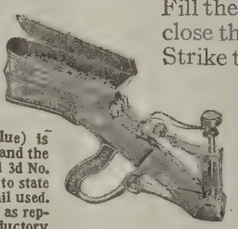
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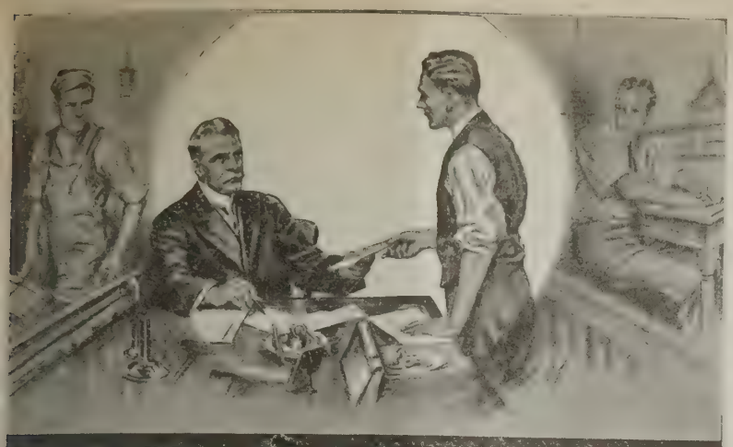
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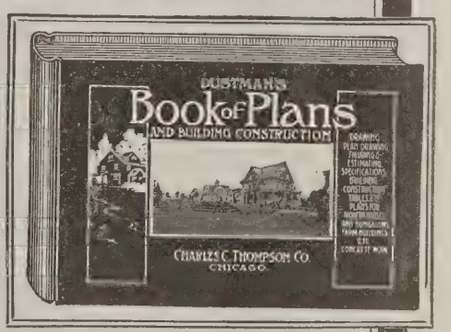


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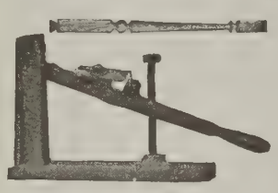
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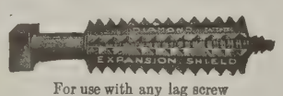




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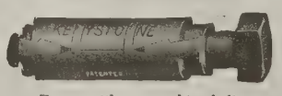
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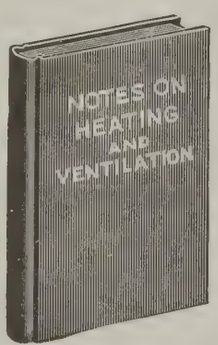
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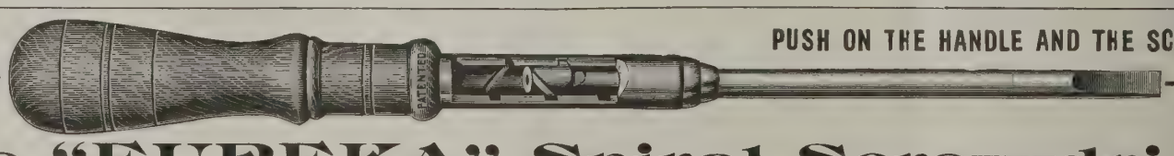
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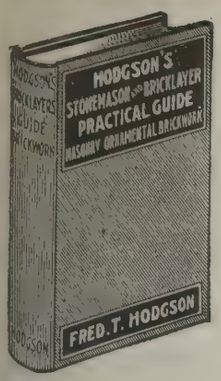


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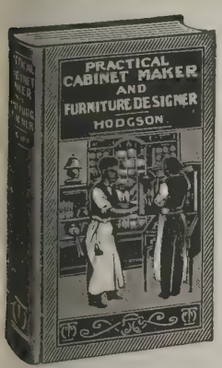
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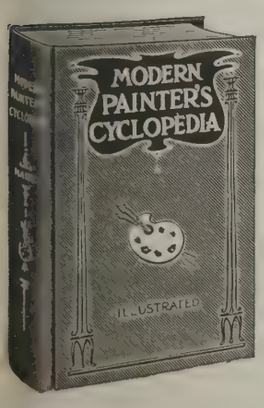
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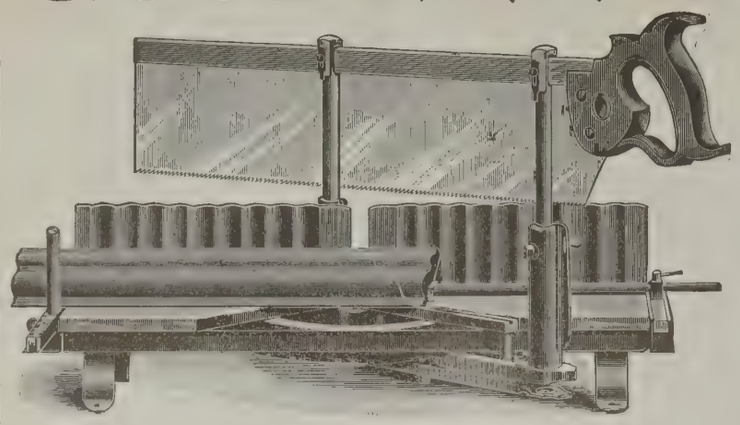
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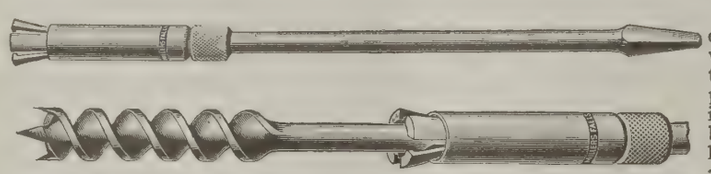
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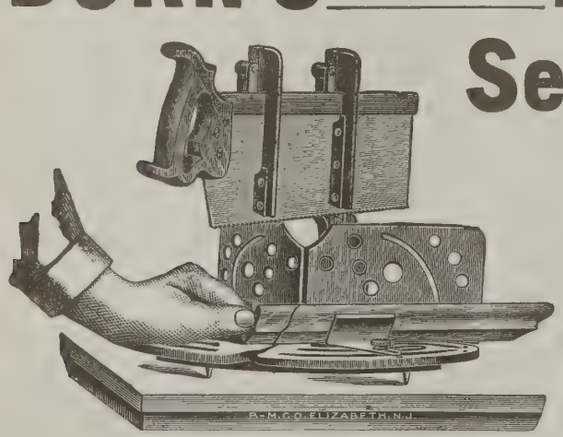
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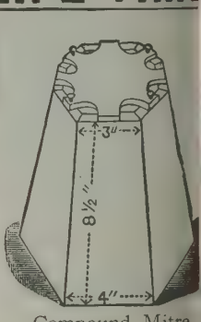
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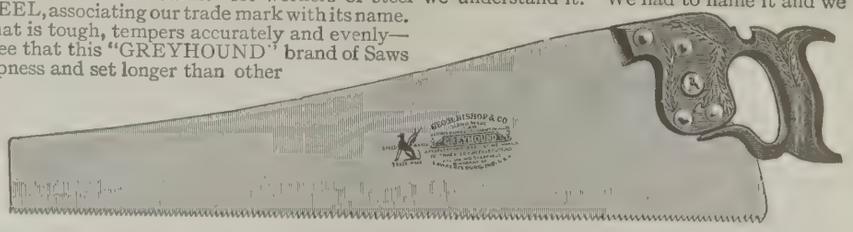
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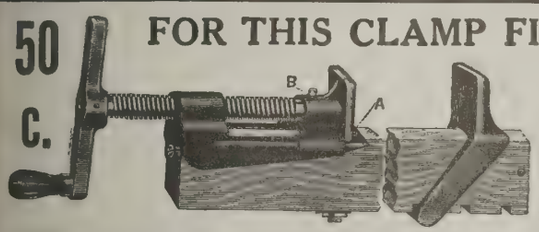
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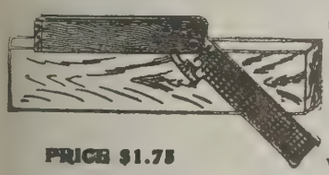
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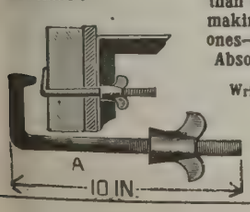
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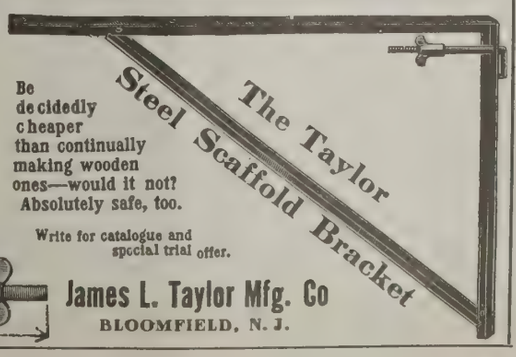
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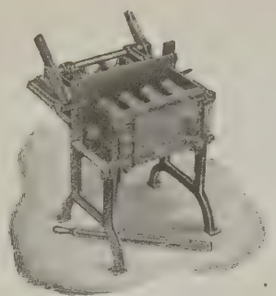
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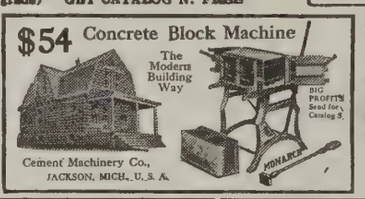
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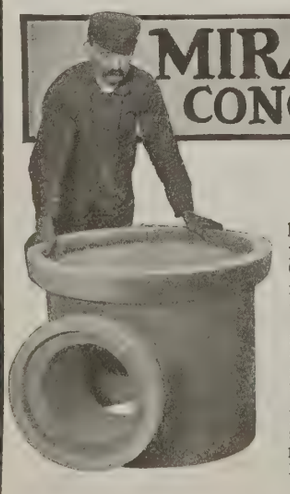
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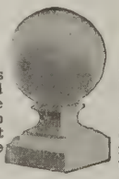
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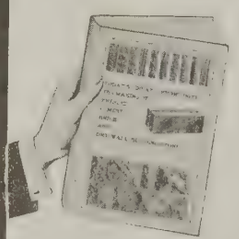
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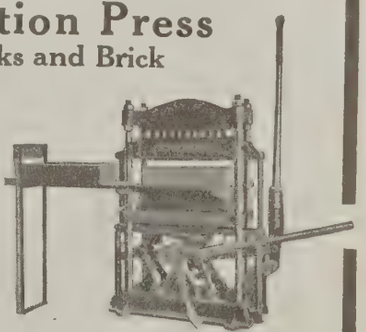
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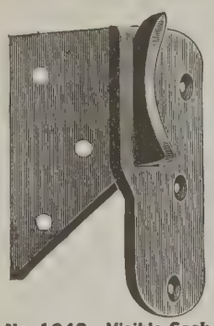
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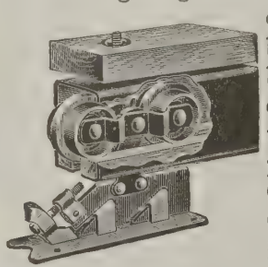
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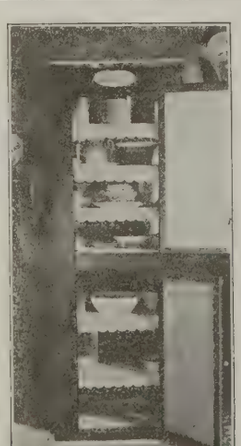
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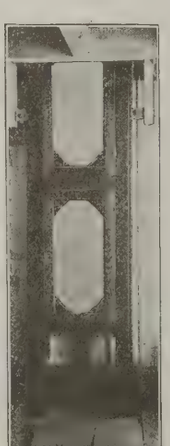
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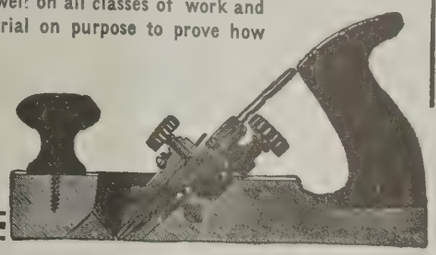
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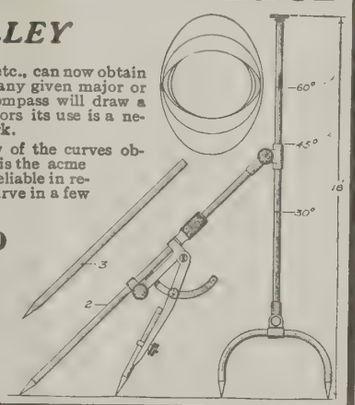
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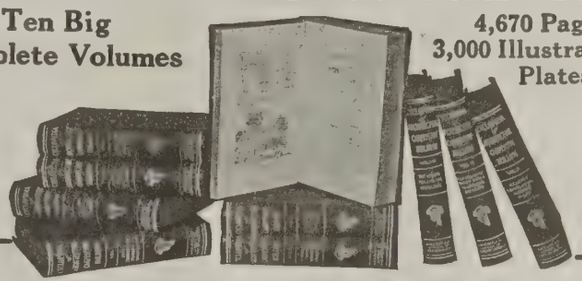
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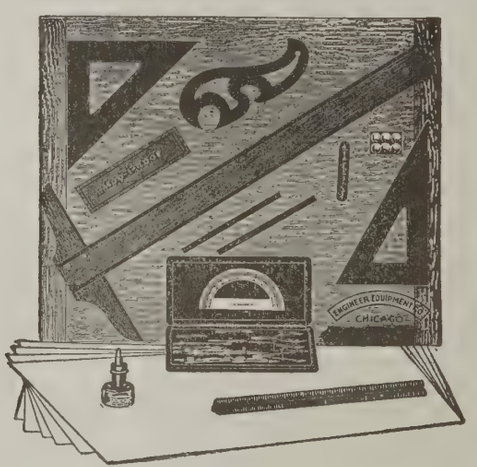
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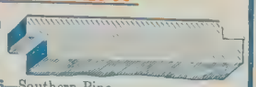


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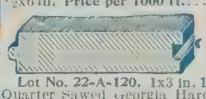
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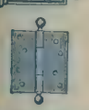
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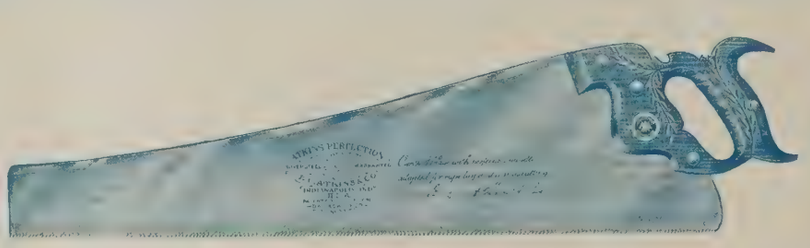


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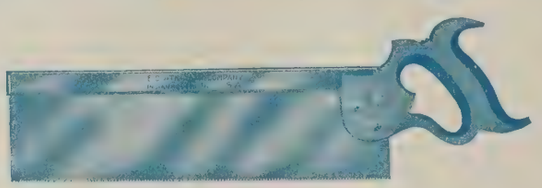
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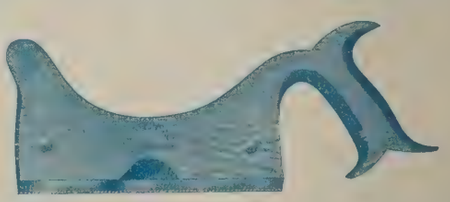
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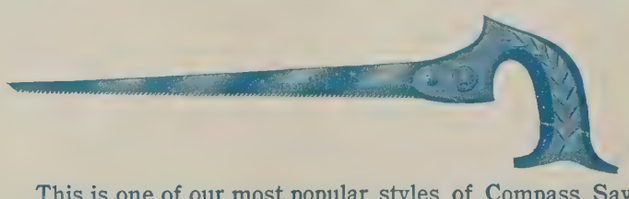
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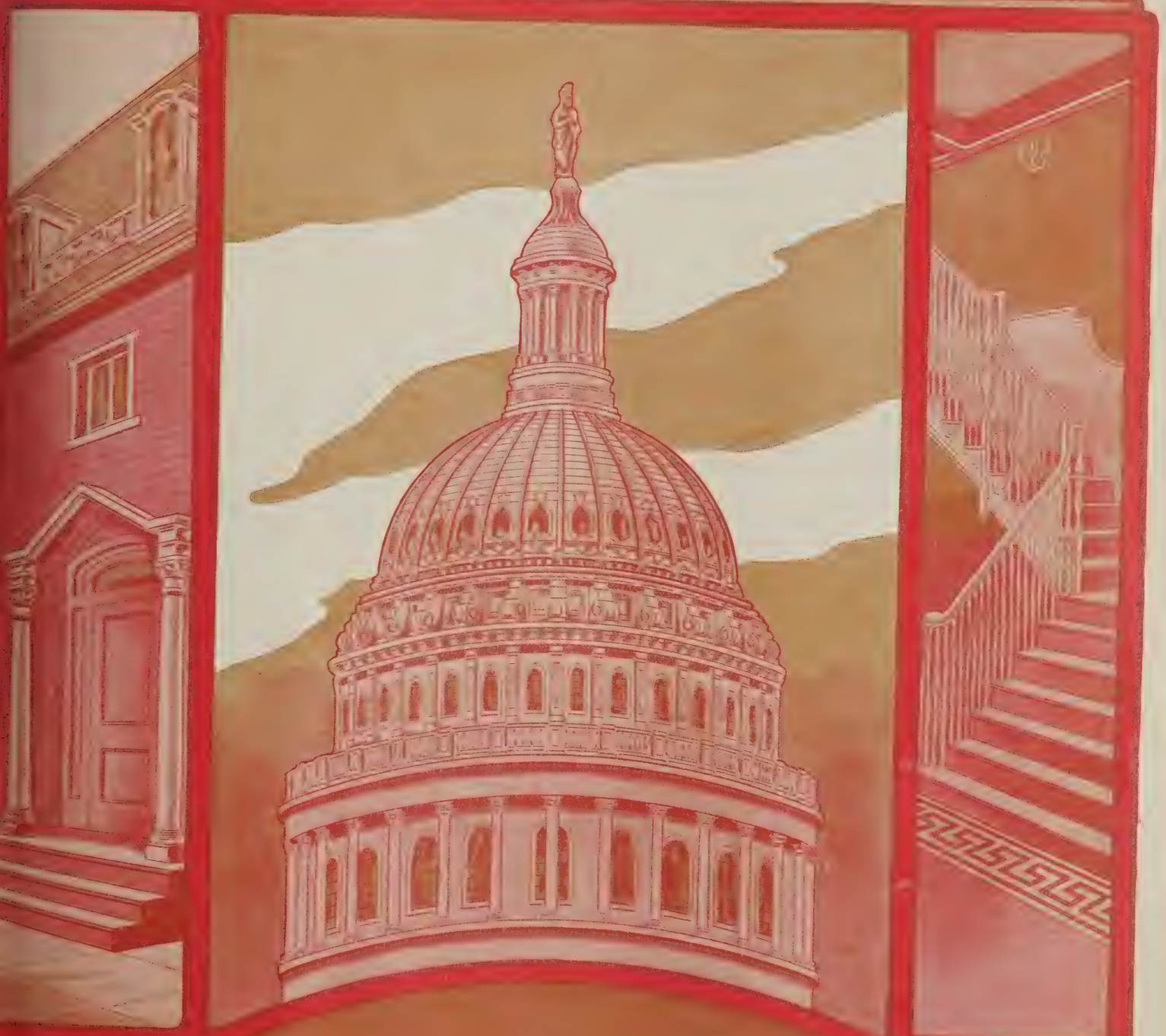
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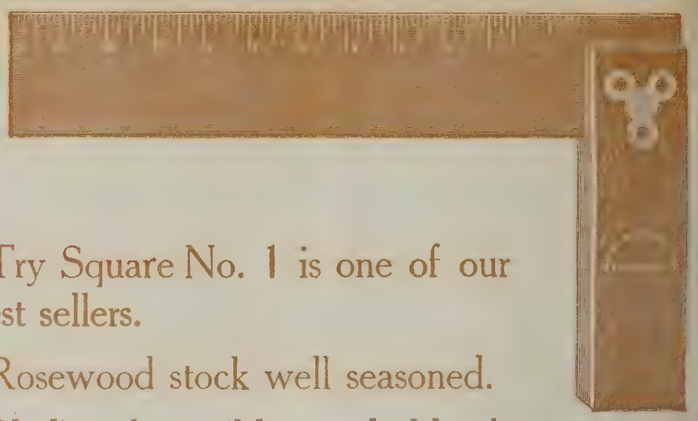
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Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



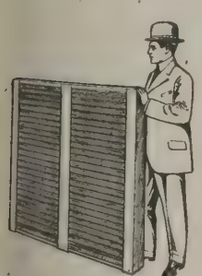
Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bisnopric Sheathing 1,000 square feet covers 1,000 square feet of space.

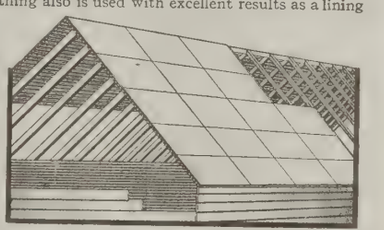
In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

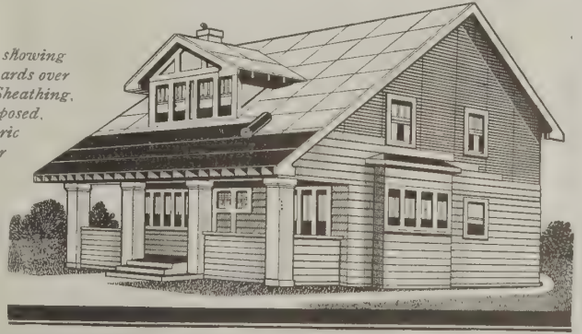
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing, (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

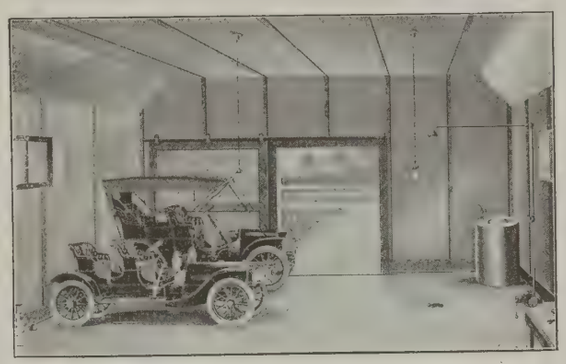
The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UTILITY WALL BOARD

A Fibrous Water-Proof Board Made in Convenient Widths and Lengths

To be Used Instead of Lath and Plaster in New Building or Repair Work



Make your Garage Warm by Lining with UTILITY Wall Board

Mr. Contractor

This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern building material.



This shows how an Attic looks after being finished with UTILITY Wall Board.

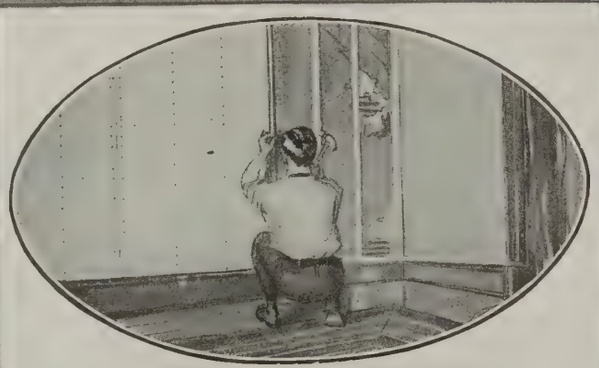
Utility Wall Board is better than lath and plaster. It saves the user a lot of money besides giving him a handsome, durable job. Utility Wall Board can be painted and decorated with the finest results. Utility Wall Board is being used in both small and large buildings. Everyone likes it.



Write Now for FREE Sample and Prices

Utility Wall Board can be applied by the carpenter—nailed right to the studs—easy and clean to handle—cuts with a saw—fits any space and can be put on in winter or summer—no waiting for plaster to dry—no cracked walls—no dirt—no ruined decorations—warm in winter and cool in summer

THE HEPPES COMPANY, 4502 Fillmore Street, Chicago, Ill.



Compo-Board

THE MODERN WALL LINING

Better than Lath and Plaster in Every Way

Compo-Board will outlast lath and plaster several times over—in fact it will outlast the building itself.

Makes absolutely dry, warm, moisture proof walls and ceiling. Cannot crack, crumble or chip off like plaster. Keeps the rooms warm in winter and cool in summer.

Compo-Board can be used in any climate. It is quickly and cheaply put on in any kind of weather—no muss or dirt or waste of time waiting for plaster to dry.

Not only is Compo-board a superior wall lining, but it has a multitude of uses in the home, around the yard, and in the office and factory.

Made of thoroughly seasoned kiln dried strips of lumber covered with a thick coat of cement and heavy durable paper put on under intense heat and pressure.

You can buy it in strips four feet wide and one to 18 feet long, any length you want in even feet.

SEND FOR BOOKLET AND SAMPLE

And you can see just what Compo-Board is, and read all about its many advantages and numerous uses.

NORTHWESTERN COMPO-BOARD CO.
5776 Lyndale Ave. No., Minneapolis, Minn.

The border of this advertisement is a cross sectional view of Compo-Board

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STAY-LOCKED COLUMNS
DO STAY LOCKED

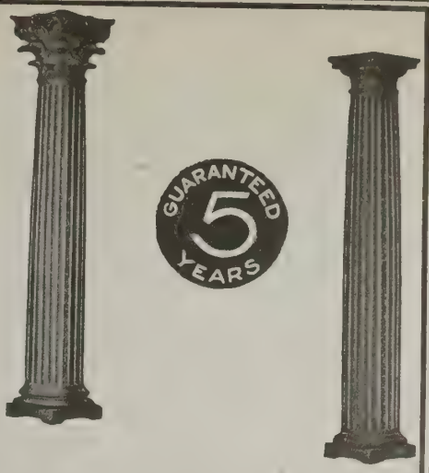


WE PAY THE FREIGHT

We cater to the careful man, *the man who cares.* Our columns cost him no more than the "don't-care-man" pays for the cheap, sure-to-open-up kind. Without a single exception they are the most beautiful and durable columns made.

THE JOINTS **CANNOT** OPEN. THAT'S WHY WE GUARANTEE THEM FIVE YEARS.

DESIGN BOOK 6 IS FREE; a postal brings it.



GUARANTEED 5 YEARS

AMERICAN COLUMN COMPANY

BATTLE CREEK, MICH.



Our No. 660

CONSOLES COLUMNS and GRILLES

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG NO. 16

It contains many beautiful designs of Consoles, Columns and Grilles.

You will make no mistake in writing us before ordering elsewhere.

NORTHWESTERN GRILLE WORKS, Office and Showroom 1824 Milwaukee Avenue, Chicago

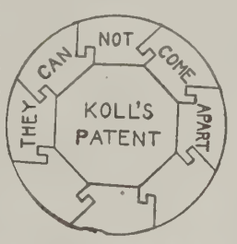


60,000 COLUMNS

at an average of $5.00 each or 6,000 at $50.00 each gives you an idea of the annual capacity of our plant.

We own the largest factory building in the world devoted exclusively to the manufacture of high grade COLUMNS and PORCH WORK.

A new and very complete catalogue of COLUMNS will be sent on request. Ask for T-40.



Hartmann-Sanders Company

Sole manufacturers of KOLL'S PATENT LOCK JOINT COLUMNS

Elston and Webster Avenues, CHICAGO

Eastern Office: 1123 Broadway, New York City

The best columns for porches, pergolas or interior use.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather. Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NAT. BUILDER

"CUT OUT REPAIR BILLS—BUILD WITH CYPRESS AT FIRST

CYPRESS "THE WOOD ETERNAL"

CYPRESS

CYPRESS DEFIES DECA

In response to a very wide demand we respectfully offer

Another Cypress House Plan Fre

The artistic, cozy and strictly modern CYPRESS SHINGLE HOUSE shown below meets completely and delightfully the desires of people who need more room than most bungalows contain, yet who wish to "keep the cost down." This CYPRESS house has 9 rooms besides the basement, and should be built complete for from $3,800 to $7,000, according to builder's taste and the kind of finish used. Complete WORKING PLANS and SPECIFICATIONS (*sufficient for any competent carpenter to build from*) are YOURS WITH OUR COMPLIMENTS in

VOL. 29 OF THE CYPRESS POCKET LIBRARY, SENT ON REQUEST. WRITE TODA

JUST THE HOUSE FOR SUBDIVISION OWNERS

AND ***CYPRESS*** *THE* ***IDEAL WOOD*** *TO ENABLE YOU TO* ***AVOID REPAIR BILL***

"Stop Depreciation *BEFORE IT BEGINS—BUILD WITH CYPRESS AT FIRST!*"



"EVERYTHING CYPRESS EXCEPT THE WINDOW GLASS."

MR. GUSTAV STICKLEY, the well-known Craftsman, writes: "In my experience, CYPRESS is the best American wood for all exterior use, such as shingles, timbers, pergolas, and all woodwork subject to weather. Its slight natural oil makes it practically impervious to moisture, so that it does not shrink or swell like other woods, and is very durable when protected merely by a coat of oil. In this it is similar to teakwood, in my opinion is quite as durable, and of course much more practicable."

ASK our "ALL-ROUND HELPS DEPT." *any* question about Wood. Our reply will be frank. We recommend CYPRESS only where CYPRESS can *prove* itself "the one best wood" for *your* use.

CYPRESS LASTS PRACTICALLY FOREVER

Southern Cypress Manufacturers' Association

1212 Hibernia Bank Building, New Orleans, La.

We *produce* CYPRESS—and *talk* it—*but do not retail it.* INSIST ON IT NEAR HOME. *Probably your Local Dealer sells CYPRESS; if not, WRITE US, and we will tell you where you CAN get it.*

CYPRESS AVERTS REPAIR BILLS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

RED GUM



Library, University Club, St. Louis, Missouri

A representative of the National Builder, in conversing with the Architect of the University Club at St. Louis, was assured by him that, although the building had been erected a good many years, the RED GUM trim had continued to give the utmost satisfaction and that it was as beautiful today as when first finished. He said furthermore that RED GUM did not on aging acquire the dull dusty color which marred the beauty of other woods and made refinishing necessary.

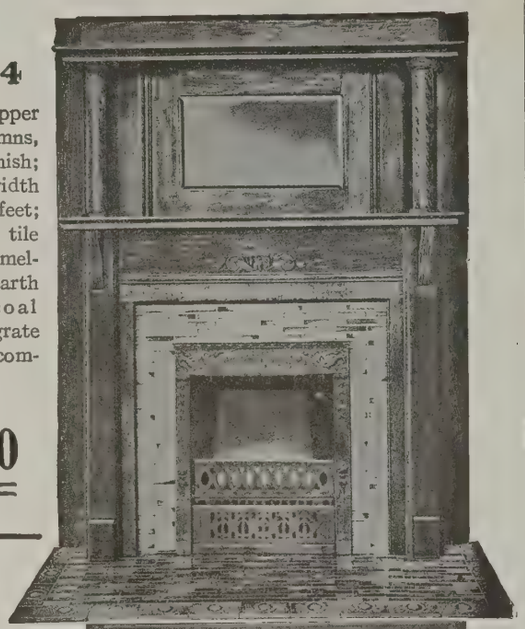
Builders who are interested in the beautiful effects and present comparatively low cost of this most abundant hardwood will protect their own and their clients' interests in a practical manner by insisting that the RED GUM used be purchased from a concern capable of providing a guarantee that the wood has been properly seasoned and all the necessary steps taken to eliminate the sap; and furthermore, that the interior trim contractor properly fills and finishes the wood when put in place. RED GUM is absolutely reliable if properly handled.

Builders desiring to see samples of Red Gum, both rough and finished, or who wish market prices of selected Red Gum, are invited to correspond with any of the following firms:

THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., St. Louis, Missouri
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
CARRIER LUMBER & MFG. COMPANY . . . . . Sardis, Mississippi
BAKER LUMBER CO. . . . . Turrell, Arkansas
ANDERSON-TULLY CO. . . . . Memphis, Tennessee

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

JUST A FEW NEW ONES FROM OUR 1910 LINE



Hornet No. 4

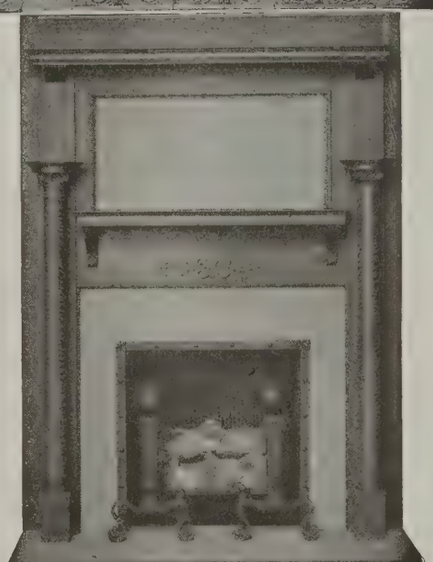
With 3-inch upper quarter-sawed columns, golden oak gloss finish; height, 77 inches; width 4 feet 6 inches or 5 feet; 14x24 bevel mirror; tile opening 36x36, enameled tile facing and hearth and combination coal and wood burning grate with summer front, complete for

$22.50

Hornet No. 5

With 3¼-inch quarter-sawed oak pedestal columns; golden oak finish; height, 84 inches; width, 5 feet or 4 feet 9 inches; 18x36 plate mirror; tile opening 36x39; enameled tile facing and hearth and combination coal and wood burning grate with summer front, complete for

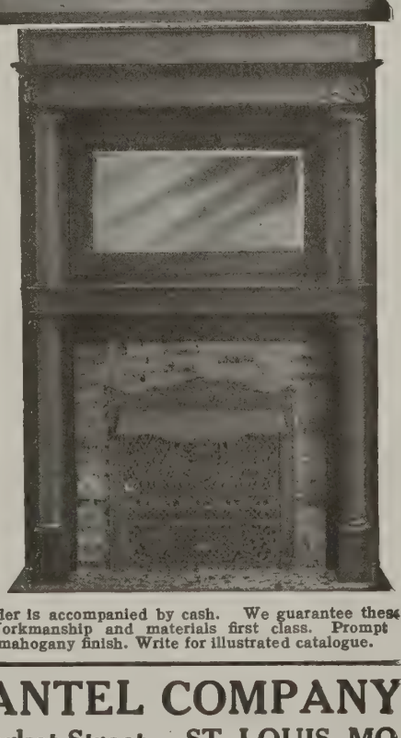
$25.00



Hornet No. 6

With 4-inch quarter-sawed oak double columns. Made of selected oak or maple, finished imitation mahogany, rubbed and polished finish. Height 7 feet 4 inches, width 5 feet, tile opening 42 inches wide by 39 inches high, projection 3 inches. French bevel plate mirror 36 inches wide by 18 inches high. Enameled tile facing and hearth and combination coal and wood burning grate and summer front, complete for

$30.00



Subject to 5 per cent discount if order is accompanied by cash. We guarantee these mantels to be as represented. Workmanship and materials first class. Prompt shipment. Furnished in oak or mahogany finish. Write for illustrated catalogue.

HORNET MANTEL COMPANY

Salesrooms: 1143 Market Street, ST. LOUIS, MO



Artistic Mante

HALF a hundred beautiful and artistic mantels, completely finish ready to set up, are shown in our catalog No. 108G. These r the newest designs, the best materials and finest workmanship po put into a mantel. Foster-Munger quality is shown in every one. All fi oak and mahogany and many wonderfully clever effects in tile and "nea mantels—grates for gas, wood or coal, a range of prices that will plea customer. The low prices we quote you on these goods enable you the biggest profit that is fair, and at the same time undersell all com

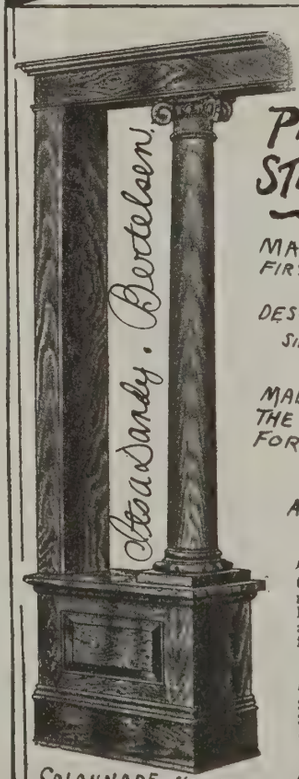
If you haven't catalog 108G, write for it today and be prepared to show a more reasonably priced line of mantels than any other dealer in your city. Write 108G at once. Mailed free.

The Foster-Munger Co. Chicago, U

AMERICA'S GREATEST SASH & DOOR HO

Wide stile cottage front doors—68 of the newest patterns in plain D. S., la and beveled plate glazings—are shown in our book 107G. The remarkably will surprise you and please your customers. Say the word and we'll send

$8.50 FOR THIS COLONNADE



A VERY LOW PRICE FOR THIS STRICKING NEW COLONNA

MATERIALS AND WORKMANSH FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUD
MADE FOR 5¾-INCH JAMBS
MADE IN OAK OR YELLOW PINE, THE WHITE, HAND SMOOTHED, REA FOR FINISHING.

PRICES
ANY HEIGHT NOT OVER 9 F

Style No. 1-2 EACH $8.5
Columns are 6 inches in diameter, tapering receive 5-inch compo. cap, pedestals are 20 inc high over all and the width is 24 inches over and when set in to receive casings extens from jamb is 18 inches. Top shelf is 10 in. w

Style No. 2-2 EACH $9.0
Same measurements as above, only pedestals 30 inches wide over all and when set in to rece casings extension from jamb is 24 inches.

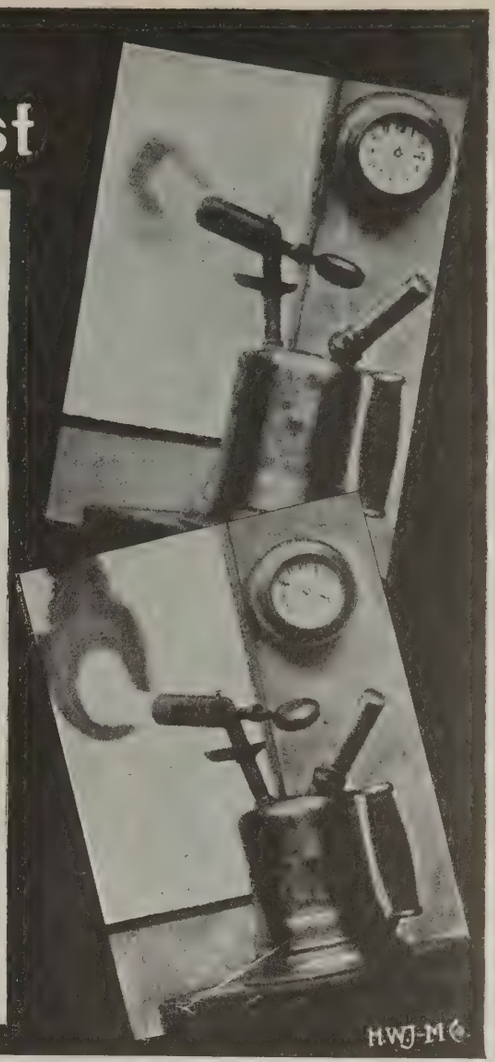
SEND YOUR ORDER NOW, DO LET IT GET AWAY FROM YOU.

COLONNADE. NO. 1-2

BERTELSEN ADJUSTABLE GRILLE CO. 619 S. CLI CHICA

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

No Other Ready Roofing Could Withstand This Test



The flame of a powerful blow-torch was placed within two inches of J-M Asbestos Roofing. At the end of fifty minutes (note clock) the roofing was not burned or injured, being only slightly blackened with smoke.

This is one of a number of tests that prove conclusively that the only permanently durable prepared roofing—the one that better than any other resists fire, acids, gases, rot, rust, heat, cold and wear is

J-M Asbestos Roofing

Other ready roofings are made of wool felt, rag stock, paper, shoddy, coal tar, and other highly inflammable materials which are an actual menace to a building instead of a protection. J-M Asbestos Roofing is the "cheapest-per-year" roofing because it requires no coating or painting to preserve it. The first cost is the only expense.

Fire-proof construction is better fire protection to a building than any amount of fire insurance. By covering buildings with J-M Asbestos roofing it will protect them from fire at no extra cost.

Write our nearest branch today for Samples and Catalog.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, Etc.

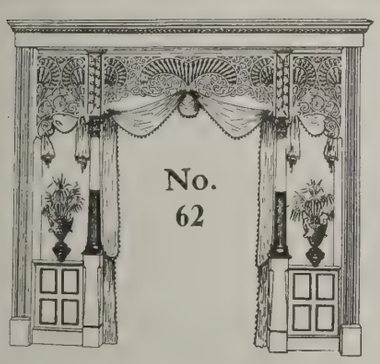
Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Detroit, Kansas City, London, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburg, San Francisco, Seattle, St. Louis

For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C. 1229

CHICAGO GRILLE WORKS

1892 1911

Interior Columns Colonnades Consoles



Established NINETEEN Years

Special Prices to the Trade

Let us estimate on your work before you purchase elsewhere.

An opening like the above will add $100.00 to the value of your property. Let us quote you a price.

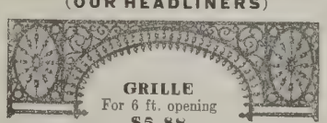
Catalogue FREE on request.

838 WELLS STREET, CHICAGO, ILL.

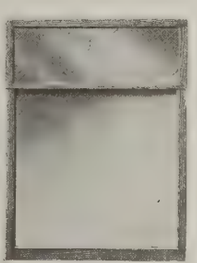
LOW PRICES & GUARANTEED QUALITY & QUICK SHIPMENTS
(OUR HEADLINERS)



CYPRESS Colonial Column
8 in. x 8 ft.
$2.10
With cap, as shown, add 65c.



GRILLE
For 6 ft. opening
$5.88



COTTAGE WINDOW
1⅜ in. thick
Glazed Clear, - **$3.75**
Leaded Top, - **4.50**

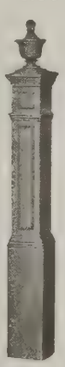
Surrounded
By EXTRAORDINARY BARGAINS

which are only a few of the many **Money Savers shown** in our **new Catalog** of **High Grade** Sash, Doors, Frames, Blinds, Mouldings, Inside Trim, Grilles, Colonnades, Stair and Porch Work, Mantels, Grates, Tiling, Art Glass, Roofing and Building Papers, Wall Boards, Hardware, Paints, Hardwood and Parquetry Flooring, Rolling Partitions, Screens, Steel Ceilings, Gutters, Shingles, etc.

Write Today for FREE Copy

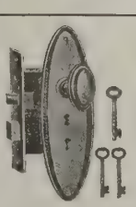
The Huber Builders Material Co.
39-43 Vine Street, CINCINNATI, O.

Stair Newel
8 in. Shaft
Yellow Pine
$3.00
Plain Red Oak
$3.25





FRONT DOOR
2-8 x 6-8
1⅜ in. thick
Glazed
$3.07



Front Door Set
Antique Copper
$1.00
Inside Door Set
49c.



BASE
Yellow Pine
⅞ x 7½ in.
$2.77
per 100 lin. ft.

CLEAT
Yellow Pine
¾ x 1½ in.
35c.
per 100 lin. ft.



CASING
Yellow Pine, 4¾ in.
$1.89
per 100 lin. ft.

Quarter Round
Yellow Pine, ¾ in.
30c per 100 lin. ft.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE *ONLY* UNIVERSAL WOOD-WORKER FOR CONTRACTORS' USE

Absolutely, without the shadow of a doubt, the **Famous No. 14** is the greatest piece of wood-working machinery ever invented and the greatest labor and time-saving device ever offered for contractors' use.

With a **Famous No. 14** you can do **all** your mill work yourself. You can be independent of planing mills with their high charges and delays—you put their profits in your own pocket. You can install a complete machine shop for the price of one machine.

You don't require an expert to operate the **FAMOUS.** You don't have to fear breakdowns. The machine is absolutely "fool proof"—there is nothing complicated, nothing to wear out, and any machinist can operate it.

The adjustments for the different operations are made almost instantly. Every part is readily accessible and "understandable."

The FAMOUS No. 14

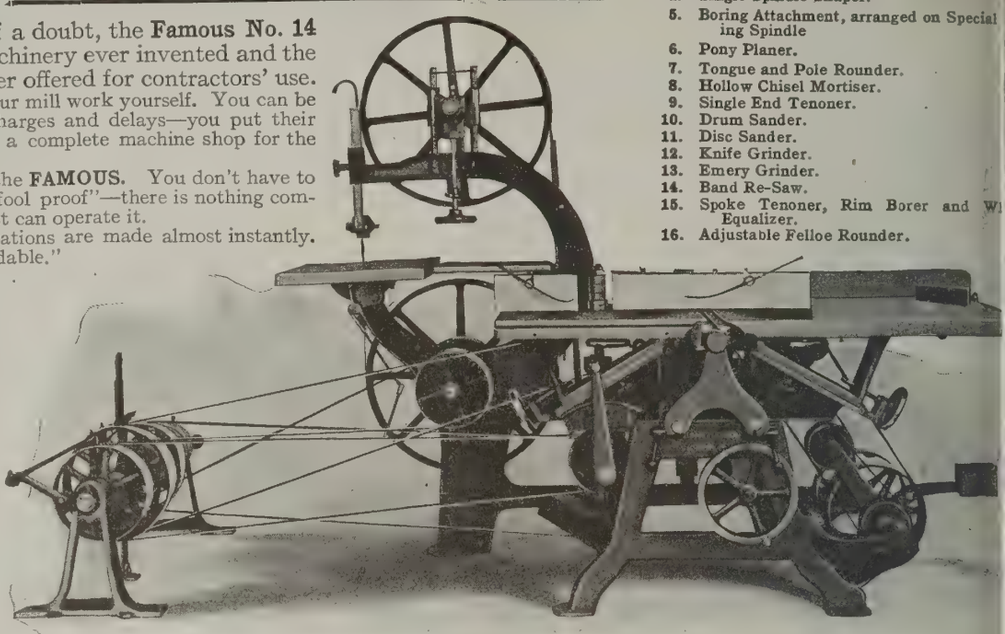
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Behind the machine is our guarantee—which covers the **entire** life of the woodworker. You **cannot** lose.

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1. 27″ Band Saw.
2. 12″ Jointer.
3. Saw Table, with raising or lowering arb
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5. Boring Attachment, arranged on Special ing Spindle
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9. Single End Tenoner.
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13. Emery Grinder.
14. Band Re-Saw.
15. Spoke Tenoner, Rim Borer and W Equalizer.
16. Adjustable Felloe Rounder.



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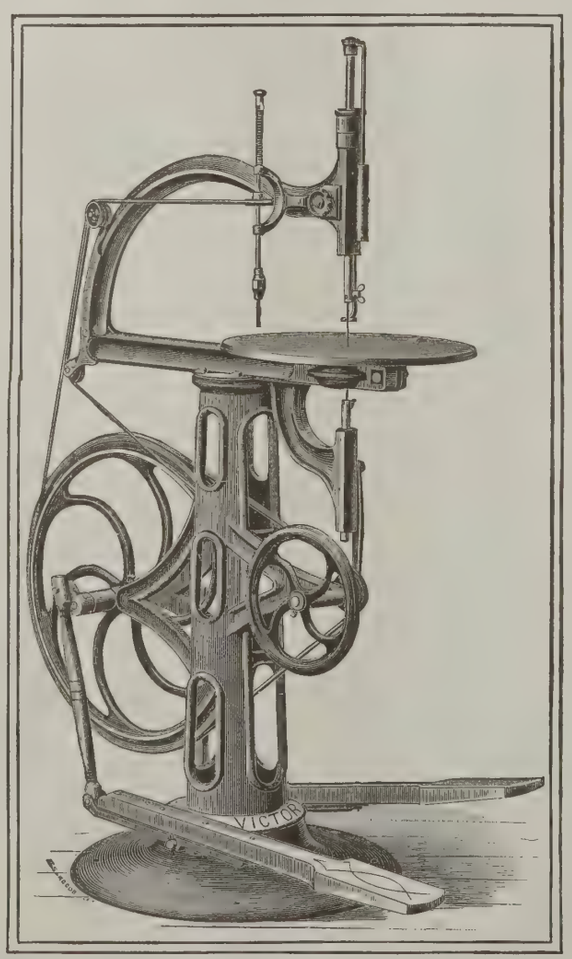
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FOR FOOT AND POWER

SUITABLE for carpenters, pattern and cabinet makers and all wood workers requiring accurate work, also for sawing soft metals. Will cut up to 3 inches thick, swings 24 inches, has powerful tread motion, cuts rapidly and is easy to operate. Has adjustable tension spring on upper spindle, dust blower, drill attachment, iron tilting table, etc. Will furnish tight and loose pulleys for power in place of treadles when desired.

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We make a complete line of Foot, Hand and Light Power Wood-Working Machinery, suitable for carpenters, builders, cabinet makers, and other wood workers. It will pay you to investigate their merits.

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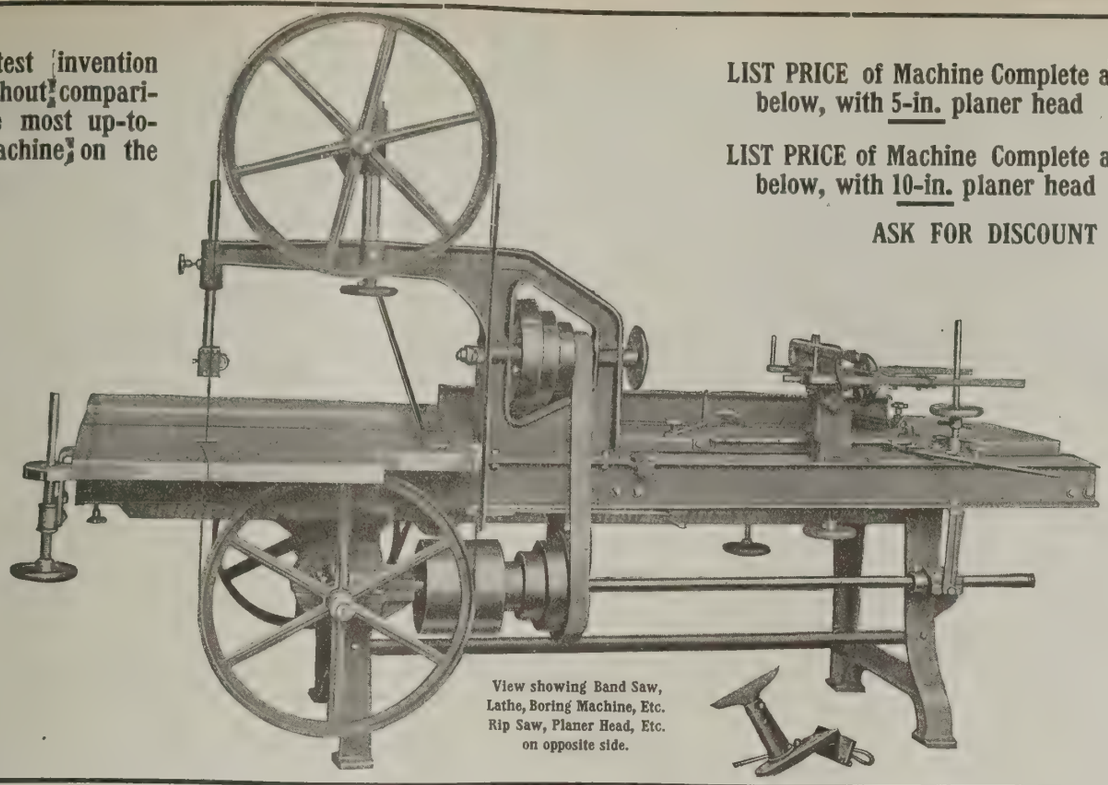
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(172)

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The latest invention and without comparison the most up-to-date machine on the market



View showing Band Saw, Lathe, Boring Machine, Etc. Rip Saw, Planer Head, Etc. on opposite side.

LIST PRICE of Machine Complete as described below, with 5-in. planer head . $300.00

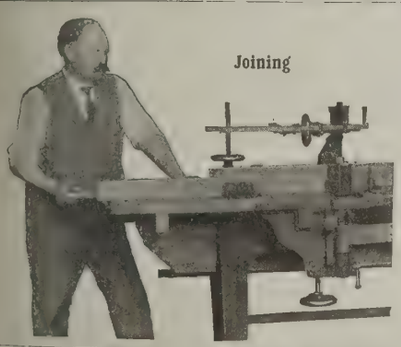
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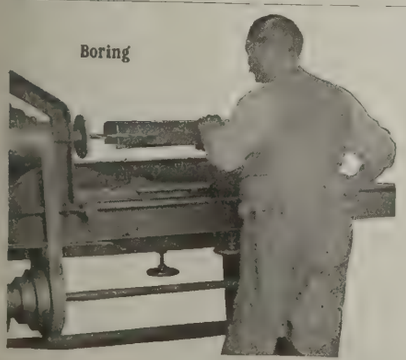
Crain Combination Woodworker



Wood Turning



Joining



Boring

Combines in One Compact Machine a

BAND SAW	PLANER
RIP SAW	LATHE
CUT-OFF SAW	BORING MACHINE
SHAPER	SPOKE EQUALIZER
SIZER	

and can be used for a number of other operations common in contractors' and builders' shops as well as pattern and repair shops. All without extra attachments; simply change the tools. The lathe swings 20-in. diameter and 40-in. between centers. The Band Saw will take 12-in. under the guide. Saw mandrel will take saws up to 12-in. diameter. It will be seen from these ample dimensions that this machine is of a very practical size and substantially built. Three men can work independently at it at one time. It is practically

12 Machines in One

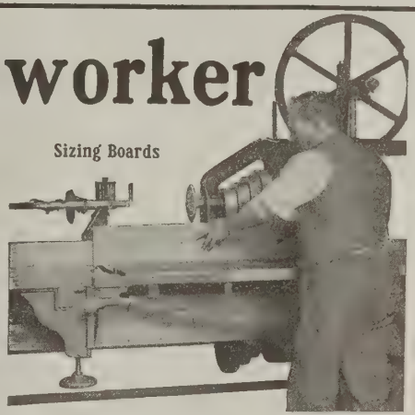
and is the most modern and complete Combination Woodworker on the market. It economizes space and power. Only 4 H. P. required. It provides at a moderate investment the conveniences of a large factory with high priced separate machines for each purpose. It is simple to operate; full instructions accompany the machine.

This machine is fully described in our Catalog 178 P—Section 5

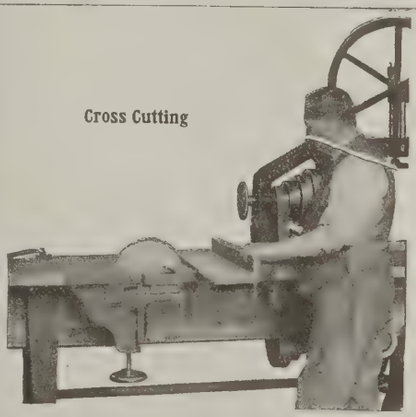
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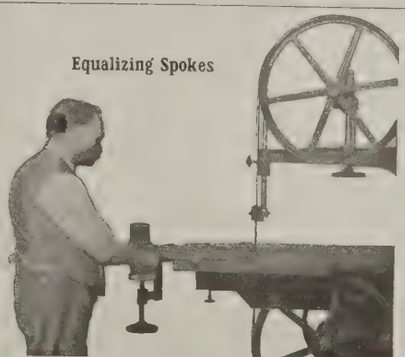
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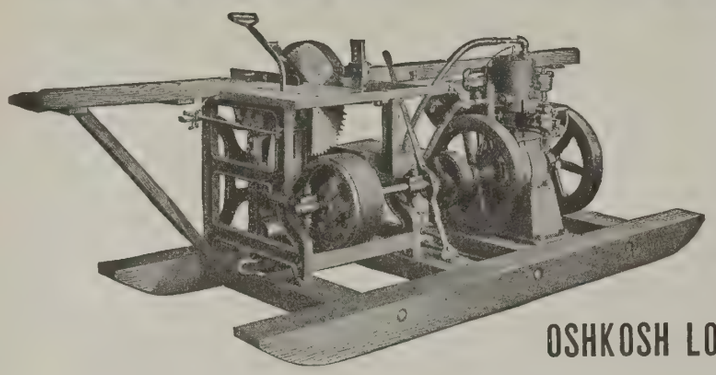


Equalizing Spokes



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BRING the MILL to the JOB



¶ Contractors and builders are now realizing the saving in labor and time that may be had by substituting practical machines for hand labor. Labor is high and time is going on, so imagine the saving that can be made by doing the work of 6 to 8 carpenters on the Oshkosh Portable Saw Rig. Investigate the only machine of its kind having a swinging saw that can be held stationary for rip sawing. Not a light, cheap affair, but a good, heavy, substantial machine.

MANUFACTURED IN TWO SIZES:

Size No. 1.—14-inch Saws— 6 H. P. Gasoline Engine or 5 H. P. Electric Motor

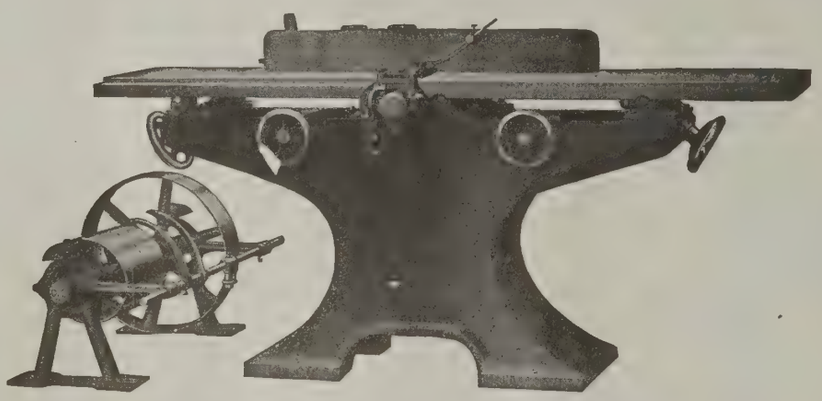
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Write for special catalogue of Saw Rig.

OSHKOSH LOGGING TOOL CO., 414 S. Main St., OSHKOSH, WIS.

PROTECT YOUR FINGERS
by using a CRESCENT Jointer with Safety Head

The knives in CRESCENT Safety Heads are made of high speed steel which will hold an edge longer and turn out better finished and more work than can be done on a common jointer with ordinary knives. You may crowd the machine to the limit and the quality of work will be just the same as though you hadn't crowded it a bit.



The price of these splendid machines is very reasonable considering the very high quality of the machines and the enormous amount of accurate work they are capable of turning out.

Send for catalog giving complete description. It tells about our elegant line of Band Saws, Saw Tables, Jointers, Borers, Shapers, Planers, Planer and Matchers, Pole Rounders, Disk Grinders, Variety Woodworkers.

THE CRESCENT MACHINE COMPANY 10 MAIN STREET LEETONIA, OHIO, U. S. A.

CARPENTERS, CONTRACTORS, BUILDERS AND RETAIL LUMBERMEN

FIND OUR

NEW NO. 270 HORIZONTAL HOLLOW CHISEL MORTISER

A GOOD INVESTMENT

This is due to the fact that it will do a great variety of light and medium mortising in all kinds of wood with VERY LITTLE POWER.

A SLIGHT PRESSURE ON THE FOOT TREADLE

gives great leverage and advances the table to chisel, mortising to a depth of 6 inches. Table is raised and lowered by crank, as shown. Frame is a very rigid casting, being molded in one piece and having broad floor base, insuring a perfectly smooth mortise.

YOU ARE INVITED TO WRITE FOR LARGE ILLUSTRATED CIRCULAR



No. 270 Horizontal Hollow Chisel Mortiser

J. A. FAY & EGAN CO, 327-347 W. Front St., CINCINNATI, OHIO

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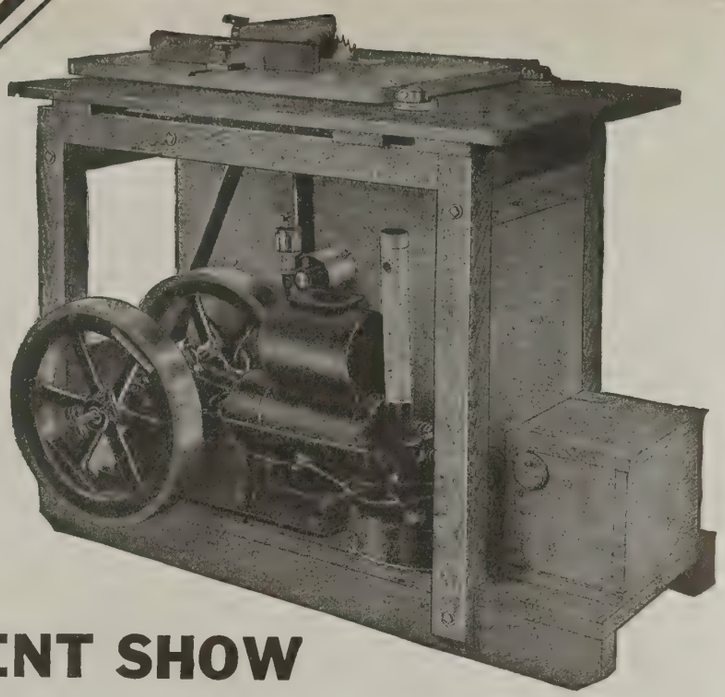
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FOR THIS

PORTABLE SAW RIG

WITH THE FOLLOWING ATTACHMENTS INCLUDED

READY TO RUN WHEN OUTFIT REACHES YOU



Booth No. 1 CEMENT SHOW

One 8″ Rip Saw	One Emery Wheel
One 8″ Cross Cut Saw	One Extra Spark Plug
One 10″ Cross Cut Saw	One Oil Can and Wrench
One ½″ Dado Head	One Belt Tightener attached to Engine.
One 2¼″ Jointer Head (four knives) and	Adjustable Iron Block

Buy Only What You Need of the Extra Attachments as Follows:

Boring Attachment complete with sliding table, bolts, chuck and two boring bits.

Sanding Disk.

Special Moulding Knives.

Different sized Dado Heads, etc.

All these extra attachments will be charged to you at cost on your order for a complete outfit.



WE ARE THE PIONEERS

IN THE MANUFACTURE OF PORTABLE SAW RIGS. OVER 1000 RIGS IN ACTUAL USE

A complete and economical operating mill, which requires no line shafts or large amount of floor space. Can be moved from job to job and will do the work of five men.

A power plant guaranteed to make you no trouble.

Designed and built to run **continuously** under **full load.**

Always ready to do sawing, and one crank of the flywheel makes it run. The three horse power water hopper cooled engine pulling the 8″ saws with ease.

Will rip 2″ and cross cut 3″ lumber.

Cuts hours to minutes. Cuts cost to pennies. Cuts out the wear and tear on muscles.

This Rig put on your job or in your shop will pay for itself in a short time and we absolutely guarantee same or return at our expense.

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C. H. & E. Manufacturing Co., Inc.

319 MINERAL STREET, -:- MILWAUKEE, WIS.

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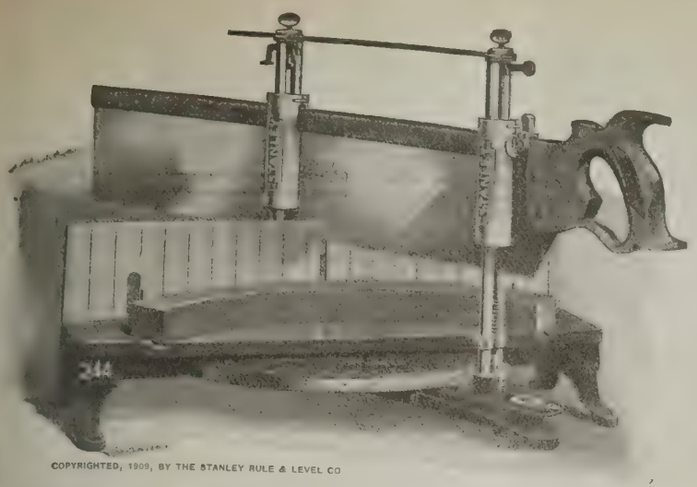
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STANLEY MITRE BOXES have the widest range of adjustment of any Mitre Box made. For strength, accuracy and durability they are unsurpassed.

No.	Saw	Capacity Right Angle	Capacity Mitre (45°)	Capacity at 30° without Stock Guide	Each
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242	22 x 4 "	8¼ "	5½ "	3½ "	10.75
244	24 x 4 "	8¼ "	5½ "	3½ "	11.00
246	26 x 4 "	8¼ "	5½ "	3½ "	11.25
346	26 x 4 "	9½ "	6½ "	4⅛ "	12.25
358	28 x 5 "	9½ "	6½ "	4⅛ "	13.00
460	30 x 6 "	11 "	7½ "	5⅛ "	16.00

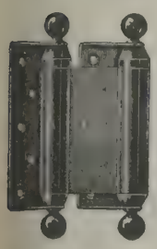
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Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

Bommer Spring Hinges are Quality Goods



But cost no more than the inferior kinds

The Springs Never Go Lame

This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge

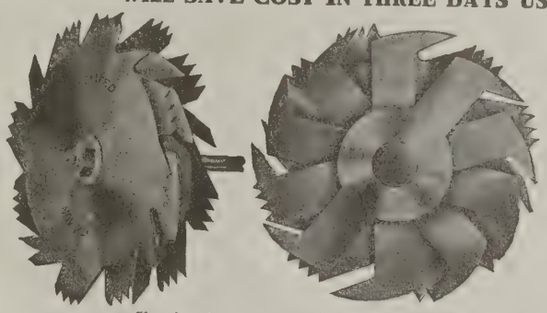


Reputations are made by consistently giving your customer the best spring hinges and avoiding imitations or substitutes

Bommer Spring Hinges are sold by all Hardware Dealers

HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N. Y.**

HAVE YOU POWER BORING MACHINES?



Quadruple Bit Price $5.00
Can not be used in a hand brace

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

Mortised at one Punch with the

Quadruple Bit

or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money

Write For Free Samples



Grand Rapids Hardware Co., 118 Pearl St. GRAND RAPID MICH.

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*



PARKS' BALL BEARING MACHINE COMPANY
KNOWLTON AND FERGUS STREETS **CINCINNATI, O.**



TRUS-CON JOIST HANGERS

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

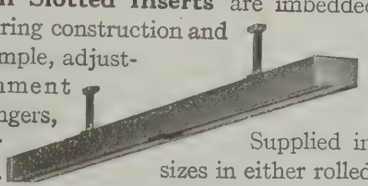
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

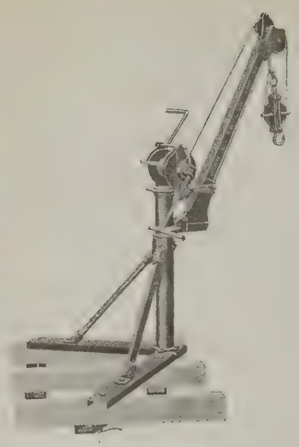
Trus-Con Slotted Inserts are imbedded in the concrete during construction and furnish a simple, adjustable attachment for shaft hangers, sprinkler systems, etc.



Supplied in various sizes in either rolled steel or cast iron; also Trus-Con Socket Inserts to receive threaded bolts.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Builders' Portable Derrick

Constructed entirely of malleable and steel, roller bearing, circle swing. Hoists clear side wall and lands on eighteen inch trucks. Adjustable speed

One man operates both cranks and can hoist 1500 pounds

Price $40.00

JOHN L. TAYLOR

Manufacturer
TAYLOR PORTABLE STEEL DERRICK

1034 Lake Street, - - CHICAGO, ILL.



The

New Smith Jointer



The design of this **New Hand Planer** is original and unique, and standing on **three supports** cannot twist out of line.

The front table is extra long so as to handle large pieces and the **round cutter head** is fitted with two self-hardening knives and two extra slots for projecting cutters.

Machines are made 12, 16, 20 and 24 inches wide and embody some adjustments and improvements not found on other jointers.

For further particulars concerning above and Other Wood Working Machines, address

H. B. SMITH MACHINE COMPANY

Smithville, N. J., U. S. A.

Branches; NEW YORK CHICAGO ATLANTA MEMPHIS



MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

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J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MAS



Barnes Hand and Foot Power Machinery

COMPLETE OUTFIT FOR

Carpenters and Builders

IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Warranted to be well made; will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

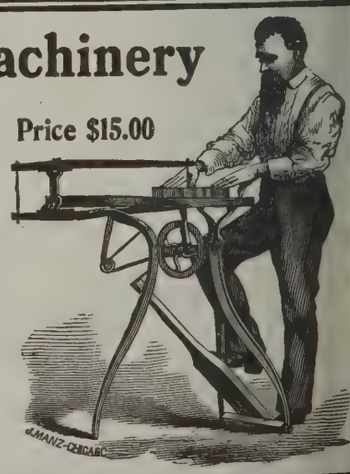
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436 Ruby Street, Rockford, Illinois

Price $15.00



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The Carey Roof Standard

CAREY'S FLEXIBLE CEMENT ROOFING

To Prove to You

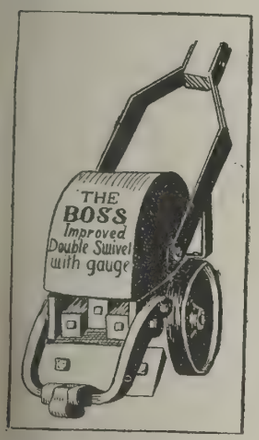
the high, standardized construction and composition of Carey's Roofing, we want to send you

Booklet and Sample FREE

and give you practical information regarding Carey's Roofing based on 25 years' actual time-proved tests. Carey's Roofing is equally adapted to flat or steep surfaces, wood-sheathing, tile or concrete. Whether your contract is large or small, we want to show you the advantage of using a standardized roofing material.

THE PHILIP CAREY MFG. CO.
59 Wayne Avenue, Cincinnati, Ohio — 50 Branches

"FAMOUS FOR DURABILITY"



The Boss Improved Floor Scraper

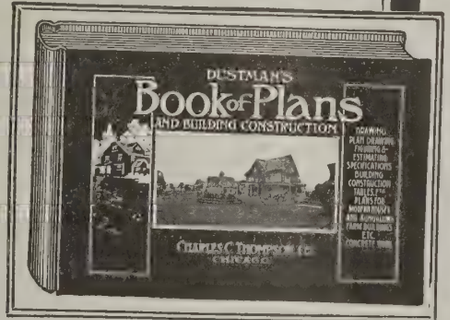
Has double swivel allowing the knife to be set in any position. Gauge can be set for any thickness of shaving and keeps knife from making depressions in floor. Gives knife double support. The pear-shaped wheel which is in the gauge is attached to the gauge in front so that when the scraper is let down to take shaving, it lets the knife down gradually, and prevents the knife from making a deep cut. With this gauge and wheel attachment, the knife will leave no mark. Impossible to do poor work. Adjustment simple—positive. Gauge can be removed instantly. Sanding attachment. Prices very low. Write for descriptive circular.

GEORGE J. KEPPLINGER
DWIGHT, ILLINOIS
Adv. Dept. B.

10,000 Sold in 30 Days

Dustman's Book of Plans and Building Construction

By U. M. DUSTMAN
(Licensed Architect)



Press Reviews

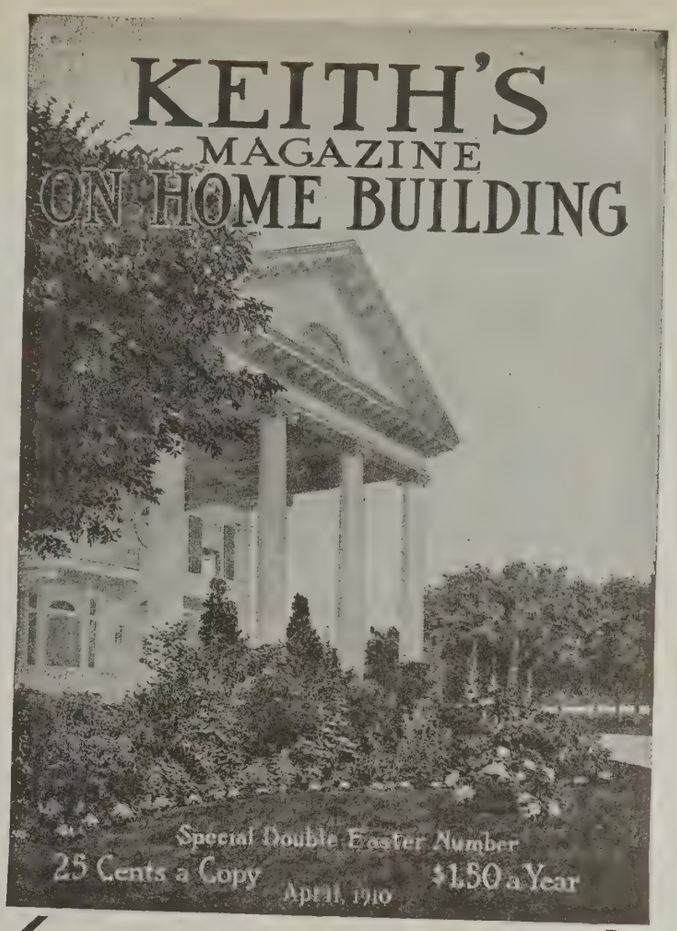
The most pretentious book of plans and building construction that has ever come to our attention.—*The St. Louis Lumberman.* The suggestions offered in description and text are of a practical nature.—*The Cement Era.* The information given in this book cannot be found in any other works.—*The Lumber World.* It is more complete and up-to-date than any other book along the same line.—*The American Lumberman.* The author does not make a mistake so common in works of this character.—*Mississippi Valley Lumberman.* The book is all that is claimed for it and more, too.—*Builder and Contractor.* The book appeals strongly to the contractor and builder. The author is a well known practical architect of over thirty years' experience.—*Building Age.*

CONTENTS

General Construction Plans—Arrangement of Rooms—Things to be Considered in Laying Out a Building—Heating Facilities—How to Estimate Cost—Figuring Amount of Material Required—Time Saving Tables—Mechanical Drawing and How it is Applied in Construction of a Building—Plans with Estimated Cost of 150 Houses, Bungalows, Barns, in Frame, Concrete or Brick Construction—Country Houses—General Barns, Cattle and Horse Stables—Dairy Barns—Poultry Houses and Silos—Hints as to Best Style of Structure—Details of Interior Construction and Finish—Window and Door Framing—Stairways—Store Fronts—Roof Construction—General Directions for Mixing and Placing Concrete—Proportions—Sand and Gravel—Itemized Lists of Material Costs—Writing of Specifications.

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Dear Sir:
I accept your Special Offer and enclose $2 for a year's subscription to the well known KEITH'S MAGAZINE on Home Building, with 2 recent sample numbers extra and one of your $1 books. I have selected from your list, Vol. No._____, which please mail to me at once.

SIGNED _____

ADDRESS _____

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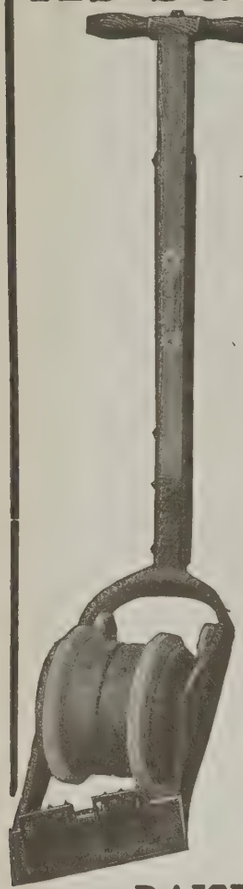
As Sure as 2 and 2 Is 4

A Shearing Cut Gets Best Results in Floor Scraping

Why does a mechanic when scraping a floor by hand use the Shearing Cut? Because he obtains smoothest and quickest work so. When you whittle a piece of wood you use a Shearing Cut.

A Shearing Cut is ALWAYS made with the

"DAISY" FLOOR SCRAPER



With One Ten-Inch Blade Single Shearing Cut is Made
With Two Five-Inch Blades Double Shearing Cut is Made



The "Daisy"

CUTS EITHER WITH OR ACROSS THE GRAIN
CUTS RIGHT UP TO BASE BOARD AND INTO EVERY CORNER
IS EASIER ON THE OPERATOR AS IT REQUIRES ONLY A SLIGHT LIFT TO GET BEST WORK
WILL DO MORE WORK THAN ANY OTHER IN SAME LENGTH OF TIME
WILL DO PERFECT STRAIGHT EDGED WORK AND WILL PLEASE YOU
CLAMPS ARE INSTANTLY FASTENED
FILING DEVICE FILES BLADES TO RIGHT BEVEL
EDGE-TURNING DEVICE IS A WONDER

UNSOLICITED TESTIMONIALS

FRED L. WALTERS
CARPENTER AND BUILDER
Jobbing Given Prompt Attention
Estimates Furnished

Gillette, N. J., Oct. 11th, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
The flooring has arrived and we have scraped it with your machine and I find it does all you claim for it. Inclosed you will find check as per agreement.
Thanking you for your kindness in allowing me to try this machine and for extending the time for trial, I am, Yours respectfully,
FRED L. WALTERS.

KUTSCH BROTHERS
CARPENTERS AND CONTRACTORS
Jobbing and Repairing
Promptly Attended to
No. 2043 Washington Street

Dubuque, Iowa, Sept. 1st, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
Immediately after using the Scraper we have found it to be satisfactory and superior to any we have seen in use.
We herewith inclose draft in full for same.
Yours truly,
KUTSCH BROTHERS
Per J. P. K.

Belle Fourche, S. Dak., Aug. 4, 1910.
THE DAISY MFG. CO., South Bend, Ind.
Gentlemen:—
After giving the three Floor Scrapers a trial we have decided that the "Daisy" is the one we want. Inclosed find draft in full for same.
Very respectfully,
NELSON & GOLDING

Ten Days Free Trial Offer

We will ship a "DAISY" Outfit to any responsible contractor who intends purchasing a floor scraper for a ten days free trial. Test it with others, if you do not find it best return it. The trial will not cost you a penny.

The DAISY MFG. Co.
South Bend, Ind.
Gentlemen:
Please send me the "Daisy" Floor Scraper Booklet free.
Name .....
City .....
State .....
Occupation .....

DAISY MFG. CO., SOUTH BEND, IND.

"Nothing but the Highest Praise for THE TRIPLE "A" MACHINE"



This Letter is Self Explanatory

Flint, Mich., 11-23-1910.

Triple "A" Machine Co.,
Chicago, Ill..

Gentlemen:—
I take pleasure in writing you regarding the workmanship of your mechanics in scraping the floors of the Flint P. Smith Building, this city.
I have tried out three different floor scraping machines and am satisfied that the Triple "A" was the best. Owing to the work which your men and machines were able to do, I can have nothing but the highest praise for the Triple "A" Machine.
Yours truly,
W. E. WOOD.

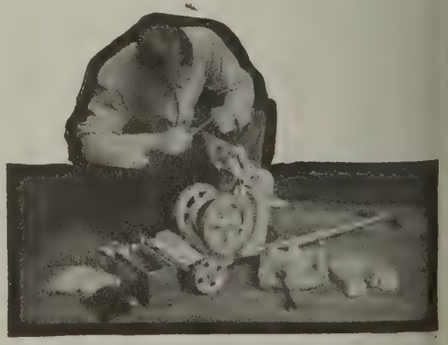
Surfacing Floors

(by contract)

pays when you have the proper equipment.

We can't do all the floor surfacing in the country, but we're willing to furnish the machines and give others a chance.

Any carpenter can successfully operate **The Triple "A" Spring Driven Floor Smoother**—It's easy—the motor spring furnishes power.



SHARPENING UP

Make it your business to see this machine in operation

Triple "A" Machine Co.

110 South Clark Street, CHICAGO

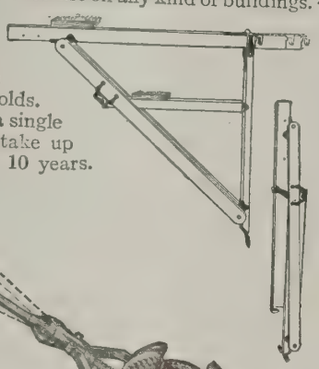
PASTE THIS DOME ON LETTERS
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IT WILL HELP.

The Latest WEBER Work Savers

SAVE time and you make money. Crude tools delay work and turn out "botch" jobs. My devices are right up to the minute—mechanically correct—and you can't afford to be a day without them, Read every word of this ad; then send for complete catalog and prices. I've been a successful contractor for 25 years, and I absolutely **know** I can save you money at every turn of the road.

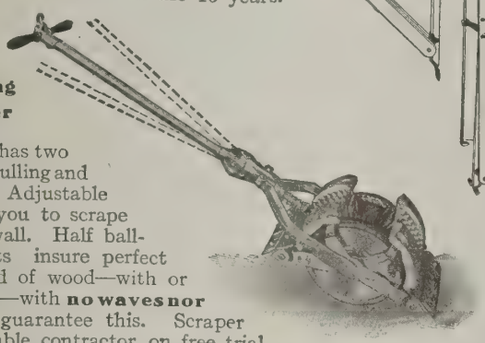
Double Scaffold Bracket

is the only one that can be adjusted for use on any kind of buildings. Will not swing sideways and has two scaffold boards which make it ideal for putting up cornices. Weighs only 22 lbs., but is much stronger than the old, heavy scaffolds. Can be folded without loosening a single bolt. When folded, 24 brackets take up space only 3 x 4 x 5 feet. In use 10 years.



WEBER

Double-Acting Floor Scraper



improved model, has two knives—one for pulling and one for pushing. Adjustable handle enables you to scrape right up to the wall. Half ball-and-socket joints insure perfect work on any kind of wood—with or against the grain—with **no waves nor chattering.** I guarantee this. Scraper ent to any reliable contractor on free trial.

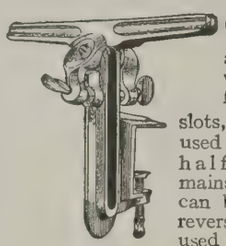
Folding Saw Vise

holds the saw with rigid unyielding grip and is as nearly noise-preventive as such a tool can be made. Can be thumb-screwed to any plank or bench in an instant. When folded, it takes up no more room than a common hammer. Saves many an aching arm from using dull saws and should be in every kit.



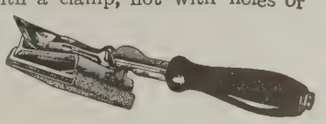
FOLDED

Cabinet Scraper and Sander



OPEN

affords a firm grip and can be controlled with ease in the tightest corners. Knife is fastened with a clamp, not with holes or slots, and can be used till but a half inch remains. Scraper can be quickly reversed and used for sandpapering and polishing. Weight 22 oz. Handiest tool ever made for the purpose.



Sharpening Device

for floor scrapers holds the file at the correct level for an even, true edge on Weber and other floor scraper knives. With this tool, anyone can do excellent work in short time without previous experience. Well worth investigation.

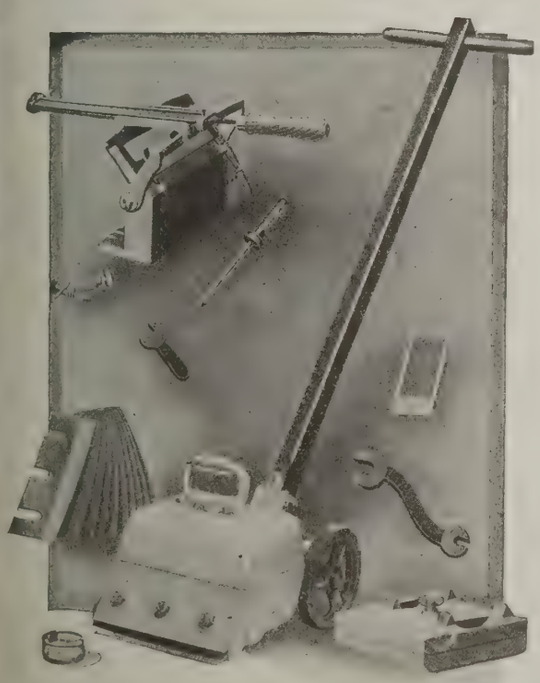


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JOHN F. WEBER, Pres. :: WEBER MFG. CO.

661 71st Avenue, WEST ALLIS, WIS.

THE "ACME" SAVES 75%



of your floor scraping labor expense, because **one** man and the **"Acme"** can do as much work as **four** men can with hand scrapers. You don't have to take my word for this—prove it to yourself by accepting my **one week's free trial offer.**

I will send the **Acme Floor Scraping Outfit** to you on a **week's free trial** and if you don't find that the machines will save you much money and do your floor finishing better and easier than you ever had it done before, pack up the outfit and send it back at my expense.

Start the new year right by investigating into my proposition. Don't put it off, but do it now. The sooner you do, the more money you will save. Write to me for booklet and further particulars.

A few January letters

Lemasters, Pa., Jan. 14, 1911.
Jos. Miotke,
Milwaukee, Wis.
Dear Sir—Please find enclosed check for the floor scraper you sent us on trial. We are very much pleased with the outfit and find it to be entirely as represented.
Yours truly,
M. HARTMANN & SONS.

Boonton, N. J. Jan. 10, 1911.
Mr. Jos. Miotke,
Milwaukee, Wis.
Dear Sir—Enclosed please find check for your scraping outfit which you sent on trial a few days ago. It works very satisfactory and I only wish that I had purchased it years ago.
Yours truly,
W. H. GRIMES.

Florence, Ala., Jan. 10, 1911.
Jos. Miotke,
Milwaukee, Wis.
Dear Sir—The two floor scraping outfits were received on the 7th and I find them O. K. and entirely satisfactory. Enclosed please find check in full payment for same.
Truly yours,
JOE L. HOLTSFORD.

JOSEPH MIOTKE, 249 Lake St., Milwauke, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



From H. Ball, Winnipeg, Man.—I am an owner of a Pearson Nailer and it is a complete success, especially this time of the year. I want to know what they will cost to agents, as I believe I **can sell them here like hot cakes.**

From Albert Heinz, Chelan Falls Wash.—I finally received the Nailing Machine and am well pleased with it. I think I will want quite a few of them this spring, as the carpenters here **don't know that there is such a thing made.**

From John G. Most, Martland, Neb.—I would like to get the agency for your Nailing Machine at this place. I have the only Nailer in this county and it is **one of the best things there is going, I think.**

COLD WEATHER TROUBLES

IN SHINGLING OVERCOME BY

PEARSON'S NAILER

for it works as well in one season as another. Wear your gloves or mittens and (with it) drive more nails than you ever did. Quit using your mouth as a nail pouch.

PEARSON NAILERS

ARE MADE IN TWO SIZES.

The Blue Nailer is for common 3d No. 14 wire nails and the Red Nailer is for the galvanized 3d, No. 13, 1¼-in. wire nails.

If you cannot get it from your dealer, order from us direct, being careful to state the nailer wanted, according to the kind of nail to be used.

$5.00 each express prepaid. Money cheerfully returned if Nailer is not as represented. Write for Circular "N."

PEARSON MFG. CO.

Robbinsdale, Minn.



From Robert Christopherson, Sioux City, Iowa.—I have one of your Pearsons Improved Nailers and can **recommend it very highly,**

From John Miller, Wauwatosa, Wis.—I have received the Nailer some time ago; am **well satisfied with it.**

From Geo. H. Moore, Chatfield, Minn.—I have one of your Nailers and I **would not do without it.** Please find enclosed 40c for new plunger. I got this Nailer about a year ago.

From C. F. Sommercom, South Byron, Wis.—I bought a Pearson Improved Nailer of you and it proved to do such a grand work so I am **going to get another** one of them. They can be used to good advantage.

From J. G. Grimm, Garrison Iowa.—Find enclosed draft for another Nailer, the red Nailer for gal. nails; send at once. **I sold the other Nailer to a man after he tried it about 5 minutes.**

10,000

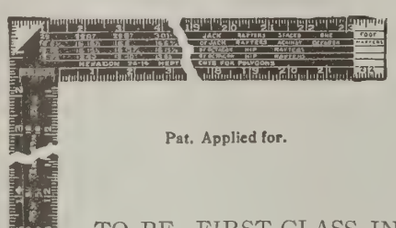
SHINGLES

Nailed in 10 hour with a PEARSON NAILER is the experience of Mr Connell:

"The Nailer more than meets my expectations, and has more than paid for itself on one job of thirty thousand shingles. With my boy of fifteen years of age I carried up and put on ten thousand shingles in one day of ten hours. Would not take $10.00 for it if I could not get another. * * *"**

P. M. Connell,
Greeley, Neb

Your experience should be just as good.



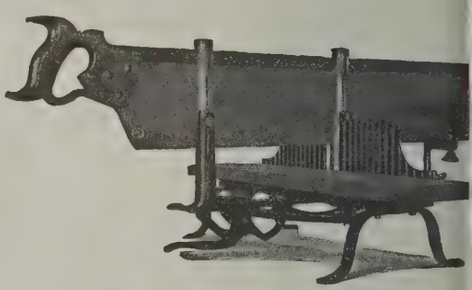
Pat. Applied for.

Nicholls' Tools

ARE

GUARANTEED

TO BE FIRST-CLASS IN EVERY RESPECT. MONEY REFUNDED IF ANY TOOL DOES NOT PROVE SATISFACTORY.



NICHOLLS HARDENED CORNER FRAMING AND STANDARD SQUARES

No. 100A contains our regular framing rule on face of body of square, also octagon framing rule on back. Price--

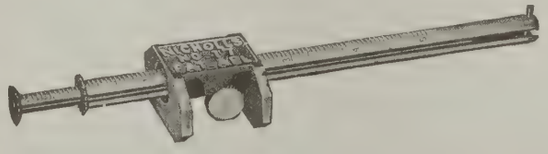
Polished Steel, $2.25 **Oxidized Copper, $2.50** **Nickel Plated, $3.00**

We will prepay express charges on any of our tools if ordered direct.

TRUE MITER BOX.

We have now a positive Center and Octagon stop, which with the miter stops, will take in ninety-five per cent of the work done with miter boxes. Then with the graduated circle, any degree may be obtained very easily.

Prices: $11.50, $11.75, $12.00 and $12.50



Nicholls New Sawtooth Roller Marking and Mortise Gauge.

By making this Gauge with a Sawtooth Wheel it runs true with edge of board, regardless of knots or cross-grain wood. Also, the line made by this wheel is easily seen as the marks are like punch marks and reflect the light from all sides as shown by illustration in the corner.

LIGHT, NEAT AND COMPACT.

No. 17 Nickel Plated	$1.00
No. 17 White Metal Finish	.75
No. 10 Nickel Plated	.60
No. 10 White Metal Finish	.50

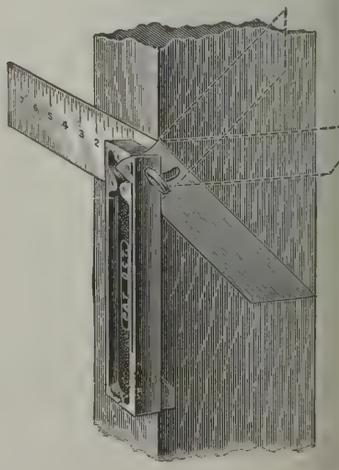
IDEAL BEVEL-TRY SQUARE

This tool is a combination of a Bevel and a Try Square. By its use the carpenter can save considerable time. When Bevel is not in use it may be closed in handle out of the way, or by removing thumb screw the bevel attachment comes off, leaving an ordinary Try-Square.

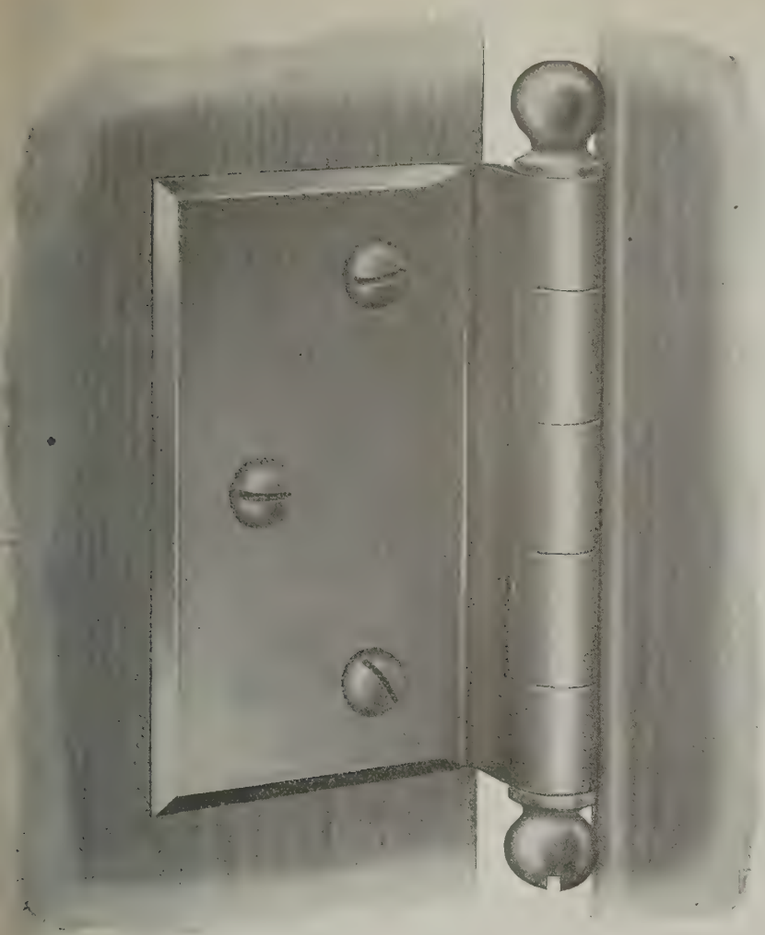
One Size Only, Eight Inch, Price **$1.20**

NICHOLLS MFG. CO.

Ottumwa, Iowa



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

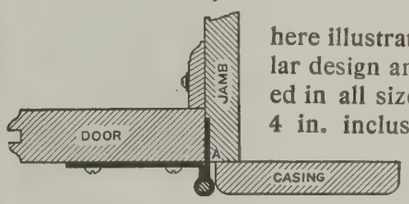
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

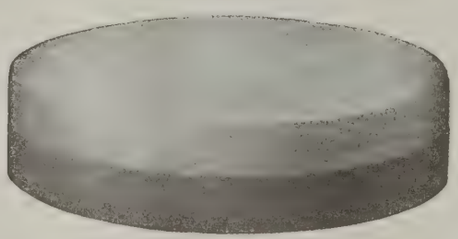
These are exclusive "NATIONAL" features.

Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.



It is Round—and It is a Wonder

The new Carborundum Carpenters' Bench Stone is just the right size for that rotary motion required in sharpening chisels, plane bits, etc. Made one side coarse grit for bringing the tool to an edge, the other fine grit for finishing. Like all Carborundum sharpening stones, it gives a better edge in less time—never fills or glazes and wears uniformly.

CARBORUNDUM ROUND COMBINATION BENCH STONE

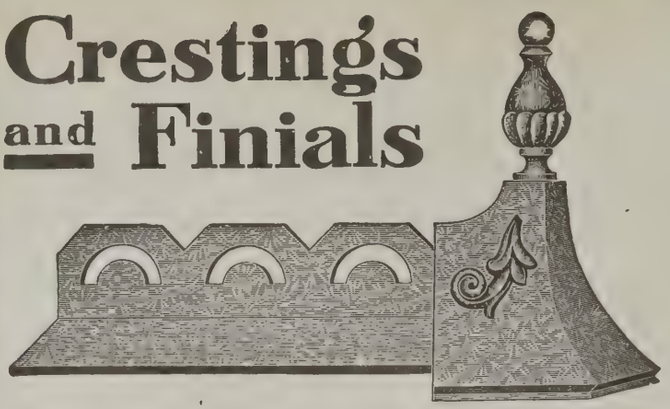
No. 107	**$1.00**
With quartered oak box holder	**1.50**
Carborundum Pocket Stone in leather case	**.35**

ASK YOUR HARDWARE DEALER OR SEND DIRECT

THE CARBORUNDUM COMPANY, Niagara Falls, New York

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Crestings and Finials



CRESTING No. 107. FINIAL No. 97

WRITE TO

Willis Mfg. Co.

GALESBURG, ILL.

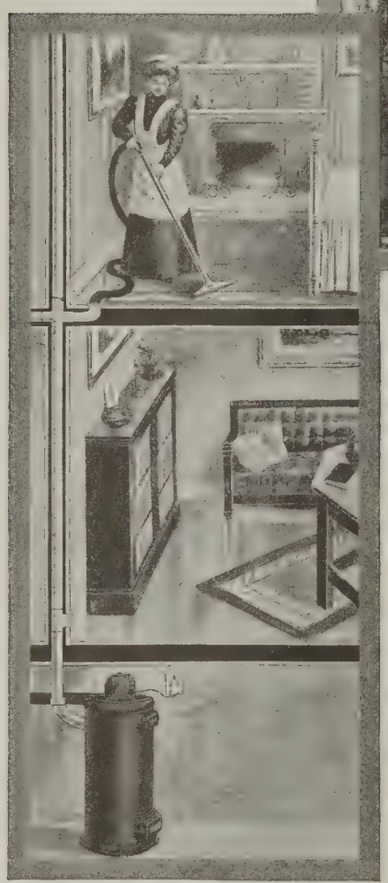
FOR CATALOGUE No. 5, ILLUSTRATING A FULL LINE O

Crestings, Finials, Store Fronts, Bay Windows, Cornices, Skylights, Deck Crestings, Gable Ornaments, Ventilators, Willis Hip Shingles, Steel Ceilings and Side Walls, Fireproof Windows and Doors, Steel Roofings and Sidings, Ornamental Stamped Work.

SEND US YOUR PLANS FOR AN ESTIMATE ON THE SHEET META

Three TUEC-Homes in a Row





Say the owners of these three homes in a Middle-West city, speaking

TUEC-170 STATIONAR Air Cleaning Sys

Installed in Each House (Names o

The man in the first house writes: "It is the only correct way of air-cleaning because it removes the dirt from the room instead of into a receptacle attached to the cleaner."

The man in the second house: "Its hygienic features are so manifest that I believe the time is not far distant when it will be considered as necessary as a bathroom."

The man in the third house: "The semi-annual house-cleaning is now a thing of the past. We go over eight rooms every week in less than two hours."

If these people and many others find the T so efficient, convenient and sanitary, isn't it w while to find out all about it?

Whether you have houses for sale or ren building new homes for the same purpose, yo know how easily the TUEC-170 can be installed much it will add to your returns and your profi

We also make larger sizes for hotels, schoo ment houses, public buildings, etc.

WRITE FOR FULL INFORMATION

THE UNITED ELECTRIC CO., Branches in all large cities 3 Hurford St., CANTO

THE WINTHROP

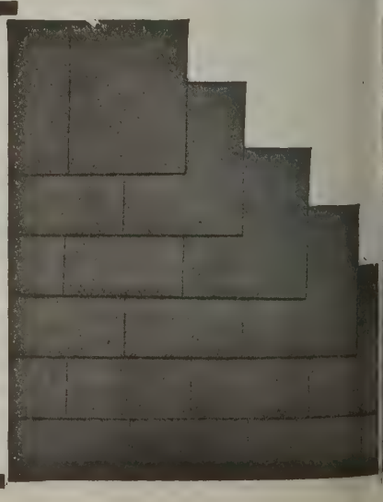
SOLID TAPERED ASPHALT SHINGLES

Are of a Cool, Gray Slate Color

And have the durability of asphalt—the fine appearance of slate and the light weight and low cost of wood shingles. They are fire-resisting—weather proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

Special Inducements to Those Who Apply First Roof in Each Town. Catalogue on Request

WINTHROP ASPHALT SHINGLE CO., 1100 THE TEMPLE CHICAGO, ILL.



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

6 Months Free Trial



This Luther Diamond Tool Grinder sharpening outfit will help any shop, factory, contractor, or any carpenter, mechanic or tool user to earn more money. This is exactly what we want you to prove by six months' free use of this **genuine** Luther Carborundum Grinder shop and factory outfit. We want tool users generally to try out this outfit for six months free—to sharpen every kind and as many tools as possible free for six months, and then, if you are not fully satisfied that this outfit is a big money-maker for you, send it back at our expense. Send back the coupon at the bottom of this page for particulars of 6 months' Free Trial, and special offer on shop and factory outfit, also Free booklet about Carborundum.

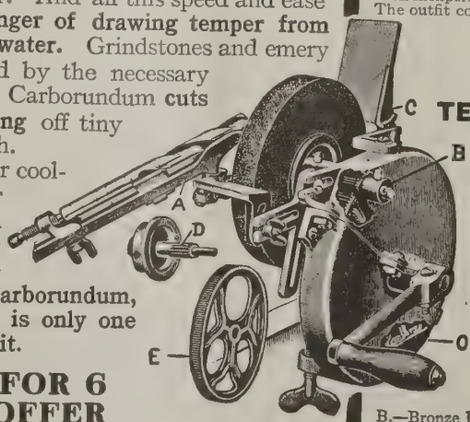
25 Times Faster Than Grindstones—6 Times Faster Than Emery—Will Not Draw Temper—Not Emery Called by a Fancy Name, But

GENUINE CARBORUNDUM

WILL NOT DRAW TEMPER

Carborundum is a wonderful sharpening substance. There's nothing else like it, or near like it in the world. Nothing except the genuine diamond itself is so hard. In fact, Carborundum is made of artificial diamond crystals, actually **created** in the terrific heat of electric furnaces at Niagara Falls, which fuses the elements of real diamonds into hard, sharp, beautiful Carborundum crystals. In this **utmost** heat, far beyond the measurements of science, in which fire brick melts and runs like butter, Carborundum crystals get a temper and sharpness that cuts hardest steel as emery does copper. Wheels actually made of genuine South African diamonds would sharpen tools no quicker. And all this speed and ease of tool sharpening is done **without danger of drawing temper from tools, and with no need of cooling with water.** Grindstones and emery wear steel away; frictional heat caused by the necessary heavy contact draws the temper. But Carborundum **cuts** steel away without frictional heat, **peeling** off tiny shavings of hardest steel at lightest touch.

No need of heavy pressure, no water cooling needed, no danger of drawing temper if it is **genuine** Carborundum. And you can be highly suspicious of anything described as we have described Carborundum, but called by any name other than **Carborundum,** no matter how fancy the name. **There is only one Carborundum; there is nothing else like it.**



SEND COUPON TODAY FOR 6 MONTHS' FREE TRIAL OFFER

Often you work with dull tools because it's not easy to sharpen them. This outfit makes any sharpening the work of only a few minutes. Keen, bright tools mean faster work every moment of the day, and that means **more money made,** to say nothing about the time saved in sharpening and the money saved, because there is no danger of drawing temper, and all your tools will last longer. The Carborundum wheels will outlast any number of emery wheels or any other abrasive. We guarantee the wheels for five years. But don't take our word; let the outfit itself prove all this in your own shop, on your **own** tools. If you don't want it after six months' free test, send it back. The six months' use will cost nothing.

Send back the coupon today and get our liberal Free Trial offer, also interesting story about the discovery of Carborundum, reprinted from McClure's Magazine.

RETURN THIS COUPON

LUTHER GRINDER MFG. CO.
Madison Street - - MILWAUKEE, WIS.

Special Offer on Shop Outfit

LUTHER DIAMOND TOOL GRINDER

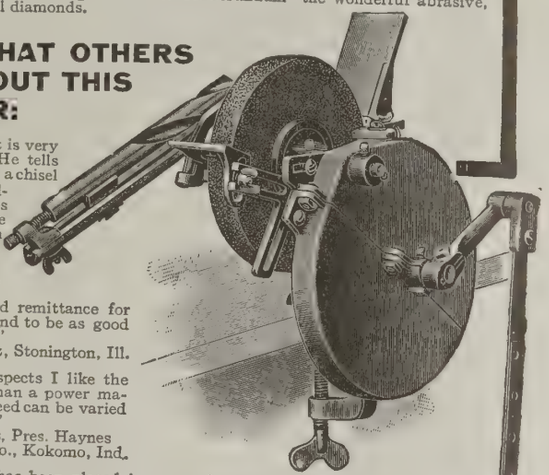
This genuine Carborundum Sharpening Outfit is a remarkable value—the most liberal, reasonably priced outfit ever offered. It provides for every kind of sharpening, buffing and polishing work. The coupon below will bring you our Six Months' Free Trial Offer, and Special Outfit Offer, also a reprint of an interesting article from McClure's Magazine about Carborundum—the wonderful abrasive, made of artificial diamonds.

READ WHAT OTHERS SAY ABOUT THIS GRINDER:

"Our machinist is very much pleased. He tells us that he ground a chisel on this tool grinder in two minutes which would have taken an hour on the grindstone."
W. H. Sears,
Pentwater, Mich.

"Enclosed find remittance for grinder which I find to be as good as recommended."
S. Schrantz, Stonington, Ill.

"In many respects I like the machine better than a power machine, since its speed can be varied instantly at will."
Elwood Haynes, Pres. Haynes Automobile Co., Kokomo, Ind.



"The grinder has been placed in our work room and proves satisfactory. I heartily recommend it."
George Leonard, Pioneer, Ohio.

"We consider your Mechanics Special the best thing on the market for grinding tools. It will give us pleasure to recommend the grinder to our friends."
MacLean & Carrick, Palmer, Mass.

10 TOOLS IN ONE

The Mechanics' Special Shop Outfit, on which we are making this special offer, embraces ten sharpening appliances. The special attachments make it easy for even inexperienced persons to do difficult grinding, such as twist drills, chisels, etc. The outfit consists of one Mechanics' Special, with the following accessories:

WILL NOT DRAW TEMPER

1. One rough genuine Carborundum wheel
2. One fine genuine Carborundum wheel
3. One Chisel grinding attachment
4. One twist drill attachment
5. One buffer
6. One polisher
7. One genuine Carborundum oil stone
8. One genuine Carborundum hone in leather case
9. One genuine Carborundum sickle stone
10. One foot power attachment

BUILT LIKE A HIGH GRADE LATHE

The Luther Mechanics' Special, forming the basis of this shop and factory outfit special offer, is built substantially for a lifetime of service. The genuine Carborundum wheel will not get lopsided. The Mechanics' Special is built with steel and malleable construction—dust-proof, bronze bearings—machine parts run in bath of oil—machine cut spur gears—speed 2,500 revolutions per minute. It will stand the severest, hardest service, out-wear and give better service than any number of emery wheels, grindstones, or anything else.

A.—Twist drill attachment to give twist drills proper angle and clearance.
B.—Bronze Bearing. C.—Chisel Sharpening Attachment.
D.—Spur gear cut from solid steel.
E.—Large spur gear machine-cut, oil bath.

Return the Coupon Below for Six Months' FREE TRIAL OFFER

COUPON

Luther Grinder Mfg. Co., 55 Madison St. Milwaukee:

Gentlemen: At no obligation, please send Six Months' Free Trial Offer on Shop and Factory Outfit. Also interesting booklet about Carborundum. This coupon does not mean that I will buy; it simply means I want full details, and does not obligate me in any way.

Name _____

Address _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

EVERYTHING IN PLUMBING AND STEAM GOODS AT CUT RATES TO EVERYBODY

SAVE YOU 30 TO 45 PER CENT



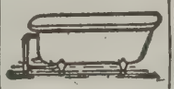
$8.50 and up

This Magnificent Enamel one piece Sink. Latest design.



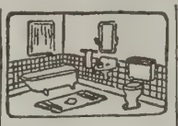
$7.50 and up

Artistic Lavatories. Various designs.



$10.95 and up

Luxurious Enamel Bath Tub of guaranteed quality. Will wear forever.



Superb Bath Room Outfit. None better, at any price..... **$35.00**



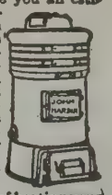
$3.00 and up

Laundry Tubs all styles and sizes.



Low-down and high combination Closets. Guaranteed to be equal to the best in the market. Used in the most palatial homes. **$11.50**

HEATING PLANTS. Let us make you an estimate on a heating plant. With instructions from our engineering department, you can install it yourself. Simple and safe as a stove. No expense after once installed. The only healthful economic method of heating your home. Plans free. Tools loaned. Boiler only **$65.00 and up**



Send for Catalog N for More Bargains

John Hardin Company, One Quarter Century at 4541 Cottage Grove Avenue, **Chicago, Illinois**

Full Line of Plumbing Supplies



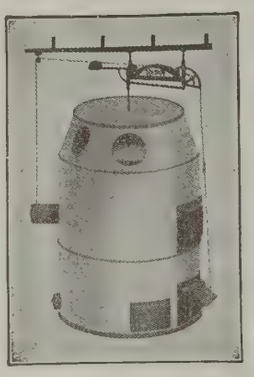
Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bath room outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

A LOT OF PEOPLE IN YOUR TOW NEED THE KEES FURNACE REGULATOR



¶ It keeps the temperature even—promoting health and comfort.

¶ It works the drafts automatically turns every pound of coal into useful h No fuel is wasted.

¶ It reduces the care the furnace quires. No need to watch the thermom or work the dampers by hand.

¶ Sells at a price any furnace owner afford. Easily attached.

A splendid side line for carpen when their regular work gets slac Drop us a card.

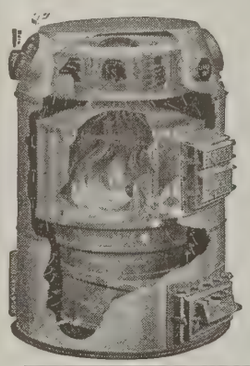
F. D. KEES MFG. CO. BEATRICE, NEB

BUY A BOVEE FURNACE

DIRECT FROM THE FACTORY

And Save $50.00 to $100.00 on your Heating Plant

They actually save from one-third to one-half of the fuel



We have one of the best equipped furnace factories in the west and make more than 30 different furnaces of seven leading styles and can furnish our customers with practically any size or style of furnace they may desire, either UPRIGHT or HORIZONTAL, sufficient to heat a large church or school house, down to a cottage heating plant complete with all pipe, registers and fittings for **$55.00.**

Our furnaces are the only furnaces having a PERFECT VENTILATING SYSTEM for every part of the house.

We ship our furnaces cut to fit. Any handy man can install them without the aid of a tinner.

Catalogue and full specifications free.

BOVEE GRINDER & FURNACE WORKS
60 8th Street, WATERLOO, IOWA



HESS Sent on Approval FURNAC

You can buy our furnace direct from our factory AT THE FACTORY PRICE, a it 60 days in winter weather. If not pleased, return it at our expense for freig ways, and pay us nothing.

This offer, and lots of good furnace information, will be found in our free booklet. Ask us for one. A postal card will do.

Hess, 907 Tacoma Building, Chica

MORE HEAT AND LESS FUEL



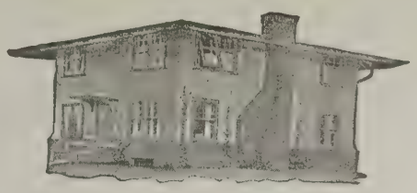
This shows the Jahant Down-Draft Furnace without the casing, pipes, etc. The air enters the inlet marked "Draft" and rises through the two cast iron smoke-proof pipes that lead to the top of the fire box. Being colder and consequently heavier than the air directly over the fire, it falls and forms a down draft through the center of the fuel until it becomes heated and rises to the service pipes. The Jahant Down-Draft Furnace consumes every piece of fuel to a fine ash and liberates every unit of heat.

$10 Down Send us $10 with plans of the rooms you desire to heat and we will send the proper sized Jahant Down-Draft Furnace with full instructions for installing. You can pay the balance in monthly installments. Write for our big furnace book. It is free.

The Jahant Heating Co.
2 Mill St., Akron, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Contractors,



There's Good Money for You Putting in

ANDREWS HOT WATER HEATING SYSTEMS

In Your Houses—They Are Sent You "Knock Down" Ready to Erect—

We Saved the Owner $160

THIS System is the easiest for you to handle as we do all the work of planning, cutting and fitting—yes, and take the risk of the plant's success. We know the Andrews Systems are the best that can be produced in every way. Your carpenter's helper can easily set up the plant, following our complete and simple directions. It will pay you to investigate our proposition which enables you to make the profit that would otherwise go to the heating contractor. Send us a rough sketch for an estimate on your next job. We will quote you a net price or quote price to your customer, allowing you a commission. Let us help you make money.

REGURGITATING SAFETY VALVE

makes your radiators one-half hotter in very cold weather. It makes Andrews Hot Water Systems heat up your house as quickly as steam without any steam plant disadvantages; stops "boiling over." It is simple, automatic, safe.

TEMPERATURE CONTROL



Andrews Thermostat keeps the whole house at 70 degrees or any other point you wish. It watches the fire and operates the dampers, saving you all bother. Accurate, absolutely dependable. Guaranteed for life.



OVER

500 MILES OF ANDREW SYSTEMS IN 44 STATES

ANDREWS LOCOMOTIVE STEEL BOILER

is made of the strongest steel plate like big power boilers, is easiest to clean, has more than two times as much heating surface and fire travel as other boilers. It costs more but will save you from $20.00 to $200.00 on coal bills yearly. Ask users near you.

How to Get an Andrews System

First send us a rough sketch or architect's plans of the house to be heated, giving size of rooms, windows, height of ceilings and construction, and get our **free estimate** of cost complete. The plant is then made complete in our factory and shipped "knock down" either to you or to your customer, as you prefer. We pay freight and furnish a 360 Days Free Trial Guaranty Bond. For your services we allow a very fair commission.



OUR HOT WATER ENGINEERS

are famous. From your rough sketch or architect's plans they design your complete hot water system, make it complete in the factory and ship it to you "knock down" with such complete and simple directions that you, your carpenter's helper or any handy man can put it in.

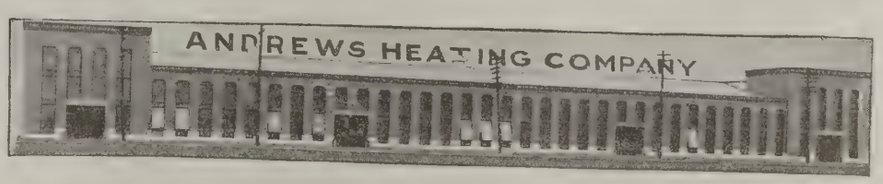
OUR BIG FACTORY

has capacity of 3,000 Systems per year. It is equipped with special tools and labor-saving devices, which reduce cost and furnish much better plants. We sell direct from factory and save you jobber's and middleman's profits.

HEATING, PLUMBING, WATER SUPPLY and SEWAGE DISPOSAL

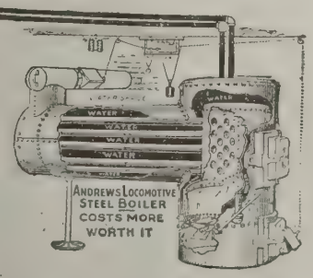
SOLD ON 360 DAYS FREE TRIAL GUARANTEED BY BOND

BUY DIRECT AND SAVE THE MIDDLEMAN'S PROFIT



WE PAY THE FREIGHT

Old Houses Easily Heated



FREE Estimate and 72 Page Heating Book Coupon

FILL IN AND MAIL US TODAY

ANDREWS HEATING COMPANY, 1162 Heating Bldg., Minneapolis, Minn.

Gentlemen:—I enclose herewith a rough sketch or architect's plan of house for which please furnish me a **Free Estimate** of Hot Water Heating System complete, also, your **Big Book** on **Heating, Plumbing, Water Supply and Sewage Disposal.**

Name..... Address.....

I enclose also two names of parties who might buy

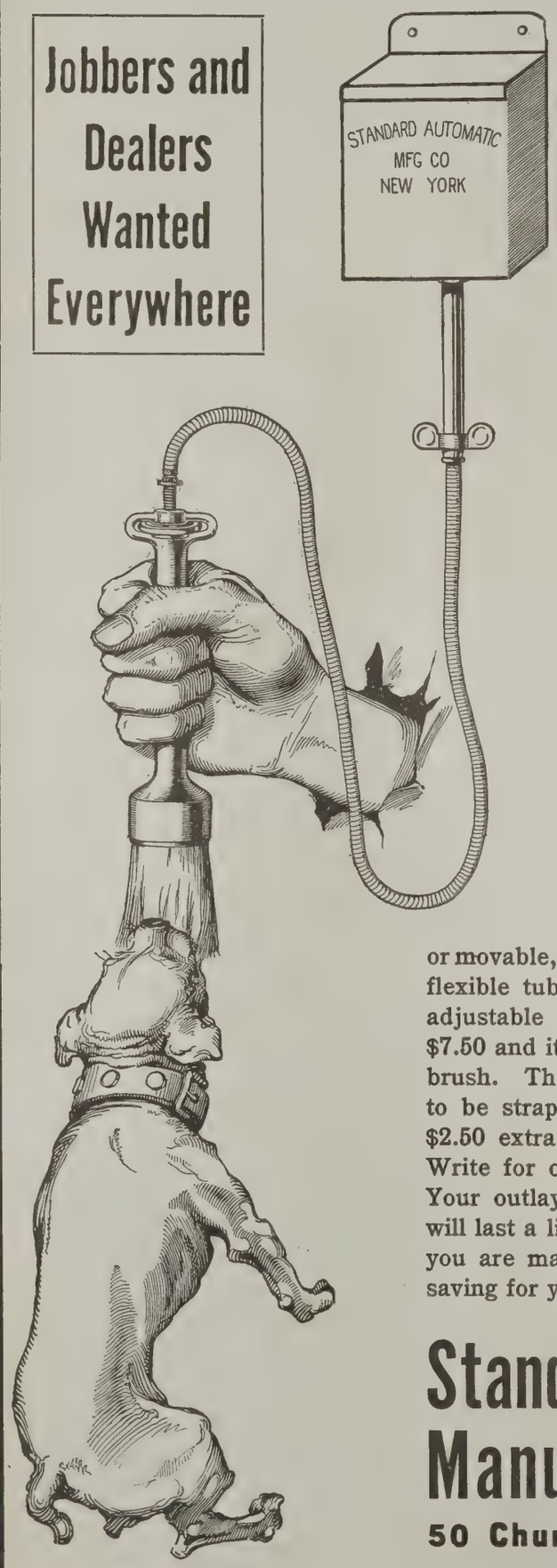
.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Standard Automatic Brush

does your painting work in a new way, better, quicker, cheaper, eliminating all waste of paint. An equal flow at all times; thickness of coat can be accurately adjusted. Absolutely clean and fireproof.

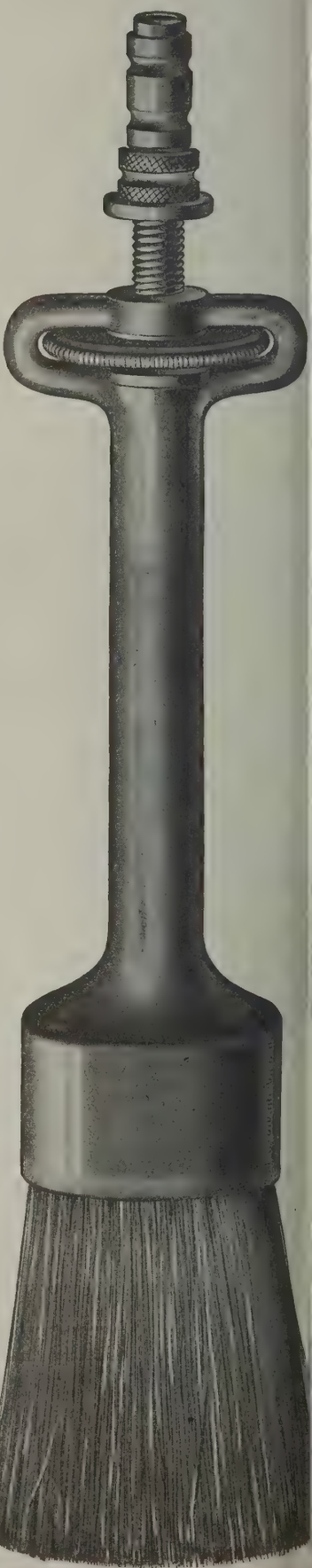
Jobbers and Dealers Wanted Everywhere



The STANDARD AUTOMATIC SYSTEM does away with the paint can. It eliminates the dip and is far superior to the spray, but it does rub it in. No air pressure is needed. Will work with any kind of paint. Get next to this new method. Made especially for manufacturers of automobiles, automobile bodies and wheels, all kinds of vehicles, carriages etc. is most useful for manufacturers of furniture. It will also save a lot of time in painting structural work, such as bridges elevated roads, etc. House and sign painting can be done effectively and quick.

Wherever duplication of work exists, this device will increase your output and reduce the cost. Buy just one outfit today and be convinced. We are sure that we will have to equip your entire plant. Special equipments can be made to suit your purpose.

Complete outfit consisting of a large paint tank, either stationary or movable, with automatic valve and six feet of flexible tubing, together with the automatic adjustable brush made of aluminum, costs $7.50 and it is still cheaper than the ordinary brush. The outfit is also made with a tank to be strapped on the back which will cost $2.50 extra. Our booklet will tell you why. Write for one today. Send in your order. Your outlay will only be once. Apparatus will last a lifetime. Let us know today what you are manufacturing and we will effect a saving for you.



Standard Automatic Manufacturing Co.

50 Church Street, NEW YORK

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

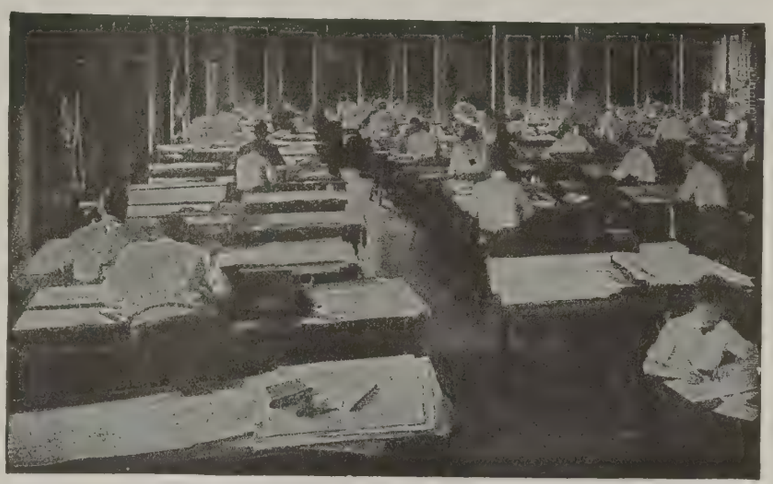
DRAW GOOD PLANS and DRAW GOOD MONEY

WITHOUT DOUBT many readers have in the past wished to be successful, first-class Draftsmen and Designers, and probably often looked for a long time at plans and drawings, trying very hard to figure out certain lines, or experienced an intense desire to be able to do the best work in most up-to-date manner; and many men in most any kind of business, especially in Architectural lines, have often felt greatly embarrassed simply because unable to read even a simple sketch or unable to make any kind of business-like drawing.

No carpenter is first-class and competent unless he is an A-1 Draftsman in addition. Without this knowledge he can never rise any higher and will remain only a Carpenter paid by the hour or day.

To become a successful Draftsman it is necessary, first of all, to receive the most practical and personal training. Not a lot of school or book knowledge, but practical Drafting-room work.

Mr. F. B. Dobe, Chief Draftsman of the Engineers' Equipment Company (inc.), Chicago has for many years made a practice of giving personal and individual Drafting instuction in complete Architectural drawing and Building design; and is prepared to accept a few more personal students, young or old. His instruction is given by mail, but must not be compared with ordinary "for all alike" correspondence school lessons, as all the work is laid out personally by himself and prepared especially for your individual requirements and advancement. He treats each student according to the student's ability; and with his individual practical method, which consists of actual Architects' work.



INSIDE OF A DRAFTING ROOM

Where draftsmen Draw from twenty-five to seventy-five dollars per week

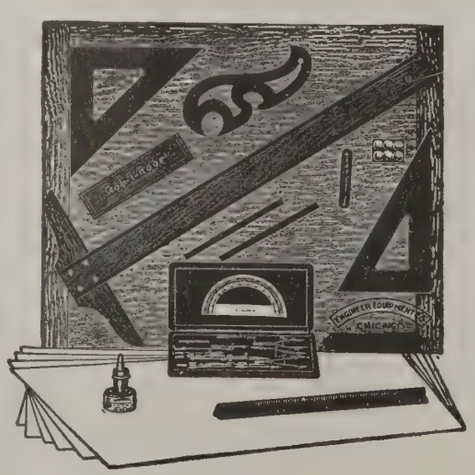
GOOD DRAFTSMEN IN DEMAND

JUDGING by the manner in which many carpenters and contractors are getting in communication with Mr. F. B. Dobe, of the Engineers' Equipment Company, and signing up for his personal instructions in architectural draftsmanship, they are realizing the necessity and pleasure of making more money. The opportunities offered today for ambitious, wide awake and progressive men capable of making from $25.00 to $75.00 per week as architectural draftsmen are better than ever. The immense amount of building which is going on and the increasing demand for more and larger structures, gives the man with actual drafting room experience splendid opportunities for steady employment at high wages, besides the chance for advancement. There is no class of men who make better architectural draftsmen than the carpenter and contractor. The experience gained by actual work on all kinds of buildings makes it much easier in studying and also in holding a responsible position afterwards. No employer cares for diplomas—neither does he care or will pay big wages to just a mere copier. What the employer wants today is originality and practical ability, and this requries practical training. The quickest and best way to be trained on practical drafting room work and to get the required practical experience is to receive personal and individual instruction from a high grade practical man at the trade, with a reputation as the most experienced man in training men to become competent and successful draftsmen.



Mr. F. B. Dobe

An ordinary draftsman, not even the best draftsman, can teach this trade unless he has had many years of experience as an instructor, and has ability to impart knowledge that is understood and will stick forever. A special gift that 99 out of 100 do not have.



This Outfit, value $13.85, furnished free by Mr. Dobe to his students

Mr. F. B. Dobe, chief draftsman of the Engineers' Equipment Company (Inc.), Chicago, with twenty years' experience in training and handling men, has for a good many years given personal individual instruction by mail with the most deserving success, because his instruction work consists of actual drafting room work that gives his personal student and apprentice the required practical experience.

Mr. Dobe has been an advertiser in this paper for a good many years and will send his "Successful Draftsmanship" prospectus, 6 by 9, also list of open draftsmen positions and full information free. His advertisement appears on last page of this paper. Anyone interested should write to him.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS IT WILL HELP.

COLONNADES

$12.50 and up

This Massive and Handsome Colonnade

Simple, but Elegant in Design and Architecturally Correct

$12.50

Best in the Market for a Low Price Colonnade. Read Description Carefully

Workmanship and Material the Best



Special 1-11 Colonnade

This colonnade is made to represent two designs. One with composition cap and one with plain wood turned cap. Columns are 6-inch diameter, tapering to receive 5-inch cap. Made for 5¾-inch jambs. Pedestals are made in two sizes 24 inches and 30 inches in width. Height of pedestals 20 inches. Casings and cap trim not included.

PUT IN YOUR STOCK FOR SPRING

THIS IS THE BEST EVER OFFERED

Prices are for any height not over 9 feet.

This Half Shows Composition Cap at Top of

This Half Shows Turned Wood Cap at Top of

This Half shows Composition Cap

Yellow Pine

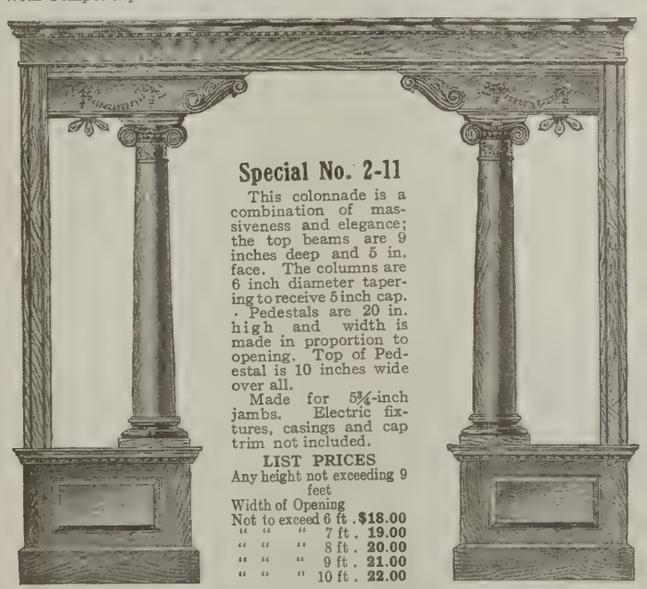
Wood cap, Pedestals 24 in. wide. Price per pair - - - - $12.50
With Compo. cap - - - 13.50
Wood cap, Pedestal 30-in wide. Price per pair - 13.50
With Compo. cap - - - 14.50

ALL PRICES ARE NET

This Half Shows Wood turned Cap

Oak

Wood cap, Pedestals 24 in. wide. Price per pair - $13.50
With Compo. caps - - 14.50
Wood cap, Pedestals 30 in. wide. Price per pair - 14.50
With Compo. cap - - - 15.50



Special No. 2-11

This colonnade is a combination of massiveness and elegance; the top beams are 9 inches deep and 5 in. face. The columns are 6 inch diameter tapering to receive 5 inch cap. Pedestals are 20 in. high and width is made in proportion to opening. Top of Pedestal is 10 inches wide over all.

Made for 5¾-inch jambs. Electric fixtures, casings and cap trim not included.

LIST PRICES

Any height not exceeding 9 feet

Width of Opening
Not to exceed 6 ft . $18.00
" " " 7 ft . 19.00
" " " 8 ft . 20.00
" " " 9 ft . 21.00
" " " 10 ft . 22.00

Made of Oak or Yellow Pine, in the White

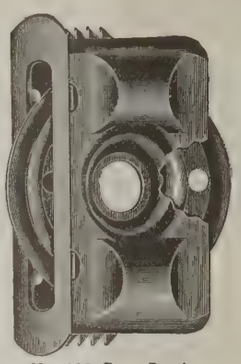
We Manufacture Grille, Arches and Colonnades of every description. Catalog Free. Write for it.

Bertelsen Adjustable Grille Co.

623-625 South Clinton Street,

CHICAGO - - - - - - U. S. A.

OTTUMWA SASH PULLEYS



Are the best for you to use and specify.

NOTE THE LARGE BEARING

Insures Smooth Action and no Noise.

SAMPLES FREE

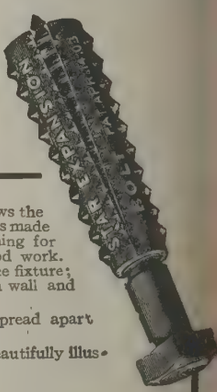


No. 109 Cone Bearing Fits "Triple" Bit Mortise

No. 110 Cone Bearing Fits "Quad" Bit Mortise

JOHNSTON & SHARP MFG. CO., - - OTTUMWA, IOWA

This is why you can't Extract a Star Expansion Bolt



IMPOSSIBLE! Note where the hand is pointing. This shows the beginning of the celebrated "inner end expansion" which has made the Star Expansion Bolt famous as a hold fast forever fastening for wooden cross beams, girders, all ornamental iron and wood work. TO USE: Insert malleable iron shield in hole in wall and place fixture; run screw through fixture to be attached and on into shield in wall and fasten tight.

As the screw is tightened the teethed jaws of the shield spread apart driving their projections deep into the wall on either side.

Every carpenter and contractor should have a copy of our beautifully illustrated 70 page catalogue number 30 and free samples.

"Write while the iron's hot."

Star Expansion Bolt Company

Catalogue Department 30 147-149 Cedar Street, New York City

The Warmest Sheathing



Wind and Frost Proof

Not a mere felt or paper, but a matted lining that keeps out the cold as a bird's feathers do. Incomparably warmer than common papers, and warmer and cheaper than black plaster. Costs less than 1c a foot. Keeps houses warm in winter and cool in summer. Has no equal as a sound-deadener for floors and partitions.

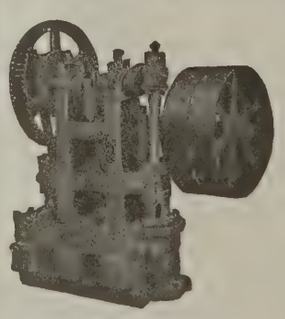
Send for sample and catalogue—free—of

Cabot's Sheathing "Quilt"

SAMUEL CABOT, Inc., Sole Manufacturers, Boston, Mass.
350 Dearborn Ave., Chicago 1133 Broadway, N. Y.

Cabot's Shingle Stains, Waterproof Cement Stains, Waterproof Brick Stains, Conservo Wood Preservative.

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Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

ASK FOR

Our Power Pump Catalogue

The Deming Co.

SALEM OHIO

Hand and Power Pumps for all uses

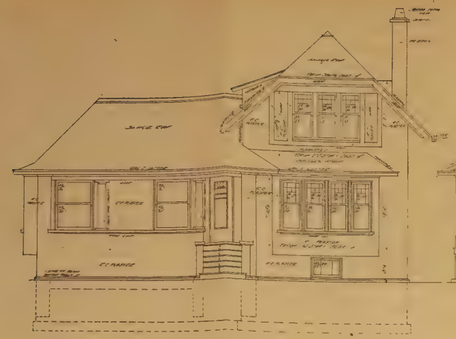
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HENION & HUBBELL, Chicago

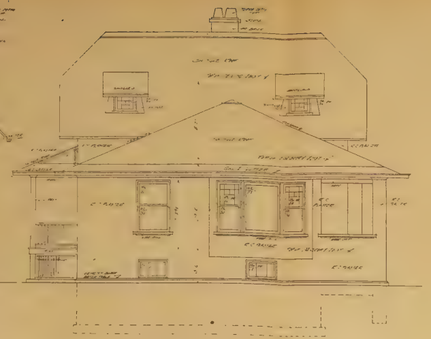
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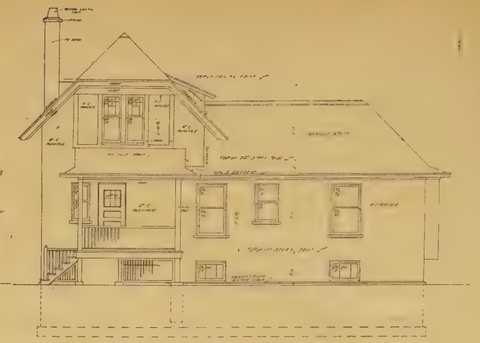
FRONT ELEVATION



LEFT SIDE ELEVATION



RIGHT SIDE ELEVATION



REAR ELEVATION



CHINA CASE



MANTEL.

INTERIOR DETAILS

SUPPLEMENT TO

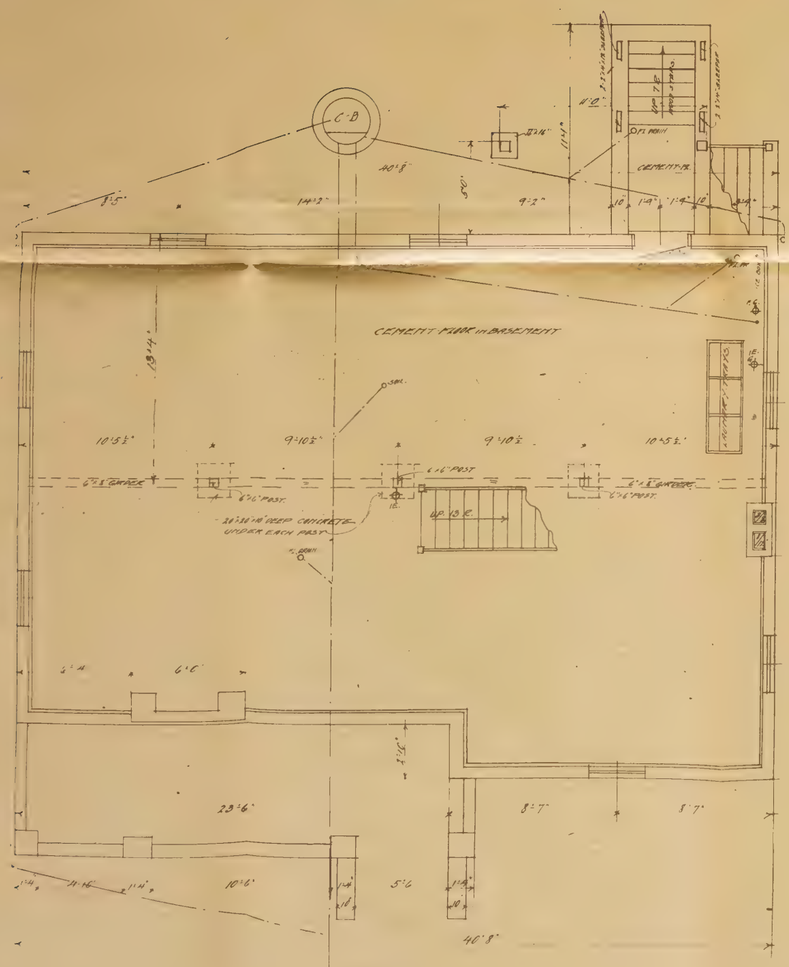
THE NATIONAL BUILDER

FEBRUARY, 1911

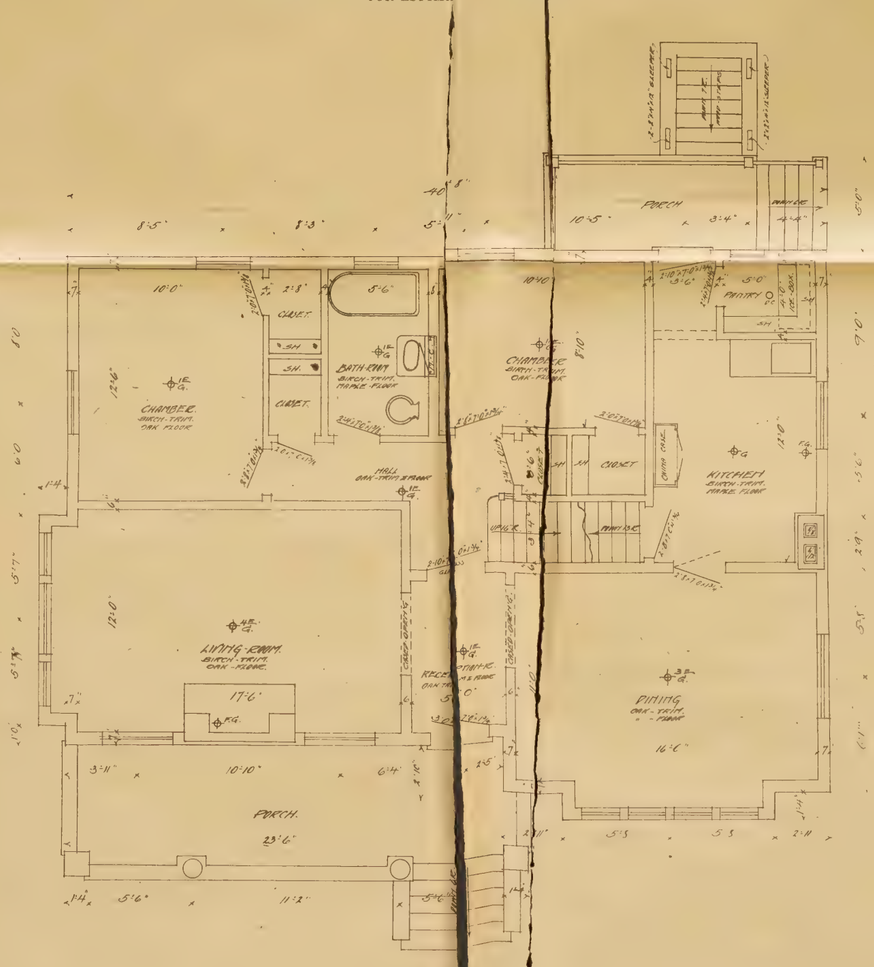
NATIONAL BUILDER DESIGN No. 338, THE DES PLAINES MANOR HOUSE

SCALE FOR FLOOR PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 8 FEET.

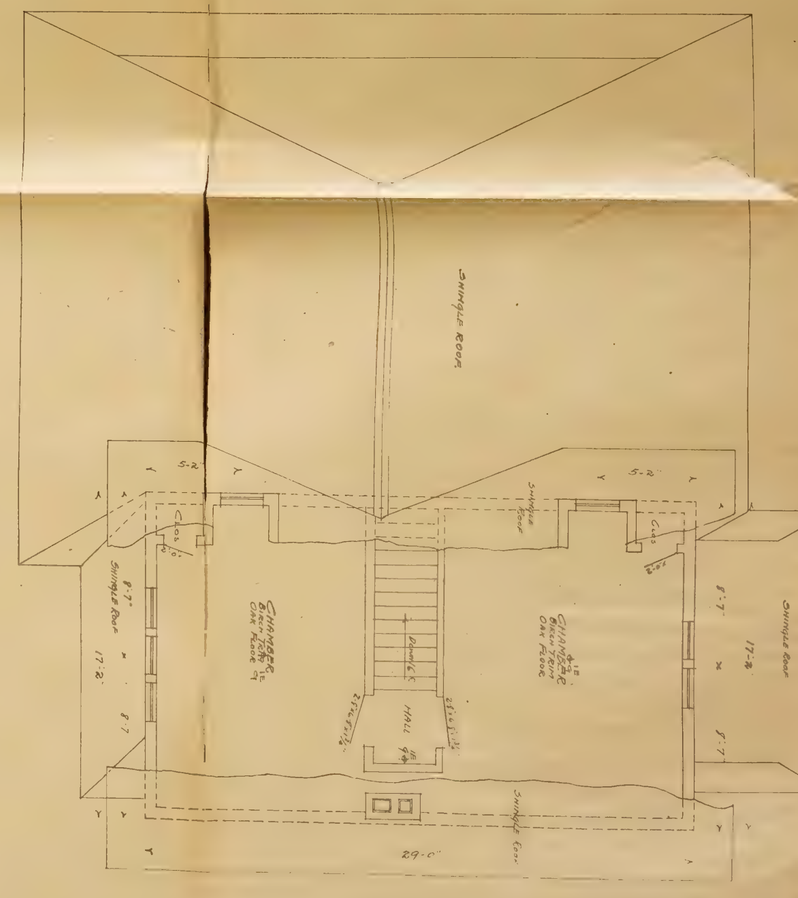
FOR ESTIMATE, SEE PAGE 20



BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

THE NATIONAL BUILDER

Vol. 52 CHICAGO, FEBRUARY, 1911 No. 2



THE DESPLAINES MANOR HOUSE

NATIONAL BUILDER DESIGN No. 338

W. E. Perry Architect, Chicago

For Floor Plans, Elevations and Details, See Supplement of This Number. Estimated Cost, Architect's Fees Not Included, $3,398.00

THE DESPLAINES MANOR HOUSE

THE house shown on the supplement sheet this month is one of a dozen designed for Desplaines Manor. It is of cement plaster, rough cast with foundation walls and footings of concrete, and cement block watertable. The basement has cement floor. The roof is shingled. The plan is equally divided between the main part which has two roomy chambers on the second floor and the single story extension. The varying heights are just enough to give interest and character to the design which is essentially of a bungalow. Clever touches by the designer are shown by the hips of the gables, the flare of the roof of the extension, the quaint dormers, the treatment of the bays and of the substantial porch. The first floor has a central hall and living room with its brick mantel at the left, the dining room with its four part mullioned window is on the right. Back of the dining room is the kitchen with china closet of good design. Two chambers and bath room complete the first floor plan. The house is direct, convenient and economical in plan. The design is pleasing and original without the eratic treatment often shown in suburban architecture. The architect was W. E. Perry, of the firm of Perry & Thomas, Chicago.

ESTIMATE OF DESPLAINES MANOR HOUSE

By I. P. HICKS

EXCAVATING AND MASONRY.

185 yards excavating, 35c	$.64.75
1,000 cubic feet concrete wall and footings, 25c	250.00
110 yards cement floor, 50c	55.00
34 lineal feet double flue chimney, $1.40 per foot	47.60
Stone and terra cotta cap	8.00
150 lineal feet cement block watertable, 20c	30.00
Total excavating and masonry	$455.35

LUMBER BILL.

			Feet
2	6x8x20	ft. girders	214
2	6x6x14	ft. posts	84
10	2x8x16	ft. wall plates	210
10	2x6x16	ft. wall plates	160
50	2x10x14	ft. first floor joists	1,150
14	2x10x16	ft. first floor joists	378
50	2x10x14	ft. second floor joists	1,150
14	2x10x16	ft. second floor joists	378
12	2x4x16	ft. ceiling joists	132
12	2x4x12	ft. ceiling joists	96
100	2x4x16	ft. outside studding	1,100

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour. See Material Prices in this number.

Copyright, 1911, by the Porter-Hodgson Co.

36	2x4x12 ft. outside studding	288
36	2x4x10 ft. outside studding	234
30	2x4x12 ft. rafters	240
48	2x4x16 ft. rafters	528
20	2x4x20 ft. rafters	260
80	2x4x18 ft. first story partitions	960
5	2x8x18 ft. first story partitions	120
30	2x4x18 ft. second story partitions	360
50	2x4x16 ft. plates	550
16	2x8x12 ft. porch joists	256
6	2x8x14 ft. porch joists	114
20	2x4x12 ft. ceiling joists	160
10	2x4x14 ft. ceiling joists	90
24	2x4x14 ft. rafters	216
10	2x10x14 ft. cellar steps, inside and outside	230
30	1x6x12 ft. No. 1 com. braces	180
20	2x2x18 ft. No. 1 com. furring	120
20	1x4x12 ft. No. 1 com. bridging	80
	Total ft. framing lumber	10,028
10,028	ft. framing lumber, $27	$270.75
1,920	ft. 8-inch No. 2 Y. P. Shiplap for rough floor, $27.	51.84
2,300	ft. 1x8x12 to 16 ft. No. 2 Y. P. sheathing, roofs, $27	62.10
2,400	ft. No. 2 Y. P. sheathing outside walls, $27	64.80
20,750	ft. clear cypress or red cedar shingles, $4.50	93.37
1,600	ft. 3/8x2 1/4 face oak flg., $70	112.00
300	ft. 3/8x2 1/4 face maple flg., $60	18.00
220	ft. 1x4x14 ft. clear fir flg., for porch floor, $45	9.90
80	ft. 1x4x10 ft. fir flg., for rear porch, $45	3.60
1,000	ft. 5/8x4 inch, 12 to 16 ft, Y. P. ceiling cornice plancher and porch ceiling, $32	32.00
250	lineal ft. 1x4x12 to 16 ft. clear fir finish, 2c	5.00
7	1 1/8x12x12 ft. clear fir finish	4.72
7	1 x 8x12 ft. clear fir finish	3.72
2	2 x 8x16 ft. clear fir finish	1.68
2	2 x 8x12 ft. clear fir finish	.96
	Total lumber bill	$734.44

MILL WORK.

7	cellar win. frames, 32x10, div., $1.75	$ 12.25
7	cellar sash, 32x10, div., $1.50	10.50
1	cellar dr. frame, 2 ft. 10 in. x 6 ft. 8 in.	2.25
1	cellar dr., 2 ft. 10 in. x 6 ft. 8 in. x 1 3/4	4.00
1	O. S. dr. frame, 3 ft x 7 ft., rab., 2 3/4 ins	2.50
1	O. S. dr. frame, 2 ft. 10 in. x 7 ft, rab., 1 3/4 ins	10.00
4	wd. frames, 42x26x30, $2.50	10.00
1	wd. frame, 42x18x22	2.25
1	wd. frame, 18x18x22	2.25
2	wd. frames, 32x26x30, $2.25	4.50
1	wd. frame, 24x18x22	2.25
1	mullion frame, 2 wds., 20x24x28	4.50
1	mullion frame, 3 wds., 20x24x28	6.75
1	mullion frame, 4 wds., 20x26x30	9.00
1	mullion frame, 3 wds., center sash, 42x58, 2 side wds., 22x26x30	6.75
2	dormer sash windows, 24x24, $2	4.00
4	wds., 42x26x30, 1 3/8 D. S., $5	20.00
1	wd., 42x18x22, 1 3/8 D. S	4.00
1	wd., 18x18x22, 1 3/8 S. S	1.50
2	wds., 32x26x30, 1 3/8 D. S., $3.50	7.00
1	wd., 24x18x22, 1 3/8 S. S	1.50
5	wds., 20x24x28, 1 3/8 D. S., top sash divided, $2.25	11.25
4	wds., 20x26x30, 1 3/8 D. S., top sash divided, $2.30	9.20
2	wds., 22x26x30, 1 3/8 D. S., top sash divided, $2.40	4.80
1	sash, 42x58, 1 lt., D. S	6.00
2	sash, 24x24, divided, $1.20	2.40
2	cased openings, 4 ft, 0 in. x 7 ft. 0 in., jambs	2.00
1	I. S. frame, 2 ft. 10 in. x 7 ft 0 in., birch	.90
4	I. S. frames, 2 ft. 8 in. x 7 ft. 0 in., birch, 90c	3.60
3	I. S. frames, 2 ft. 4 in. x 7 ft. 0 in., birch, 85c	2.55
3	I. S. frames, 2 ft. 0 in. x 7 ft 0 in., birch, 80c	2.40
2	I. S. frames, 2 ft. 8 in. x 6 ft. 8 in., birch, 80c	1.60
2	I. S. frames, 2 ft. 0 in. x 6 ft. 0 in., birch, 70c	1.40
72	plinth blocks, 1 1/8x4 3/8x10, birch, 8c	5.76
34	casings, 4 3/4x5 ft. 6 in., birch	5.61
4	casings, 4 3/4x2 ft. 6 in., birch	.30
60	casings, 4 3/4x7 ft. 0 in., birch	12.60
16	casings, 4 3/4x6 ft. 0 in., birch	2.88
8	casings, 6 x5 ft. 6 in., birch	1.54
2	head casings, 4 3/4x10 ft., birch	.60
1	head casing, 4 3/4x 8 ft., birch	.24
1	head casing, 4 3/4x6 ft., birch	.18
5	head casings, 4 3/4x5 ft., birch	.75
4	head casings, 4 3/4x6 in., birch	.72
22	head casings, 4 3/4x4 in., birch	2.64
240	ft. cap mold, birch	6.00
240	ft. fillet mold, birch	1.20
2	aprons, 4 3/4x10 ft., birch	.60
1	apron, 4 3/4x 8 in., birch	.24
1	apron, 4 3/4x 6 in., birch	.18
5	aprons, 4 3/4x 5 in., birch	.75
10	aprons, 4 3/4x 4 in., birch	1.20
96	ft. window stool, birch	2.88
320	ft. window stops, 14 ft., birch	3.20
320	ft. door stops, 16 ft., birch	4.80
528	ft. 7 1/2 inch base, birch, 4c	21.12
528	ft. floor mold, 1/2 in x 1 in	5.28
340	ft. picture mold, birch	6.80
120	ft. 1x12x16 ft., Y. P. finish, for shelves, etc	6.00
	China closet	10.00
	Medicine case	5.00
	Stairs	50.00
2	cellar stair newels	1.00
24	ft. rail	1.20
2	6x6 columns, rear porch	3.00
1	5x5 newel	.70
1	piece rail, 14 ft., bottom	.70
1	piece rail, 14 ft., top	.70
1	piece rail, 5 ft., top	.25
1	piece rail, 5 ft., bottom	.25
60	balusters, 1 3/8x1 3/8x2 ft	2.40
200	ft. 3/8x1 3/4, lattice	1.20
1	front dr., 3 ft. 0 in. x 7 ft. 0 in. x 1 3/4 in	14.00
1	dr., 2 ft. 10 in. x 7 ft 0 in. x 1 3/4 in	12.00
1	dr., 2 ft. 10 in. x 7 ft 0 in. x 1 3/4 in	10.00
4	drs., 2 ft. 8 in. x. 7 ft. 0 in. x 1 3/4 in., $9	36.00
3	drs., 2 ft. 4 in. x 7 ft. 0 in. x 1 3/8 in., $8	24.00
3	drs., 2 ft. 0 in. x 7 ft. 0 in. x 1 3/8 in., $8	24.00
2	drs., 2 ft. 8 in. x 6 ft. 8 in. x 1 3/4 in., $8	16.00
2	drs., 2 ft. 0 in. x 6 ft. 0 in. x 1 3/8 in., $7	14.00
	Mantel	45.00
	Total mill work	$541.32

CARPENTER LABOR.

10,028	ft. framing lumber, $8	$ 80.22
4,220	ft. boarding, $10	42.20
2,400	ft. boarding, outside walls, $10	24.00
20 3/4	M shingles, $1.75	36.28
1,600	ft. oak flg.	32.00
300	ft. maple flg.	6.00
1,900	ft. smoothing firs.	28.50
300	ft. fir flg., $1.50	4.50
300	ft. porch ceiling, $1.50	4.50
240	lineal ft. cornice, 15c	36.00
	Work on 2 dormers	20.00
	Work on rear porch	14.00
	Work on front porch	20.00
	Setting dr. frames	5.70
	Setting wd. frames	6.90
	Finishing 7 cellar wd. frames, $1.25	8.75
	Finishing 1 cellar door	2.00
	Hatchway doors	4.50
	Finishing front door	4.50
	Finishing rear door	3.50
	Finishing 2 cased openings, $2	4.00
	Finishing 15 inside doors, $3	45.00
	Finishing 21 windows, $2	42.00
	Finishing 2 dormer wds., $2	4.00
	Finishing 528 ft. inside base, 5c	26.40
	Finishing 340 ft. picture mold, 1 1/2c	5.10
	Finishing main stairs	20.00
	Finishing cellar stairs outside and inside	10.00
	Finishing medicine case	2.50
	Finishing china closet	5.00
	Finishing closets, 6 at $1.50	9.00

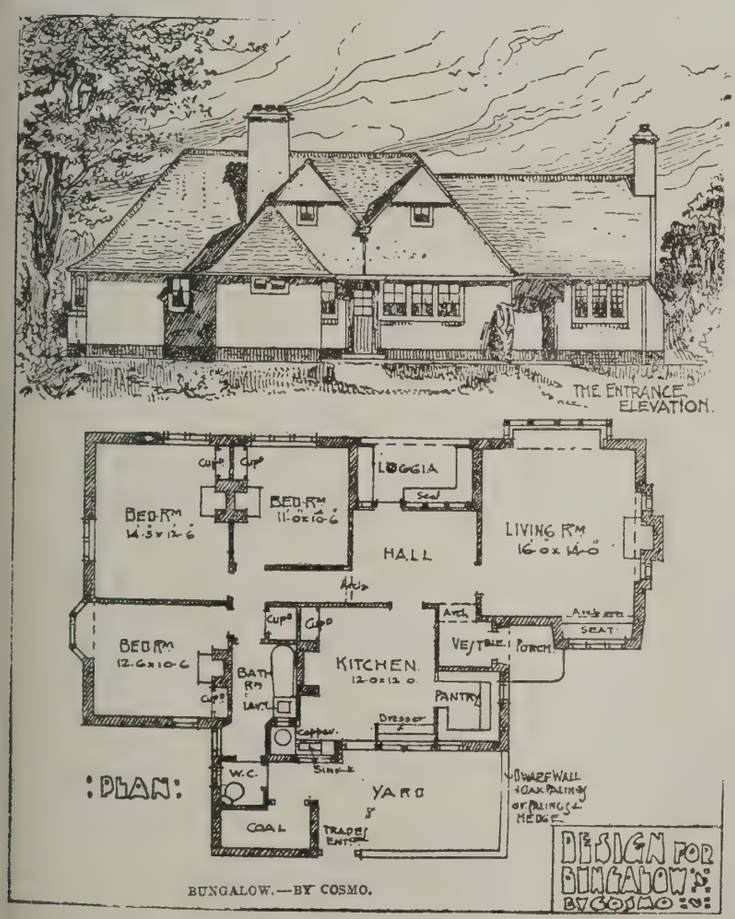
Finishing pantry, shelving, etc.	10.00
Incidentals 10%	56.70
Total carpenter labor	$623.75

RECAPITULATION.

Excavating and masonry	$ 455.35
Lumber bill	734.44
Mill work	541.32
Carpenter labor	623.75
Nails and hardware	60.00
Tin work	40.00
Plastering, 640 yds., 27c	172.80
Outside rough plaster, 220 yds., 70c	154.00
Plumbing	260.00
Electric wiring	45.00
Painting	150.00
Incidentals, 5%	161.83
Total estimate	$3,398.49

THE BUNGALOW

The accompanying design has been designed to meet certain requirements. The elevation shown is that facing road, the wall or hedge enclosing yard being omitted. The elevation to garden might be somewhat simpler. I think, whenever practicable, it is preferable to have a separate room for bath, etc. The arrangement shown is simple. The w. c. is so arranged that it may be used from inside or outside of house. The washing copper and sink may be cut off from view when not in use. If preferred the space of bathroom, etc., may be utilized as a scullery with direct access from kitchen. Hot water to sink and bathroom may be applied by one of the several systems in use. A good storeroom, etc., may be had over bathroom and kitchen. Materials: Brick outer walls built with cavity, with tarred plinth, remainder "color washed." Roofs either covered with "Ruberoid" or diagonal "compo" slating. In regard to patent partitions, these are chiefly of value where space is the main consideration.



BUNGALOW.—BY COSMO.



It is said that war destroys thousands of lives and millions of dollars worth of property—but war only stalks through the country at long intervals. Everybody deplores war—its appalling death role—its destruction of home and property, and the long trail of famine and misery and suffering that follow in its trail.

* * *

Did it ever occur to anyone, that while war with all its horrors and sufferings, was hardly a second in the cause of suffering, distruction and disaster? The loss of life and property by fires, that may be said to be preventable, is greater several times over on the average, than that caused by war. The hundreds of millions of dollars that are lost each year in the United States is appalling—particularly when we feel that these fires, or a great portion of them at any rate, are preventable, if proper steps were taken in this direction. * * *

A week or two ago we got news of fires in Chicago and Philadelphia that cut off over 40 lives and a few days previous to that a great fire took place in Cincinnati. Going back a month or so earlier we have an account of a big disaster in Newark, where a large number of youthful lives were hurled into eternity at a moment's notice. Hardly a day passes on the continent without a record of fire losses amounting to hundreds of thousands of dollars—and in many cases the loss also of precious lives. Why is it that in America the fire losses are so greatly in excess of those in the countries of Europe? The answer is on the very surface of things. The European building is constructed to last. Its stairways are generally of solid stone; its elevator shafts—when it has any—are cut off from the building served by heavy walls, the fabric of the building is massive, and the governmental and municipal laws are so stringent and so well enforced, both as to the height of the building, and the material used, that fire seems to be almost impossible.

* * *

One is inclined to ask: Are the lives of American citizens of as much value to the Commonwealth as the lives of the European citizens are to their various governments? We believe they are. Indeed, we believe they are of greater value, and our whole immigration policy and progressive laws tend to prove this. Why then should not the lives of the American citizens be protected by every possible safeguard, furnished by the resources of civilization?

* * *

On this continent we are just beginning to build for the future. The great bulk of the inside finishings in our present buildings are almost as inflammable as a planing mill. The profusion and economy of American wood have led to its utilization on a scale that has no parallel in Europe. The free use of electric power is far more extensive in America than in the old world, and wires conveying high voltage are carried into buildings in a rough and ready way, that make immunity from fire through defective installation almost a providential matter.

* * *

The great loss of property yearly has stimulated the fire insurance companies to pass such rules and enforce such usage as they think will best protect their interests, but no company has made any effort to make and enforce rules for the protection of the lives of the inmates in the buildings that have as yet had any effect on the method of building. True, the federal, state and municipal authorities have passed many laws—good, bad and indifferent—for this purpose, but the lack of stringent enforcement of these laws has rendered them in a great measure nugatory. Surely the time has arrived when disaster after disaster follow each other as they have done this last year, in rapid succesion, that something should be done, and done earnestly and effectually, to stop this dreadful slaughter of the innocents.

We are rich. We are human. But unfortunately we continue to wait for some other person to start a campaign in the interests of humanity along these lines. Buildings can be made fire-proof, notwithstanding all talk to the contrary, and it is only a matter of dollars and cents against precious lives. It is now time that lives had their innings.

* * *

We do not hold any brief for the makers of steel and cement; but it is quite evident that these materials in the near future must to a very large extent, replace wood in the construction of buildings. The supplies for these materials are inexhaustible and their cost is within such economic limits as to admit of their use in all sorts of buildings. There can be no doubt but that a freer use of these unburnable materials will tend very much to reduce the risk of fires and therefore prevent loss of property and the snuffing out of innocent lives.

There is a big engineering contract to be allotted shortly in New York. It is for the construction of forty-four miles of subway, with 133 miles of rails. Twenty-three firms have submitted tenders. The estimates prepared for the scheme contain some colossal figures. The excavation of no less than 9,000,000 cubic yards of earth and rock, the use of nearly 2,000,000 cubic yards of concrete, and over 200,000 tons of steel, are included in the items. Thanks to the playful energy of the statistican who has been revelling in these big figures, we learn that if the excavated material were built up in a column, with a base of 100 feet square, it would rise to a height of 920 feet; the concrete to be used similarly stacked would reach a height of 186 feet; and the steel would either form a cube with faces 67 feet square, or would furnish a railroad track of 2,280 miles.

HANDLING CONCRETE IN COLD WEATHER

By D. C. BABCOCK

IT MAY be of interest to some of the brother mechanics to have a few pointers concerning a method of handling concrete in freezing weather.

The method I give in the following article is taken from actual experience, and copied from my daily memorandum, and has given very satisfactory results, and as well not over-expensive.

You should not think for one moment that you can install concrete in cold weather and protect it from the power of the frost for the same money that you could do the same work in the summer time, for it is impossible, just as much so as if you were expected to build a cellar wall that would be proof against the frost in the north to one erected in the southern climate.

My intention is simply to give the readers of THE NATIONAL BUILDER my method, which has proved satisfactory at a trifle increase of cost.

In the first place you should be particular to choose a quick-setting brand of cement, for the quicker concrete is set after being placed in the forms, the shorter time you will have to protect it.

Next in order is the gravel. Be sure that your gravel is composed of clean, sharp sand and stone, and is free from any foreign matter, as loam and other soils mixed in the gravel tend to retard the setting qualities of the cement.

If you are using bank gravel in place of sand and crushed stone, it should be run over a screen of not larger than ½-inch or ¾-inch mesh, and the proportion be rated by the cement and sand, as the cement and sand form the proportion of the concrete. Then you must use your own judgment as to the amount of stone; use all the stone that the cement and stone will furnish mortar, to make a thoroughly mixed aggregate, with plenty of mortar to make a good solid mass when well tamped.

Care should be taken in keeping the forms wet ahead of the concrete, and the top of the footings wet and sprinkled with dry cement to insure a perfect weld between the old concrete and the new.

It would be well if you have any surplus stone to warm and throw them into the concrete when filling the forms, as they will help to keep the mass warm.

In using cement in cold weather you should make arrangements for a steam line, where it will be convenient to connect to it by the use of a hose, thus enabling you to heat the water, and also by laying two or three lines of ¾-inch pipe about 2 feet apart on the ground, you may pile your gravel upon them when unloading same; and by turning steam into the pipes you will keep the gravel free from frost.

Care should be taken that the water is not too hot when applied to the cement, as boiling water retards the setting qualities of the cement.

You should place the concrete in the forms as quickly as possible after being mixed to prevent it being chilled before it goes into the forms.

It should be well tamped and spaded along the face of the form to insure a perfectly smooth finish when the forms are removed.

In case of intense cold weather you had better use one pail of salt to each yard of concrete and protect it at night by spreading paper over the top and all exposed surfaces, then covering the same with straw.

If light material is used for sheathing the forms, it would be advisable to bank the forms with some material to protect the face from frost.

It is necessary to use great care in protecting the concrete for the first 12 or 15 hours.

If necessary to remove the forms before the concrete is thoroughly set you should protect it for a reasonable length of time to prevent face scales. In case it does get touched by the frost, do not feel badly about it and think it is a failure, but after the frost is out of the wall scrape off all that is loose and mix some cement and sand, about 1 to 2, and apply to the spots after same has been washed and sprinkled with dry cement.

All places of leaving off at night should be treated with warm water and cement before starting to deposit concrete in the morning; and be sure to work the new around all places to insure a perfect joint and a good connection.

After removing the forms all exterior faces should be well rubbed with sandstone, or, if not too hard, a small block of wood will do the work, and follow this operation with a solution of cement and water mixed about like paint. Apply this solution with a white-wash brush. You should brush perpendicular on the wall from top to bottom, or from bottom to top, and after partly dry this operation should be repeated, and you will have a perfectly finished face, the color of stone, with no joints or patches visible. In case you desire a lighter color you may add a little lime to your cement wash and produce as light a finish as desired. The latter finish is more desirable for cellars, and where it is desired to produce as much light as possible.

Please bear in mind that if your wall gets touched by the frost to remove all loose concrete and patch same before the rubbing process.

By following the advice given concrete may be used in freezing weather as safely as at any time, but you must bear in mind that the same brand of cement does not set as quickly in cold weather as it would in warm weather.

You must watch your batch and note the working of the same, and not think this formula cannot be changed, for it may act altogether differently under different circumstances.

I will try and take up a different subject in our general construction line in the near future, as different experiences are sometimes helpful to others.

Edward W. Redfield, the noted painter, said at the Art Club in Philadelphia, apropos of picture prices:

"I am glad there are not many buyers like an old farmer in Center Bridge.

"A very distinguished etcher, sketching in Cedar Bridge, made a study of the farmer's barn. The farmer happened to appear and said he'd like to have the sketch.

" 'Ef 'tain't too dear,' he added cautiously.

" 'Oh,' said the etcher, who makes $12,000 a year, 'I won't charge you anything for the sketch, but——'

"His eye lighted on the pig pen.

" 'But I'll tell you what. You give me one of those nice little pink suckling pigs there.'

" 'Why, man,' said the farmer with a frown, 'do ye know what them pigs is worth? They're worth a dollar apiece.' "—Los Angeles Times.

MAKING GARDEN ORNAMENTS IN CEMENT

By G. F. RHEAD

THE making of garden ornaments in cement is quite within the scope of the average worker who has an hour to spare occasionally, and the objects may be put to use with excellent effect in a garden. A little ability for forming curves is necessary if one intends to ornament the object, otherwise the work is straightforward, and requires only care to accomplish. Cement is quite simple to work, more so even than plaster, for it does not set so rapidly, being workable for about two hours after being mixed.

The necessary tools consist of the ordinary carpentry ones, two or three steel tools employed by plasterers (Fig. 1), a trowel, a laying trowel (Fig. 2), and a board on which to mix the cement



FIG. 4—DESIGN FOR PLANT POT ON PEDESTAL



FIG. 5—DESIGN FOR PLANT POT ON PEDESTAL

(Fig. 3). The latter consists of a piece of smooth wood about 2 feet square, with three sides about 2 inches high to safeguard the cement in mixing.

Figs. 4 and 5 show two plant-pots on pedestals, of such design that offers no great difficulty in execution. Fig. 6 shows the elevations with dimensions; but, of course, these may be altered to meet requirements.

In making the ornaments (Fig. 4), the construction of the cylindrical shaft should be first taken in hand. Join together three boards 1 inch thick to form a square 2 feet 4 inches. A piece of iron piping 3 feet 2 inches long is passed through the center of this, and made to project 2 inches at the other side. The projecting piece is inserted in a hole drilled in another board cramped on



Fig. 1.—Tools for Cement Work.

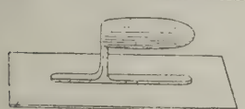


Fig. 2.—Laying Trowel.



Fig. 3.—Board on which to Mix the Cement.

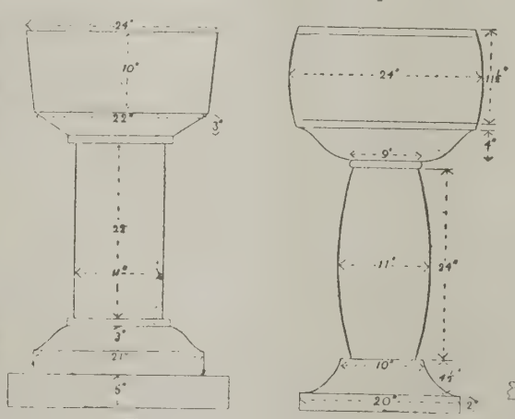


Fig. 6.—Elevations of Plant-pots.

the working table, a little blacklead being introduced between the two boards, so that the upper one may revolve freely (see Fig. 7). Now build up all round the rod a mixture of broken brick 1 part, cement 1 part, the pieces of the brick being no larger than a walnut. This rough work is continued to about 2 inches from the correct diameter of the shaft, it being usual to diminish the quantity of brick as the surface is approached.

Next cut a mould consisting of a board with a straight piece cut out the length of the cylinder, this being fixed vertically with the baseboard at a distance of 5½ inches from the center (see Fig. 8). Then continue to lay on neat cement until it is of sufficient thickness, and true up by turning it against the mould. The work should then be left for about twenty-four hours to harden somewhat, when any slight irregularities in the cylinder, such as scratches caused by lumps dragged over the surface, may be filled in and leveled with one of the steel tools. Then build up the cement base to a height of 1 foot from the ground and a little within the wood base. This must be left for an hour or two to harden a little, a template being cut in the meantime to the shape of the moulding. The template is cut in sheet zinc and mounted to give strength, on a piece of wood, which is cut to the same shape, but sloping away from the cutting edge. These are nailed together, and a guide is fixed at right angles, and made rigid with a strut (see Fig. 9), a second guide being nailed or screwed on it to form a rebate. This rebate fits aginst the edge of the wood square at the bottom of the shaft, the template being drawn along the cement to shape it, and when this is completed set aside to harden.

To form the plant-pot there will be required a box mould of wood, of the shape shown in the elevation (Fig.6), the inside measurements corresponding with those shown, which will present no great difficulty, but will require great care in the setting out of the sloping sides. The wet cement is laid in the mould round the sides to thickness of about 3½ inches, also at the bottom; and after a day has elapsed the wood may be broken away and the cement faces



FIG. 10—EARLY CHRISTIAN FONT



FIG. 11—EXAMPLE OF CELTIC INTERLACED ORNAMENT

smoothed up, the laying trowel being found particularly serviceable for this purpose. The bottom of the pot and the top of the shaft must be perfectly level, a hole being drilled in the center of the pot for the insertion of the projecting 2 inches of iron pipe. The small square moulding is added in cement at the bottom of the pot with the laying trowel, and is trued up with the help of a try-square.

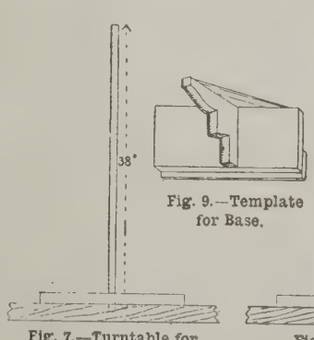


Fig. 7.—Turntable for Working Cement.

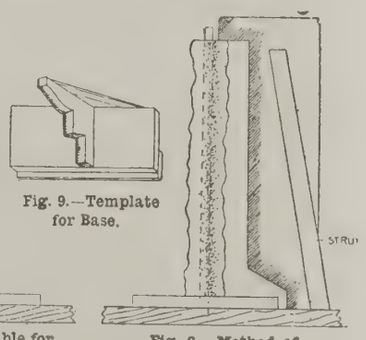


Fig. 9.—Template for Base.

Fig. 8.—Method of Turning Shaft.

This completes the plain form of the object, the ornament being now drawn out full size on paper, the ground of the design being cut away where possible to form a silhouette. This is laid on the surface of the cement, and traced round with a steel point. Use one of the tools illustrated to cut away the ground round the interlaced work, the sunken part being leveled with the central tool in Fig. 1.

A variety of effects may be produced merely by scratching away the cement, but corrections and additions may be made by applying fresh cement where required. In the illustration shown the

shaft of the pedestal has been stippled over with a little cement to give roughened texture, which has a rather better effect than a perfectly smooth surface.

The ornament in Fig. 5 is made on an exactly similar plan, with different shaped moulds, except that the pot in this instance is turned instead of being made in a box mould. The hollowness is obtained by building the cement round a conveniently shaped earthenware vessel, which requires to be plentifully oiled to facilitate removal when the cement has set.

A great variety of designs for these and similar objects may be found in the South Kensington Museum among the ancient works, and it only requires a little taste to turn these beautiful things to account in modern decoration. Fig. 10 shows a very early Christian font, the ornamentation of which would indeed be very suitable for the purpose in hand. If the worker possesses the ability to adapt, a great deal can be obtained from these early examples, which in many ways would be most difficult to improve upon. Fig. 11 gives an illustration of a piece of Celtic interlaced work, which would be particularly suitable for executing in cement in the manner described.

CONSTRUCTING A SPORTS STADIUM

IN Tacoma, Wash., there has just been completed a high school stadium with an estimated seating capacity of 30,000. The plan was finally arranged in the shape of a U with diverging legs, the open end overlooking Puget Sound. At the bottom of the seats was placed a walk, and at the top a promenade, both running entirely around the stadium. The running track, having five laps to the mile, was arranged so as to have easy turns; and with a straight-away at the open end of the stadium, to accommodate the 100-yard dash and the 120-yard hurdle race. With E street above the stadium at an elevation of about 240 feet above sea level, the finished field was arranged at an elevation of 140 feet, and the level of the promenade 50 feet higher. Around the stadium the earth was sloped, with an inclination of 1½ to 1, to the parapet wall of the promenade. At points where the height was too great to allow of the inclination in the available run, retaining walls were provided. At the open end of the field the earth was sloped from the level of the field with an inclination of 1½ to 1. This was only a temporary arrangement. When the proposed boulevard is built, a retaining wall will be built at its outer edge, and an ornamental iron fence will be built at the open end of the field between the stadium and the boulevard.

The water falling on the seats was drained to the lower walk, in which outlets were provided at intervals of about 39 feet on the straight, and 30 feet on the curved part. From these outlets the water was carried in 3-inch pipes to a sewer pipe just inside the inner parapet wall. Tile drains were placed behind all retaining walls. These drains were carried under the superstructure down to the field, there joining the field drainage system.

In the field the drainage is very simple. All around the outside of the field was carried an 8-inch sewer pipe, which receives all the water from behind the retaining walls and the drainage from the seats. In the middle, and running the full length of the field, was run a straight line of drain tile varying in size from 3 to 6 inches. On either side, eight branches of 3-inch tile were carried to the edge of the field. At the open end of the field, all drainage was carried to the extreme eastern part of the stadium, there passing through a sand trap, and joining the drainage system of the high school building. This was done in order to leave all drainage undisturbed when the boulevard with its retaining walls is built. The sewage from the toilet and dressing rooms has a separate system of drainage, and was similarly disposed of.

In the inner wall of the promenade were placed 28 ornamental iron posts, each carrying a torch lamp with a powerful reflector. On cables stretched across the field were suspended 12 other lamps of the same type.

A large portion of the ground upon which the stadium was built was a cemented gravel, but in other parts a very deep fill was found. In the filled parts it was necessary to drive piling for a foundation. The piles were well seasoned fir with a minimum diameter of 10 inches at one end and 14 inches at the other. In driving the piles a penetration of 5 inches was allowed under the last five blows of a 1-ton hammer falling 20 feet. The ends of all piles were treated with carbolineum.

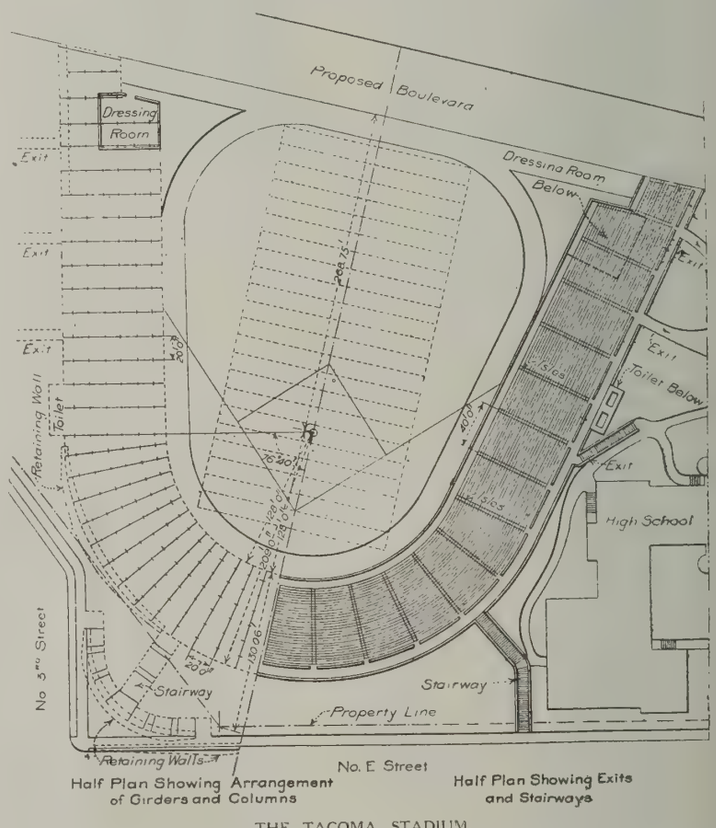
The superstructure was carried on piers, of which there are six in a row, spaced as shown on the sectional drawing. The cemented gravel has a safe bearing value of 8 to 10 tons per square foot, but on account of the shape of the structure, this was not a factor in designing the footings, which were made of plain concrete.

All concrete was of a 1/6 mixture, using sand and gravel, the aggregate being so proportioned as to obtain the maximum density. In the stadium proper mild steel rods, Clinton fabric, and latticed steel beams were used as reinforcement. In the retaining walls it was thought better to use bars having a mechanical bond, and in these corrugated bars were used. In the stadium proper, with these conditions, the following assumptions were made:

The live load on the seats was taken to be 80 pounds per square foot, and on the promenade and lower walk 100 pounds per square foot. Full dead and live loads were figured on all members.

Concrete in tension, 0; concrete in shear, 50 pounds per square inch; concrete in direct compression, 400 pounds; extreme fibre stress in bending, 700 pounds; adhesion between concrete and steel, 70 pounds. Steel in tension, 16,000 pounds per square inch; steel in compression (in columns), 6,000 pounds; steel in shear, 10,000 pounds. Ratio of moduli of elasticity of steel and concrete was taken to be 15.

The columns being short, it was unnecessary to design them for fixture; and in their sign they were increased in size to better withstand any sliding tendency that might develop in the ground.



THE TACOMA STADIUM.

In calculating bending stresses, the straight-line formula was used. The girders were figured as simple beams, and maximum bending moment was taken as $W\,l/8$.

The beams under the extreme outer edge of the promenade were not figured as being continuous, but the maximum bending moment was assumed to be $W\,l/10$.

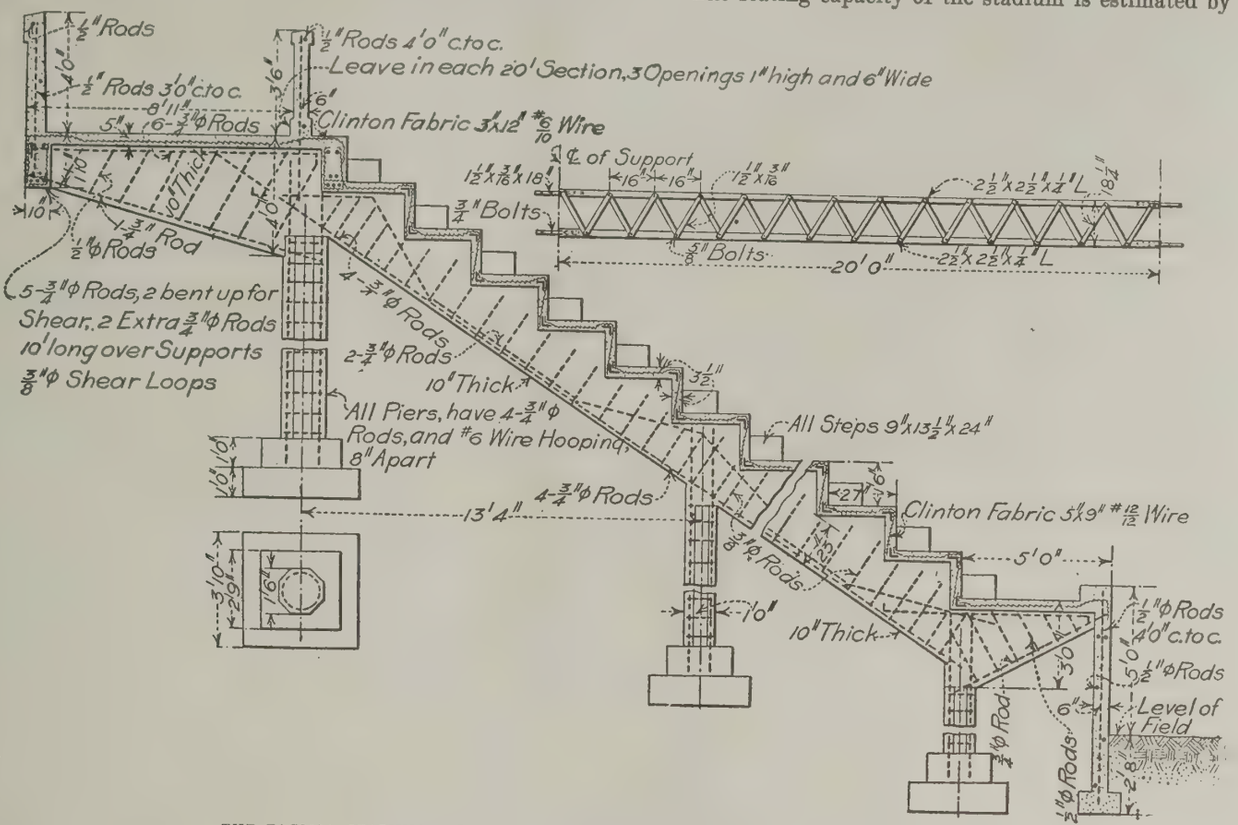
The beams forming the risers of the seats were latticed, being built of steel angles and flat bars. They were set directly on the girders and the ends bolted together over the girders by means of fish-plates. They were figured as simple beams, and sufficiently strong without the aid of enclosing concrete to bear safely the assumed load. Over the beams were laid strips of Clinton wire fabric 5-inch by 9-inch mesh 12/12 wire, the wires on the 5-inch spacing being laid normal to the beam. Where two layers of fabric joined they were securely wired together. It was at first intended to construct the beams of reinforced concrete, but it was found that by substituting beams of structural steel a comparatively large saving could be made. This was accomplished, first, by a saving

of time in erecting, and, second, by a saving of time and money in form work. The latter was accomplished by hanging the forms from the steel beams, thereby making unnecessary expensive shoring below.

In some cases, especially in massive work, expansion joints are provided from 25 feet to 50 feet apart throughout the length of the structure. In this case, however, it was considered better for two reasons to provide sufficient steel in the concrete to take up the contraction and expansion; first, because expansion joints would be almost as unsightly as cracks, and, second, because of the thin section of the concrete subjected to temperature stresses. The amount of steel required depends on the range of temperature to which the concrete is subjected, and to the position of the steel in the concrete.

The principal quantities used in the construction were approximately as follows: Excavation, 185,000 cubic yards; concrete, 10,000 cubic yards; steel, 160 tons; Clinton fabric, 130,000 square feet.

The seating capacity of the stadium is estimated by the architect to be 30,000, but by using the available standing room 35,000 people have been in the stadium at one time, and none of them on the field. It is planned, should necessity arise, to build additional seats on the terraces. In this way the seating capacity could be increased by 12,000 to 15,000. The entire cost was about $135,000.



THE TACOMA STADIUM: SECTION SHOWING REINFORCEMENT OF SUPPORTING COLUMNS.

THE COST OF HEAT

IT COSTS just as much to keep a coal fire for a family of two as it does for a family of eight, so that the coal fire is very economical in large families, and expensive in small families. About thirty years ago gas ranges were introduced to the kitchen, and since then they have held their own, more because of their cleanliness and handiness than for their real saving in expense. Several years ago it was discovered that electricity was the only form of energy that could be instantly changed into heat, with practically no loss. This led to the development of the electric cooking stove, which is so common today. Electricity is the most flexible form of heat. It can be instantly made to warm a plate, or the same pressure of the finger will let loose energy enough to boil a quart of diamonds or melt a block of solid concrete.

Electricity is about the only thing that costs less today than it has at any time since it became a recognized utilitarian force. This is owing to the astonishing improvements which have been made in electric apparatus. One dollar will now buy ten times the amount of electric light, which can be transformed into heat, than it would purchase twenty years ago. Power rates have been reduced each year, as the cost of producing electricity has diminished, and wherever electric cooking is advocated, a special rate, at about one-third the price asked for electric light, is obtainable. In a modern electric kitchen where the heat is applied direct to the devices and utensils, instead of through the medium of a wasteful stove, the current used will approximate 300 watts a meal a person. This means from $1 to $1.50 per person per month.

A good coal stove costs about $50, a gas stove about $25, and an electric kitchen outfit, $75. This seems high for the latter, but it must be remembered that the cost includes all the kitchen devices necessary for cooking the meals, such as the cereal cooker, the frying pan, the oven, broiler, percolator, grid, toaster, etc. An electric device is made to heat water to the boiling point as fast as it is drawn, the turning on and off of the water performing a like service for the electric current.

Cinder Concrete as a Fire-Proof Material

CINDER concrete has been under test at Columbia University for the last two years, to determine its qualities as a fire-proof material. The walls of the buildings used in subjecting floor constructions to fire tests have been given five fire tests of four hours each, during which the temperature has been raised as high as 1,700 degrees Fahr. At the end of each test a stream of water at 60-pound nozzle pressure was played back and forth over the ceiling for ten minutes, while the ceiling wall was red hot. After this severe treatment, Professor Ira H. Woolson states that the walls are practically as good today as they were when new, except that the rear wall has been scored by the water to a depth of from ½ to 1 inch for 2 or 3 feet near the top. He believes the structure is good for an indefinite number of tests, the only repairs necessary being an occasional plastering, to renew the wall surface washed away.

Professor Woolson believes that, within reasonable limits, the percentage of coal and the amount of fire material in cinder concrete have very little, if any, effect on its fire resisting qualities. He believes that sifting and washing the cinders would be a useless expense, and injurious to them as the aggregate for concrete. The pieces of coal which came next to the surface in the walls have been burned to an ash, but they remain in place and act as a non-conductor of heat. Plenty of particles of pure coal can be found in the walls less than 2 inches beneath the surface.

ADVENT OF THE SLEEPING PORCH

By GEORGE RICE

PERSONS believing in plenty of fresh air are ordering carpenters and builders to make sleeping or air porches on their houses. The original architectural design of quite a number of buildings in cities and towns has been altered in order to permit the addition of this porch fad. The sleeping porch in the future may be a part of the original edifice, according to statements made by some of the interested parties. One contractor and builder told the writer that he had a very large number of orders for installing sleeping porches on homes already built.

While the designer of the sleeping porch has more or less difficulty in affixing a porch to the house which is already erected, the trouble is quite easily overcome by the use of various braces and brackets with which the fastenings are made to either wooden,

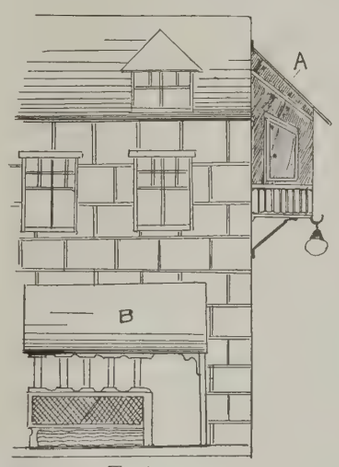
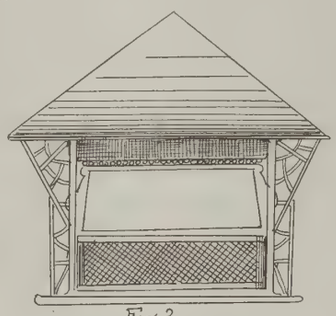


Fig 1


Fig 2

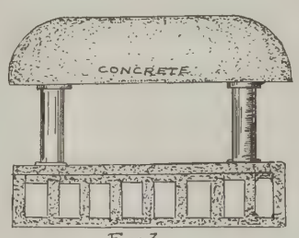


Fig 3

masonry or other kinds of walls. There have been sleeping porches attached to the hard, smooth concrete walls of buildings. Sleeping porches are often attached to bedroom windows. Some are designed to fit so securely with braces and hangers that very few screws or bolts are needed in the main building. A system of angular braces can be designed with which ample fastening can be obtained without damaging the walls of the building itself. The advantage of having the sleeping porch attached to the chamber window is that in cold weather the occupant can use the warm room for dressing and the sleeping porch to rest in. The introduction of the sleeping porch has resulted partly through the recommendation of physicians who have advised certain classes of patients to adopt the fresh air cure.

Persons troubled with various chronic ills have undertaken a cure by sleeping and sometimes reading and dining in open porches during the cold weather. Cures have been brought about.

There are ready made porches on the market to fill the demand, and some of these are of good design and useful. On the other hand, many people who want a sleeping porch prefer to get a local carpenter to design a porch and erect it according to the peculiar ideas of the patron. Sometimes they claim wooden addition to the main building is desired. Then again a very artistic and costly structure is contemplated. Then in some instances the customer desires to have the porch erected at an elevation so that an abundance of cool, breezy air may be obtained. Other patrons of the sleeping porch want to get close to the ground and use the lower story. There are porches made of wood and some of sheet metal. Concrete is finding service in the sleeping porch, too. Figure 1 illustrates two sleeping porches fixed to the building. The upper porch is marked A. It is constructed of ordinary boards, properly shaped and trimmed. Mouldings are employed to shade off the edges properly. The front side of the porch is the open side in this case. Windows with sliding sash are employed. In the event of storm these windows are closed and the porch becomes intact like the main part of the house. When the weather is clear the windows are wide open and the patient gets plenty of cold, fresh air as desired. Perhaps this is his sleeping porch, but in most cases the occupant utilized the place to read, write, smoke and rest. In fact, while he is taking the fresh air cure, he makes this place his home much of the time.

In case that the patient desires to have the sleeping porch a part of the building on the main floor, the plan shown at B in figure 1 is adopted. These porches can be erected at moderate expense, according to the market prices of labor and material. Much has to do with the selection of stock. In some instances the cheapest of material is used because it is the intention of the patient to use the porch only until he gets well. He may figure on recovering his usual state of health in six months. Hence he does not want to expend money for a porch of lasting duration. Some of the porches are exceedingly flimsy because of this fact. I have seen porches of frame work of wood with canvas covering put up at an expense of $20.00. Then again there are porches erected with mosquito screening only at even less expense. Some of the rich folks invest several hundreds of dollars in modern types of permanent sleeping porches. Such porches are really rooms with all of the lighting and modern conveniences except heating."

In figure 2 is another form of the sleeping porch, showing the front side, with lattice work liberally used. The manufacturers of concrete have not been behind hand in designing concrete porches of a nature calculated to be attached to position on a building where a foundation of suitable character can be used.

Figure 3 is a design for a concrete open porch. The porch is usually made so that plenty of wind can circulate through it. Openwork is the fad. Certain builders of my acquaintance are making good profits designing and constructing sleeping porches to comply with the modern fresh air fad.

CHIMNEY COUNSEL

TO some contractors and builders the chimney is a necessary incident that he does not figure to make anything out of and usually does not give much thought to in the way of design or location except to get it out of the way as much as possible and keep it from interfering with the general plan of the house. Moreover, even to some building owners the chimney today is merely incidental, especially where the old-fashioned fire-place is done away with and a furnace is used to heat the building. For that reason we are losing some of the old-time regard for the technical qualities involved in chimney building.

The chimney really deserves as much careful attention both in the matter of location and design as any of the balance of the house, and more in some respects. If we go about it right we can build better chimneys today than ever before, for there is better material to work with and there is a common practice of equipping chimneys with special flue lining that insures a smoother surface and better draft than the old-fashioned chimney, and also less danger of the chimney being choked by being made small at some points of its heighth and interfering with its drawing qualities.

There are several points the wide-awake builder should keep in mind about chimneys. One of these is that the best service can be secured from a chimney that is built entirely inside of a house.

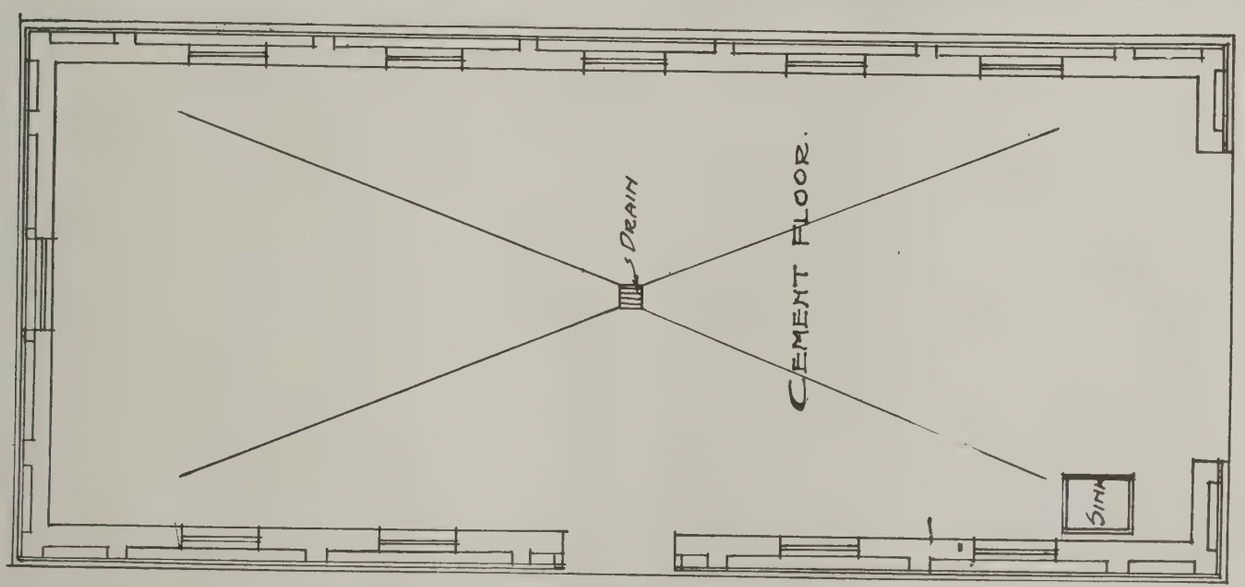
It is quite a common practice these days to build a chimney on the outside for ornamental or architectural effect and it does very well, too, provided the body of the chimney is made thick enough to prevent the chilling from outside. A chimney with one side exposed or entirely exposed to the outside elements will not draw as well as a chimney all enclosed inside a building, because the cold air outside tends to cool off the chimney and cool the temperature of the gases ascending the flues and thus lessen the force of the draft. To get the maximum of draft the chimney should be enclosed somewhere in the center of the house so that the gases will retain their heat until they pass up to the top. Also, a chimney of this kind helps heat the house and where practical to include in the plans it is really best to locate the chimney all inside somewhere near the center of the building.

Another point is, urge upon customers that they have all chimneys built with fire-proof flue linings, which is made in standard sizes from 7 inches square inside to 7x11 inside, and even 11 inches square. Usually these are made so that their outsides are equal to one or two lengths of brick so that they will work in well with the brick.

There are strong points in favor of the flue lining; one is that it insures safety against fire through defective flues.



CONCRETE GARAGE FOR H. E. DAVIS, GLENRIDGE, N. J. DAVIS, MCGRATH & KIESSLING, ARCHITECTS, NEW YORK CITY.



THE DRAWING TOOLS

THE drawing tools of the old-time carpenter were a square, his two-foot rule, and a carpenter pencil or a round pencil. With these he drew plans for houses, barns, and other structures. That is, drew the general outline so that he could understand what he meant to do, but did not undertake to work from these in detail.

The modern plan of work involves quite commonly the laying out of everything in detail, drawn to scale, and the carpenter, whether he be young or old, that does not keep up with these things, learn to work from blue prints or scale drawings will soon fall behind the times and soon become a helper instead of a leader.

It is not only necessary for a carpenter to understand drawings and blue prints, but every carpenter should make it a point to equip himself with a good set of drawing tools and have a drawing table in his study at home or in his shop and put in a fair amount of time in drawing. He should draw in detail lots of work that he can easily do without the drawing simply for the sake of the training it gives him. The habit of drawing is a great aid to reading plans and taking off work from plans, and besides training in drawing is almost essential for the modern carpenter. In many instances the carpenter must be part architect and often by being something of an architect he can further his own cause by submitting plans to people who are thinking of building and altering them to suit their notions, thus giving them the advantage of architectural advice without the expense.

In short, drawing tools are today as much a part of the carpenter's equipment as his woodworking tools, and he should keep in practice and using them even though it involves drawing in detail lots of work that he might easily do without.

VALUE OF THE PRIVATE ICE HOUSE

By GEORGE E. WALSH

THE country estate and residence should depend upon its own private ice house for refrigerating purposes, and modern methods of living require that such a house should be constructed with a view to furnishing ice for the table and for chilling dairy rooms and cold storage places for fruits, eggs, butter and meat. There is a great variety of ice houses in the country, and many are built on plans of rather elaborate nature, but when the cardinal principles are thoroughly understood it will be found that any one with the slightest gift for carpentry and masonry can build or at least design and oversee the building of a perfectly adequate ice house.

The principle of ice preservation is simply that it must be protected on the top, bottom and sides from contact with the air by six to ten inches of sawdust. In proportion to the completeness of this protection will the preservation of the ice in hot weather depend. Next to hot air water is the most destructive agent to the ice. Consequently there must be perfect drainage so that the water from the melting ice can be conducted quickly and adequately away. The third point to observe is that there must be good ventilation under the roof above the ice to carry away any undue moisture that may collect. The sawdust spread over the top of the ice is to protect it from the air; the roof is merely to protect it from sun and rain. The drier the ice is kept the longer it will remain hard and perfect. There must be constant moisture ascending from the melting ice and saturated sawdust on top, and if this damp air is not removed by a good system of ventilation the ice will rot quickly.

With these principles understood it is not so difficult to design and construct a serviceable ice house for private use. We have two general types of ice houses to choose from. One is the underground or ice pit, and the other is the surface ice house. At one time the surface ice house was considered impossible. Ice could not be kept except underground, but as the principles of ice keeping were better understood it was found that the surface ice house properly constructed would answer all purposes. Most of the old ice houses were built entirely of wood, but today more are constructed of stones and cement. These grout ice houses are cheaper and fully as serviceable as any wooden affair, and they can be built with but very little expense in regions where stones are abundant.

How large an ice house does the average family require to carry them from ice season to ice season? A good deal of estimating has been made on this problem, and the consensus of opinion is that a house 8 by 8 feet, inside measurement, and walls 8 feet high, will hold all the ice that the ordinary family will need, provided the house is constructed so the ice will keep well and reasonable care is exercised in keeping it protected with sawdust at all times. For a family where ice is needed for cooling the milk of a fair sized dairy, a house 12 by 14 feet should hold sufficient to carry from season to season. An ice house for a private family, boarding house and dairy should be at least 14 by 16 feet and 14 feet high.

An ice house of the latter dimensions, except that the height varied from 18 feet in the rear and sloped to 10 feet in front, was built for about $150. The foundation walls are of loose stones laid on the surface in the ordinary method for building barn foundations, and coarse stones and gravel are spread and leveled over the ground within the foundations to a depth of about six inches. Eight-inch chestnut sills are laid on the foundation walls, and on these are erected 2-inch by 6-inch by 14-inch studding with 2-foot centers. The corner posts are made of two 2 by 6 joists nailed together, and the posts and studding are nailed to the sills and not framed. The framework of the walls are completed by a 4 by 6-inch plate, and the rafters which support the roof boards and shingles are 2 by 4-inch joist, with 3-foot centers. The walls are lined with unmatched hemlock boards, and the outside covered with novelty siding. At the top a space of about three inches is left open to ventilate, and also a space between rafters and the plate is left open. Doors or windows in the gable ends give a good circulation of air. The foundations are banked on either side to prevent the air from reaching underneath.

The grout or cement ice house should cost less than the above. If properly constructed the cost should not exceed $100 to $125 for a house of similar capacity. Only field stones and cement are used in this type of house, except the wood in the doors and roof. The walls should be about 12 inches thick, and are made of stone bound together by a mixture of sand and cement. In order to make this type of house false work must first be constructed, consisting of a double row of posts along the line of the foundation with boards placed between, one high, and removed as the courses are laid and set. The boards must be kept at a regular distance apart, so that the walls will be of uniform thickness. Between these boards stones of various sizes are placed, and then bonded together with concrete. The mixture of sand and cement should be fluid enough to run in between the stones and form a compact mass. The walls are built up in this way, one course on top of another, and the boards finally removed when the coment has firmly set. A plate is then laid on the walls, and the roof erected in the ordinary way. Frames for doors or windows are made before the walls are erected, and the grout work settles firmly around them. The boards used for the framework of the foundations can be used for the roof. An ice house of this character, measuring 12 by 14 by 8 feet has been constructed for a trifle over $90. The highest single item in the cost even then was for lumber used for the cribbing and roof. The three next highest cost of items were for labor, cement and for hauling stones.

All-concrete icehouses are also popular, and their cost reasonable. The method to pursue in such cases is to excavate a foot below the desired depth, and lay down coarse gravel or broken stone, and when rammed down hard this forms a good floor with plenty of drainage. Set up the forms as desired, allowing 16 inches for the walls. Build foundations sixteen inches wide and four feet deep, or below the frost line. Then build two 3-inch walls, with a 10-inch space, each reinforced with one-quarter inch rods placed 12 inches apart in both directions. The walls are built in sections of about two feet at a time. The outer and inner walls are bound together by galvanized iron strips at every coarse. These strips strengthen the walls. The roof is made slanting and double, like the rest of the house.

The mistake is commonly made of placing the icehouse a considerable distance from the residence. Usually it is near the pond where the ice is gathered. There seems to be a mistaken notion that time and labor are gained by filling the icehouse near the pond, and then carting the ice piecemeal to the residence as needed. Just the opposite is the truth. Ice once loaded on wagons can be carted in bulk cheaper than it can be carried by small pieces.

There is no unsanitary conditions about an icehouse. If there were the ice could not keep well. Therefore it can be located near the residence, preferably in back near the kitchen where the supply can be obtained easily and quickly. If properly built it will not spoil the architectural effect of the landscape. If there is danger of this the ice pit can be placed entirely underground, and nothing shows above except a slight roof a few inches above the ground. The ice in such pits is difficult to get at, for it must be reached by a ladder and each piece must be hauled up by hand or by tackle.

Ice can usually be purchased in the winter season from neighboring ponds when the crop is good from one to two cents a cake. A good many make a business of cutting and selling ice to those owning houses. The cost of purchasing ice and hauling and storing amounts as a rule to about 50 cents to $1 per ton. Even so it pays a big dividend to own your own icehouse. But a better way is to have your own pond.

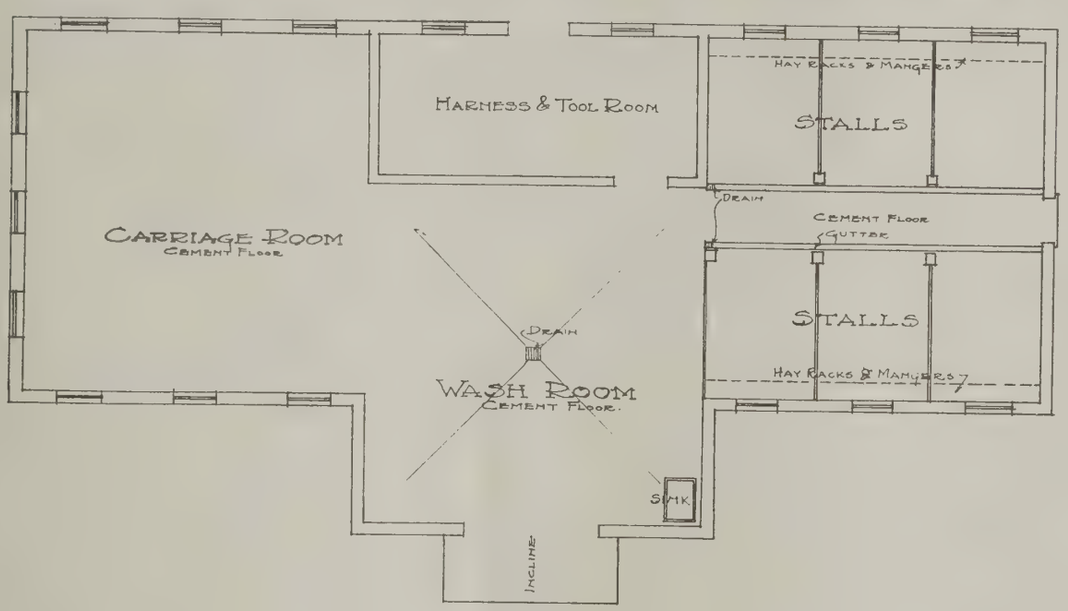
Now there are many natural depressions, where, for a small outlay, one can make an artificial pond for ice cutting purposes. By building a slight dam across the narrowest point the water can be backed up to a depth of a couple of feet. Such a shallow pond freezes much quicker than deeper ones, and if fed by bottom springs the water will be pure enough for all purposes. A sluiceway should be provided so the water will be kept moving.

A space of eight to ten inches is left between the pile of ice and the walls, and this is filled in with sawdust. Pack and ram this sawdust down well, especially near the bottom. So much depends upon the packing that this point cannot be over-emphasized. Boards must be placed across the doorways or windows to keep the sawdust down in position. When the house is filled with ice to the desired depth ten inches of sawdust should be placed over the top. Then if the ventilation and drainage are good the ice should keep well.

The icehouse in warm weather should not be opened every day, for each time the warm outside air melts a good deal of ice.



CONCRETE STABLE FOR J. J. CHAPMAN, BARRYTOWN-ON-HUDSON, N. Y. CHARLES A. PLATT, ARCHITECT, NEW YORK CITY.



PLAN OF STABLE.

Coating Tin Roofs with Coal Tar

The question was recently raised by a Kansas correspondent of the *Painter's Magazine* as to what would be the best treatment for a tin roof that had been coated for some time with coal tar. He stated that the tar could not be removed because its removal would open up leaks where the tin had rusted badly. Oil paint was tried, but it did not adhere to the tar. In some places the tar was ⅛ inch thick, and in other places the tin was bare. The tar on drying crawled in bunches, and on hot days the sun softened the tar.

The journal in question replied as follows: The best remedy would be a new roof, and if the roof is a flat one, a gravel and tar on top of this without removing the tin would be best. However, if the roof is gabled in, if gravel roofs are not used in that locality or if the owner does not want to go to the expense of a new roof, the very best thing to do is to wait until the tar becomes hard and then go over the roof with a stiff broom, removing whatever loose dried-up tar may be there. Then coat the bare spots on the roof with liquid coal tar, to every gallon of which add ¼ lb. air slaked lime (quicklime that has been permitted to fall into powder by exposure to air and is then sifted), and 2 ounces of dry soda ash or pearlash. Stir thoroughly, and if the coal tar is too heavy, then with coal tar naphtha or turpentine. Do not use benzine or gasoline for thinning, as that makes it too brittle. Instead of one heavy coat, apply two thick coats. If some of this gets on the old tar it does not matter, as you can hardly spoil the appearance of the roof now.

ADVICE TO ASPIRING CONTRACTORS—Second Paper

By CHAS. ANDERSON

THAT knowledge is power is undeniable. As generations pass, our wealth of knowledge in all the sciences, arts, professions and mechanical pursuits increases. Which means (be it right or wrong), the survival of the fittest. We find in every branch of human activity those in competition straining every nerve to outdo the other.

It is true, in some branches, large syndicates and monopolies are formed with the purpose of removing this competition. While in other lines competition becomes keener every day, contracting, it can safely be said, is one of these lines.

To enter such a race with any hope of winning one must be thoroughly prepared. I do not mean to say prepared with an abundant capital, but with a technical and business training.

While a course of study is very essential, it is generally conceded that theory alone does not fit one for practical business; practice must accompany or follow the study of theory.

One might master all the text-books obtainable and yet be unprepared to successfully combat his competitors in actual business life.

At least two years should be spent associated with some prosperous contractor or firm, strict attention being paid to the minutest details of the business. Thorough knowledge is more necessary than capital. Some of the most successful contractors have begun with a very small amount of capital.

OTHER ESSENTIAL ELEMENTS.

First. Honesty: Be honest, because it is right; dishonesty breeds contempt, ruins credit, and destroys the brightest prospects. Better remain poor, than become rich through unfaithfulness and deception. The man who rises through dishonesty and trickery will sooner or later come to grief.

Truth crushed to earth will rise again and live; the eternal years of God are hers.—POPE.

Second. Diligence: Idleness is the curse of mankind. Take care of the minutes; the hours will take care of themselves. God deems time so precious, He only gives us one moment at a time; each one lost is lost forever; it can never be recalled.

Third. Perseverance: Do not allow yourself to become discouraged. You notice that those who have accomplished the best results have been noted for their perseverance. Sticktoitivness; this consists as much in waiting as in working. Work diligently and wait patiently for the results.

Fourth. Politeness: Genuine politeness is one of the business man's best assets. It is a great power in controlling men and circumstances. It often succeeds when all else fails. It is said it offered people more pleasure when the Duke of Marlborough denied them a request than when others granted it: because he did it so politely. A friendly word usually finds a friendly heart; politeness cost nothing, but it makes its possessor rich.

SAFE BUSINESS RULES AND PRINCIPLES.

Business men in business hours attend only to business matters.

No man will be successful who neglects his business.

A man of honor respects his word as he does his bond.

Make your business known in few words without loss of time.

Cut short your losses; let your profit go on.

Know the exact condition of your affairs by keeping accurate accounts.

Settle often; have short accounts.

Become known and favorably known.

Let your dealings with a stranger be most carefully considered.

Choose that investment which will best promote your regular business.

Leave nothing undone that ought to be done.

Follow your business closely and it will lead you to honor and wealth.

Be clear and precise in all your bargains.

Trust nothing to memory that should be in writing.

Make no haste to be rich if you would prosper.

Be economical, industrious and self reliant.

Ever live (misfortune excepted), within your income.

Do not take too much advice, think for yourself.

Be courteous to all with whom you come in contact; courtesy may lead to a fortune in itself.

Avoid speculations; concentrate your energy and means on your business.

Treat all men with respect; confide in few; wrong no man.

Keep your word as good as a bank; remember that an honest man is the noblest work of God.

Be economical. A gain usually requires expense, what is saved is clear.

Be well satsified before you give credit that those you give it to are worthy to be trusted.

THINGS TO AVOID.

Never sign a paper for a stranger.

Never take chances on another man's game.

Never fail to read a paper carefully before signing your name to it.

Never fail to keep a business engagement.

Never boast about your business.

Never advertise your competitor by running him down.

Never neglect to perform the commission which your friend may have entrusted to you.

Never borrow money and neglect to pay it back; if you do you will soon be known as a person of no business integrity.

Never unduly infringe on another's time. Bear in mind time is valuable.

Never disappoint an old customer to oblige a new one.

Never forget that it is written: those that are faithful over a few things may be ruler over many.

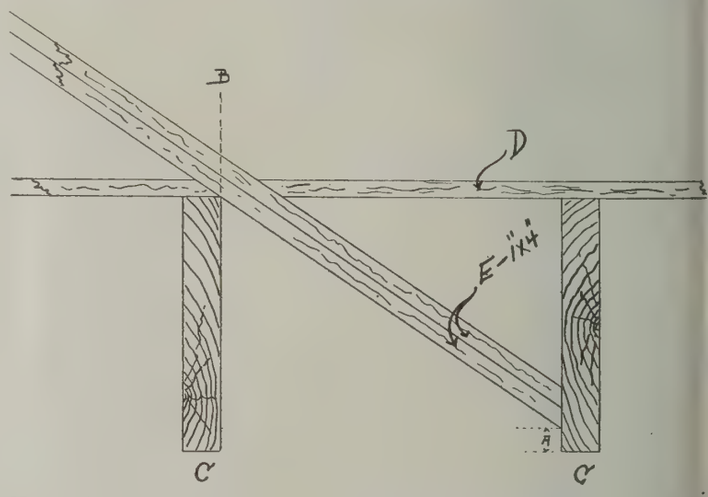
Never fail to speak kindly when addressing those about you. show yourself to be a gentleman by your pleasant mode of address.

In my next paper I will give a few hints on bookkeeping, suitable for the beginner.

ONE WAY OF CUTTING BRIDGING

By W. A. LANE

OFTEN contractors object to a man taking the time to use a strip to space his floor joist or to let him cut a lot of bridging in a mitre box before starting to lay the flooring. They prefer laying the floor up to the center of the room then from the pile of scrap 1 by 4-inch sheeting proceed to cut the bridging as follows: C C is an end view of the floor joist. D is the flooring.



Now with two pieces of 1 by 4-inch laying flat together as at E and one end about an inch up from the bottom edge of the joist as at A, and the other end resting on the top edge of the next joist, holding them in this position with one hand, saw down and across on the dotted line B. These two make a pair of bridging for that space. Do the same for the next ones. This method is quick and makes a good fit, no matter how wide or narrow the spaces are, you are always certain of success.

The Parson—And so, Donald, it's been touch and go with you this time. Ten stories is a long way to fall. I suppose thoughts of your past life passed hurriedly through your mind?

Donald (the local window cleaner)—Well, sir, I was a bit worried till I got the length o' the fifth story, and then I minded that I'd left my pipe on the window sill. It was a weight off my mind, sir.—M. A. P.

ROOF CONSTRUCTION WITH PAPER MODELS

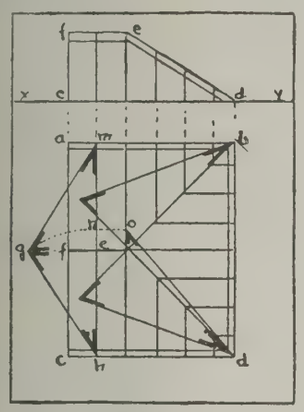
By JOHN Y. DUNLOP

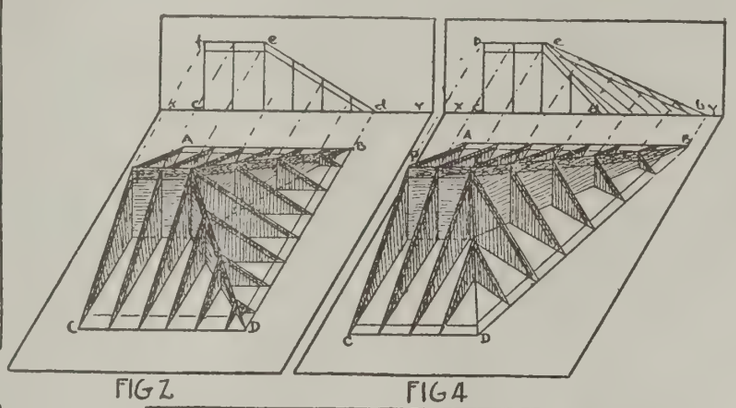
IN the most simple form the hip roof is a quadrilateral pyramid, each triangle side of which is a hip, and the rafter in each angle is a hip rafter.

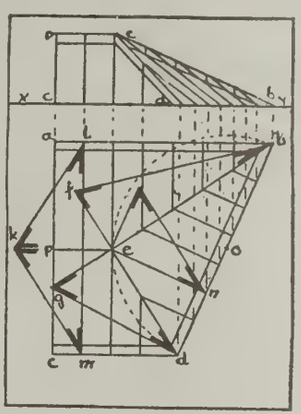
The common rafters which lie between the hip rafter in the plane of the sides and ends of the roof, and which, by abutting on the hip rafters, are necessarily shorter than the length of the sloping sides, are called jack rafters.

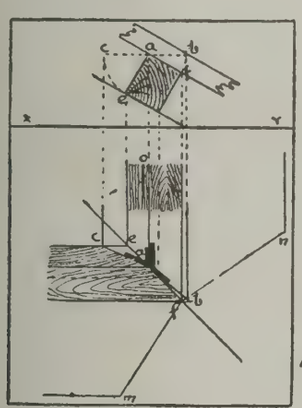
The various points to be determined in a hip roof are as follows:

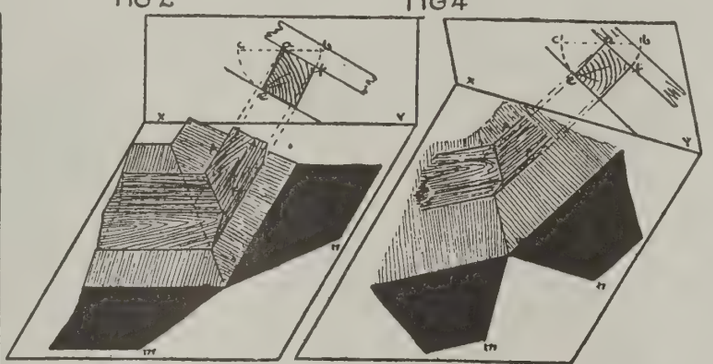
The angle which the common rafter makes with the plane of the wall-head; that is the angle of the slope of the side of the roof or the level bevel.

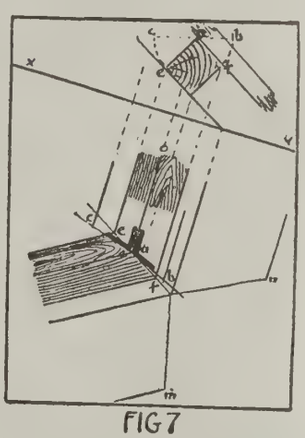












ROOF CONSTRUCTION, ILLUSTRATED WITH PAPER MODELS—BY JOHN Y. DUNLOP.

The angle which the hip rafter makes with the wall-head or the bottom bevel.

The angle which the hip rafter makes with the ridge piece, called the side bevel.

The height of the ridge, the length of the common spars, and the jack rafters.

The length of the hip rafters.

Fig. 1 shows the plan and elevation of the end of a roof, the pitch being given to find the true length of the rafter and the side bevels of the jack rafters. A, b, c, d is the plan of the roof; draw e f parallel to the side and in the middle of the distance between them. Set up the height of the ridge, and draw the slope of the common rafter on each side. This will show at a glance the lengths of the common rafter, and its inclination to the horizontal and vertical indicates the two bevels.

It will be seen that those two angles which are the horizontal and the vertical bevel are always equal to a right angle, the edge of a common rafter being the hypotenuse of a right angled triangle.

If the lower end of the common rafter is a projecting rafter, then the end of the rafter will require to be cut to the angles shown to enable the fascia board or gutter facing to be fixed against it.

It is plain that with ridge roofs all common rafters will be the same length when the side walls are the same height and parallel to each other, and the ridge is parallel to the walls.

In all other cases the rafters will vary, and the length of the rafter can only be obtained by drawing a cross section through the roof, or as it is done in practice by setting up the two end spars and measuring the length of the intermediate spars with a rod.

To determine the length and bevel of the hip rafters: If the pitch of the sides and end of the roof is the same, and if the end wall is at right angles to the side, then the plan of the hip rafters bisects the angles of the building, and the two hip rafters are the same length, as shown in the plan Fig. 1.

To obtain the length of the hip rafters, consider the plan of the rafter as the base of a right angled triangle, the hypotenuse, which is the true length, while the altitude is the height of the ridge above the wall plate.

In Fig. 1 the length of both rafters, with the top and bottom bevel, is shown.

The top and bottom bevel of the jack rafters are similar to those of the common rafters, and if the hip rafter against which they are fixed bisects the angle of the building, then the jack rafter on each side are similar.

Turn h g on to m n, and draw m o parallel to the sides of the roof; draw o d, and the edge cut or side bevel is shown at o. It will be seen that to obtain the edge cut, the surface h g developed is the actual roof surface turned horizontally, the end bevel of the roof boarding being o d h.

Fig. 2 shows the paper model of this example, which should be made up in such a way that it can be folded flat for reference.

Fig. 3 shows an example similiar to Fig. 1, excepting that the angle which the end of the roof makes with the side is not a right angle.

Bisect d b in o, and from o describe a semi-circle; draw e k parallel to the sides and join e d and e b for the plan of the hip rafters.

On m l set of the slope of the sides of the roof, which will give the point k the height of the ridge. Draw e g and e f at right angles to e d and e b and from e set off g and f equal to the height of the ridge. Join g d and f b which shows the true length and the bevels of the hip rafters.

Fig. 4 shows the model which should be cut out of separate pieces of paper and set up as shown. By it I hope that the apprentice will be able to understand clearly the various cuts in hipped roof construction.

Fig. 5 shows how to obtain the bevels of purlins meeting on angle couples.

Purlins, which are generally horizontal, require cutting where they meet or where they are required to be fitted against hip rafters.

When the purlin has one of its faces in the plane of the roof the end cut presents some difficulty.

Fig. 5 shows how those bevels are obtained.

The plan and elevation of the purlin at the corner of the roof should first be drawn. From a as center describe the arcs a c and a b and from the opposite extremities of the diameter draw c c and d d perpendicular to x y. From e and f corners of the purlin draw e e and f f parallel to c c; also from e and f draw e c and f b parallel to x y; join b a and a c and the angle o a c is the down bevel of the purlin and o a b the upper edge.

The method shown is on the principle of developing or turning the width as seen in the plan until they are horizontal, then projecting them to the plan and carrying the points forward to the projected lines. By following this method it is possible to obtain the end bevel of purlins in special cases (Fig. 7) without confusion, even with roofs having the sides sloping at different angles.

In all cases a section of the common spar and purlin should be drawn in position, x y being always drawn at right angles to the length of purlin in section.

Fig. 6 and 8 show models of both examples, the sloping surface on which the purlins are lying being cut out of the drawing. The model of the purlin is made of separate pieces cut to the angles obtained in Figs. 5 and 7 and gummed in position as shown. —*From English Carpenter and Builder.*

PAINTING AND DECORATING A RESIDENCE

THE painting and decorating of a residence is an important subject to the contractor and owner, because it entails the outlay of a considerable amount of money, and being the part of the house, i. e., walls, woodwork and floor that receive the greatest wear, it is necessary that the builder should use careful judgment in his selection.

THE NATIONAL BUILDER has for some time been investigating wall finishes and it is upon this part of the residence decorating this article will deal.

Kalsomine, paint and wall paper are the three materials most universally used on the walls of residences. Of the latter we will say little, as everyone is familiar with the decorating value of wall paper. However, it must be remembered that wall paper is considered less sanitary than either of the others, and if paper of any quality at all it used it is considerably more expensive. It has only been within the last year or two that the flat finish wall paint has been developed. At present it is perhaps the most popular wall finish on the market, and I might say deservingly so. Besides the great advantage of washing the walls with soap and water when they become soiled, as is possible when finished with wall paint, it has the additional advantage of running uniform in tints and flat in finish. Although kalsomine freshly applied looks like flat finish wall paint, it does not continue so but a short time.

First, let us consider kalsomining, what it is made of and how best to apply the same.

Kalsomine is made of whiting (which is ground chalk), fish glue, ground colors and water, and this undoubtedly is the cheapest material for decorative purposes.

An important factor in the success of a well decorated wall is the preparation of the surface, and if this is neglected an unsatisfactory job is the result. All cracks and holes should be made smooth and level. Whether paint or kalsomine is used, a smooth, even surface must be obtained first.

Before the kalsomine is applied to a wall which has never before been decorated, the wall should first be treated to a varnish size; this gives a hard, even surface, to which the kalsomine will adhere. Some decorators, especially where the kind of size is not designated, use a glue instead of a varnish size, principally because the glue is the cheapest.

When kalsomine is applied to a glue size, the moisture in the kalsomine has a tendency to soften the glue and is likely to cause the kalsomine to become too hard, so that it has a tendency to flake off, whereas varnish size being impervious to moisture, the kalsomine has no effect on it; moreover, it is easy to wash kalsomine off a varnish size without injuring the size.

The principal cause of poor kalsomine work is the result of the decorator using either too much or too little glue. If not enough glue is used, the kalsomine will be soft and easily rubbed off; if too much glue is put in, the kalsomine will be too hard and will flake off, and the builder must be governed by the condition of the walls to be tinted as to the amount of glue to use. One of the great objections to kalsomine is that it is practically impossible to match kalsomine; that is, if there is a spot on a wall that you wish to retouch, you cannot mix just the exact color you want, and a wall always shows where it has been retouched.

After a wall has been kalsomined twice, and a new coat is needed, the old kalsomine should be thoroughly washed off, because the third coat will seldom adhere properly to the second coat and one can never be sure of the result. Many people will kalsomine a wall three or four times, with more or less success, but I do not think this is advisable.

Kalsomining varies in cost according to the color used. For instance, a light cream will cost about four cents per square yard, whereas a dark red or green will cost in the neighborhood of ten cents per square yard.

The records we have gathered show that it has cost about $5 per room to put on a fresh coat of kalsomine, an average of $8.33 per room to wash off old kalsomine and put on a new coat, and about $10 per room to varnish, size and kalsomine. These figures include labor and material.

How long the kalsomine will remain in good condition depends on the amount of soot and dust which gets into the room. The rooms which are exposed to the prevailing winds look dingy in a year, whereas those facing a court and protected look well for two years. The first place to become soiled is over the radiators or furnace, and although some people claim they can clean kalsomine, yet my experience shows that it cannot be done successfully.

Next let us consider the use of paint instead of kalsomine, and in treating this subject I will not deal with the best methods to be employed in mixing the materials, because it is a subject which can only be handled intelligently by an expert who is a practical painter as well as having a thorough knowledge of the material to be used.

As a rule, three coats of paint are sufficient to properly cover a wall. Oftentimes the wall is in such condition that four coats are necessary to make a good job.

In mixing the paint for the first coat as much boiled linseed oil should be used as the wall will permit; then the second coat should contain a less quantity of oil. After these two coats have thoroughly dried, a coat of glue size should be put on in order to give a smooth and hard surface on which to apply the last coat.

In mixing the material for this last coat you should use about one-quarter to one-third as much zinc as you do lead. This makes a hard surface.

Three-coat paint work costs about 21 or 22 cents per square yard, whether done by contract or by the day, but personally I prefer to have the work done by the day and buy my own materials, for then I know the quality of oil, lead, zinc, etc., whereas a painter doing work under contract will invariably use materials of inferior quality.

In order to ascertain the exact cost of painting and decorating, two rooms, each 12x15 were selected.

These rooms had previously been kalsomined and the following statement shows just what it costs to wash off the old kalsomine, patch the walls, paint the walls, cost of paint and tinting the ceiling.

Two painters were employed at $3.50 per day and the best of materials used.

Washing off old kalsomine and patching walls	$ 7.45
Painting walls	6.06
Washing ceilings and tinting same	5.24
Cost of paint	10.83
Total	$29.70

If kalsomine had been used instead of paint, these rooms would have cost about $18, or about two-thirds as much as paint.

Walls properly painted and washed every few months will look well for years and a new coat of paint costs no more than

it does to wash off old kalsomine and put on new, so it will be seen that paint work is more economical in the end.

The ease with which flat finish wall paint can be cleaned, the beautiful flat effects obtainable and its durability makes it an ideal finish for walls.

A good wall finish will remain in excellent condition for four or five years, and in comparing it with kalsomine finish during that length of time, the paint is actually less expensive than the kalsomine because of the fact of the necessity of renewing the latter every year.

The flat finish paint appeals to housewives not only on account of the ease in cleaning, but it eliminates the dreadful tearing up every year to redecorate.

In conclusion, it may be safely said that flat finish wall paint is here to stay and it is only a question of time when we believe it will supercede kalsomine practically in every home.

THE BERTRAM

THIS house, by James Dunn, is built at Cleveland, Ohio, and has a number of good ideas in house building. The veranda has a spacious and pleasing appearance. Its features are:

(1st) The ceiling, which is of Georgia pine, polished and oiled.

(2d) The "doing away" with a friese, the ceiling rests on the top of posts.

(3d) The barge boards, of unique design conforming with those of the main roof. These barge boards are the oirginal ideas of the builder.

The roofs are slate. The gables are shingled with red cedar shingles dipped in green creosote stain. The house is painted pure white. The chimney is a pleasing feature, being built of dark red pressed brick laid in black mortar and ornamented with cut blocks of white sandstone. The cellar walls and veranda buttments are of concrete blocks which have a white finish and are laid in black mortar. The walks are all of concrete.

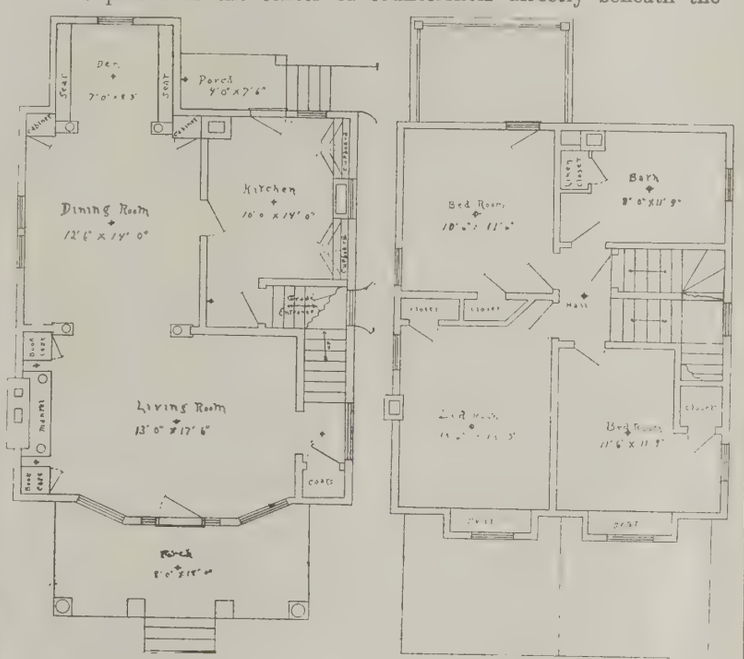
The woodwork in the living room, dining room, den and stairway is oak polished and finished natural. The floors are all oak polished and waxed. The features of the living room are the fireplace of imported gray brick. The book cases with leaded glass



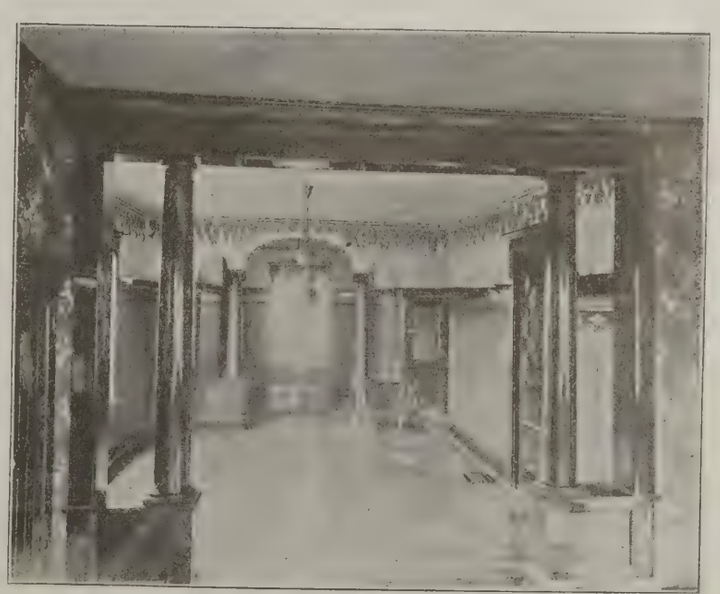
doors. The unique opening to the stairway, the front door, which is of the design known as the "Dutch Door." It is placed in the center of a bay as shown by floor plan, and the beautifully trimmed opening to the dining room. Here a beaded moulding is used in the construction of the head casing. This moulding is a pleasing change from the egg and dart pattern so commonly used. It is of a design after the builders' own ideas.

The dining room is of nice size, well lighted by two large windows. It has a beautiful oak plate rail. The walls are papered in panel effect to the height of plate rail. The ceiling and walls above the plate rail are finished in pure white plaster of paris and a frescoe is painted on the walls in natural oil colors by hand. There is a beautiful triple arched opening between dining room and den. On each side of this arch on the dining room side are china cabinets with leaded glass doors, while on the den side are two long seats. The den also has a plate rail and the decorations are the same as in the dining room, excepting the fresco, which is of different design. The electroliers are of pleasing design.

The kitchen has a large cupboard the full length of the room. There are four large doors beneath the counter shelf. On one of these is attached a good sized flour bin. Above the counter shelf are cupboards, one on each side of window, each having four adjustable shelves, enclosed by two large glass doors, also two large drawers. The sink is a two-piece white enameled, cast iron one and is placed in the center of countershelf directly beneath the



window. The plumbing is open and here the wall is of white tile; the walls are covered with a washable paper of tile design. There is a back entrance and porch, also grade entrance. The woodwork is of Georgia pine, natural finish, while the floor is oak polished and waxed.



The door to coat closet at foot of stairs is a one-panel door and has a bevel plate mirror panel.

On the second floor are three nice bedrooms. Each has a clothes closet. Both front rooms have a fine window seat with

tufted cushions. These rooms are covered with a paper of a very light color and small neat pattern.

The rear bedroom has a large figured paper. The window at rear is hinged and serves as a door to roof over den. There is plenty of room on this roof for an out-door sleeping room, which could either be built in or made to put away in the winter by using frames covered with netting that can be hooked together. The roof could be of canvas or tin.

The bathroom is of good size and the linen closet is placed in it. The walls and ceiling are covered with a washable paper in tile design. The fixtures are of white porcelain ware, and consists of bath tub, water closet and lavatory.

The wood work on this floor is all of Georgia pine, white enameled. The floors are all of oak polished and waxed. There is a stairway to the attic.

Every room has electric lights. The heating is hot air system.

The house is 24'0"x28'0". The den is added to the rear and is 6'6"x9'6" outside.

It was designed by Mr. M. E. Bertram, contractor and builder, Cleveland, Ohio. The plans show many original and unique ideas and the photos show how successfully they were carried out and the good workmanship employed.

The cost was about $2,800, divided as follows:

ESTIMATE OF "THE BERTRAM."

	Cost.	Total Cost.
Excavating 160 yards @ 35c	$	56.00
Foundation included in masonry		
Masonry		295.00
Cellar drain included in excavating		
Cementing cellar included in masonry		
Lumber		510.00
Special interior woodwork	$ 40.00	
Kitchen cupboard	32.00	
Interior finish	105.00	
		177.00
Porch work	28.00	
Doors and windows and frames	140.00	
		168.00
Carpenter labor @ 45c per hour		450.00
Hardware		42.00
Plastering 700 yards @ 26c		182.00
Keen cement included in masonry		
Painting		125.00
Finishing floors		22.00
Furnace (hot air)		85.00
Plumbing		215.00
Slate roofing		95.00
Tin work		35.00
Electric fixtures		40.00
Wiring		35.00
Mantels		40.00
Shades		15.00
Decorating		80.00
Sidewalks included in masonry		
Miscellaneous, 5 per cent		133.60
Total		$2,805.60

"The Lowest or Any Tender Not Necessarily Accepted"

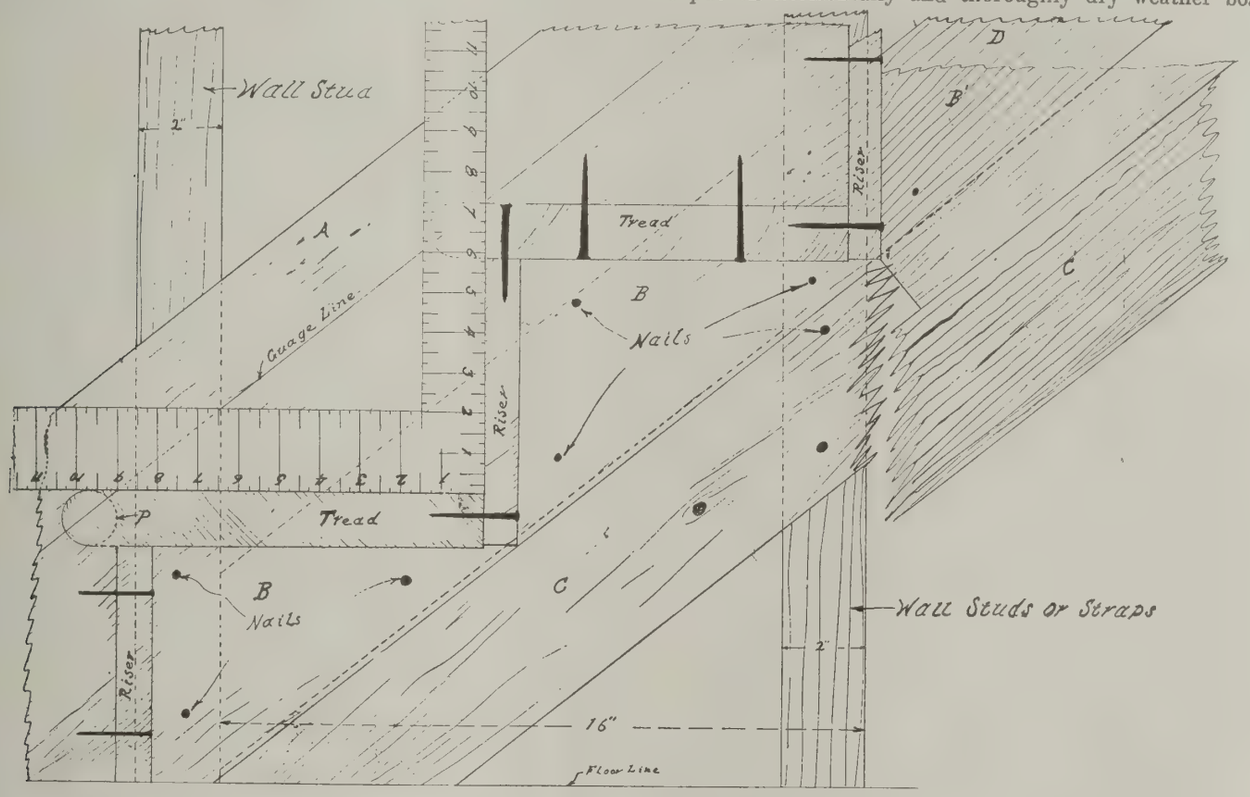
THIS is one form of a formula used in connection with most enquiries for tenders. Its object is obviously to preserve, up to the actual signing of contract, the freedom of action of the parties who invite tenders. If we remember rightly, its omission on one occasion led to litigation, with the result that the court ruled that those who had invited the tenders without this qualification were under obligation to accept and carry out the lowest. This is only the correlative to the fact that a tender sent in without qualification of a relatively similar kind becomes by mere acceptance a binding contract. Hence the practice of adding to the form of tender a proviso that mere acceptance shall not constitute a contract. Contractors, however, often express themselves strongly as to the way in which the freedom thus reserved is used. When tenders are invited from selected contractors, the object is, ostensibly at least, to obtain the lowest bid for the work; and the reasonable inference and expectation is, that the lowest tender will be accepted if the work is gone on with. Therefore those who tender exercise their utmost ingenuity in order to arrive at prices which will bring out the lowest tender; in the process much time is spent and much experience brought to bear. It is, and must be, very galling therefore to such to find, as sometimes happens even to firms of high repute, that although they have come out lowest in the competition, a tender at a higher rate has been preferred. Under these circumstances contractors naturally infer that either the architect or engineer has advised his clients that the work cannot be properly done below a certain figure; or that the firm quoting the lowest price is objectionable or incompetent in some way or financially inadequate to the work; or that the job was intended from the first to go to a certain firm, and the tenders of others were invited merely as a check. Probably the last-named inference is the one most generally made, and is the one which excites anger. It will be at once admitted that a client is well within his rights in rejecting a tender which his professional adviser says is too low; indeed, a contractor is thereby saved from the consequences of his own error of judgment. Financial inadequacy or incompetence on the part of a contractor are generally sound reasons for rejections. Contractors, however, rightly think that the two latter matters should be considered beforehand, and that the mere fact that they have been asked to tender implies that they are deemed competent both financially and otherwise, and therefore that the lowest tender of those invited should be invariably accepted, unless the professional adviser is clear that the price quoted is too low. There can, of course, be no two opinions about the unfairness of inviting tenders from a number of firms merely as a check price on some favored firm, to whom the work is to be given if their price is anywhere near the mark. If the fact becomes known, and it often does, that a certain firm is to be preferred, the competition tends to become a farce played at the expense of its promoters. The better way is to accept the verdict of a competent surveyor on prices quoted by a preferred firm by way of testing their fairness. Some rather startling figures were recently given by a correspondent as to the expense of architectural competitions, and these could be easily paralleled by builders who compete freely for work. In view of these considerations it has been suggested that the formula "the lowest or any tender not necessarily accepted," or, as it is oftener put, "the proprietor does not bind himself to accept the lowest or any tender," should have the words, "the lowest or" omitted when the tenders are to be invited from selected contractors, the object being to secure an implied right to acceptance by the firm quoting the lowest price. This would make it difficult, however, for an architect or engineer to exercise his discretion in advising his client as to whether the lowest price was an adequate price, which is a serious objection. The words "does not bind himself to accept the lowest or any tender" seem to imply that lowness of price is not to be the determining factor, but that consideration will be given to the adequacy of the price quoted for the result expected. If all tenders were loyally settled on such a principle, there would be scant grounds for objection. The difficulty is that there is no criterion by which either side can test a decision before the event. It has been suggested that a fair price would automatically result from accepting, not the lowest tender, but the tender which approximated most nearly, on the lower side, to the mean price of the various tenders received. If announced in conditions of tendering, this method would probably eliminate most of the objections to the present system, and tend to make contractors quote a carefully considered price, because the temptation to resort to price cutting would no longer be the dominating factor, as it is now, and this offers perhaps the best solution of the difficulty in the case of a selected competition. When we turn to open tendering, each of the considerations to which we have referred has to be reckoned with after the tenders are in, and it becomes necessary that the advice of the professional advisers engaged in the matter should be listened to, when they advise the rejection of certain tenders on good and substantial grounds, even though those rejected are among the lowest. As to the morality of inviting tenders with no real intention of proceeding with the work, it stands self-condemned, and in the case of works where the cost of plans and quantities falls upon those who invite tenders, there is an obvious check on the indulgence of such fancies.

CONSTRUCTION OF THE ECONOMY STAIR

By WILLIAM C. A. STEVENSON

THE illustration shown herewith is of a portion of the string in elevation for a box stair (a stair between walls), which is very simple in construction, yet has every appearanee of the housed and keyed stair when completed.

"A" shows the string board, laid out with the square from the gauge line as illustrated, to suit the rise and run. In this case a 9" tread and a 7¼" rise have been used. When the required number of steps have been laid out, bore for the nosing, using a center bit, the size corresponding to the thickness of the tread stock as at P; then saw out the string, leaving that portion that will show above the treads and risers; the strings are then nailed to the wall studs or strapping as the case may be. Now cut the treads and risers the length between the walls and nail them up into the strings as shown in illustration.



Pitch blocks B are then nailed into the angle of the steps underneath; these may be cut from a 2"x6", reversing the cut each time to avoid waste of materials and needless labor, the blocks cut out of the string may be used if desired. The piece C is then nailed under blocks B to form supporters and make ready to receive the lath on the soffitt. If the blocks B cut from the string are used they will drop lower down as seen at B' and C'. The supporters C can be of any size desired; 2"x2", 1"x4" or 2"x4"; ribs should be cut between the studs conforming to the pitch of the string as at D and shown by the dotted lines extended down, to form nailing for the blocks B, as the regular spacing of the wall studs or straps does not provide sufficient nailing places.

It is preferable to have the walls lathed before the strings are nailed up, as this saves cutting in furring pieces to receive the ends of the lath up the pitch of the string both on the top and under edge.

It cannot be said that this stair makes as good a job as the housed, blocked and keyed string. However, if the materials are at all reasonably dry and the workman makes good joints, securely nailing the blocks B and the supporters C, a satisfactory job should be the result. This style will often be found to fit well into play where something cheap is required and a good appearance desired.

REASON FOR BIASED SHEATHING

OCCASIONALLY one sees in the building papers a discussion of the relative merits of storm sheathing put on horizontally and storm sheathing put on at an angle. Generally this discussion turns on the matter of the strength of holding qualities of the sheathing when the fact of the matter is the actual reason for biased sheathing it not so that it will hold the frame together better, but another matter entirely.

Of course, there is something to argue about in the relative holding or bracing qualities of biased or horizontal sheathing, but either of them well nailed on render a building perfectly safe and secure. And it is strange in view of this fact how many people have jumped to the wrong conclusion in regard to biased sheathing and have assumed that it is put on that way to brace the house.

The real reason for biased sheathing is to prevent splitting the weather boarding from the sheathing shrinking in the final drying out. When you put on sheathing horizontally of comparatively wide stock, say 10-inch boards, there is often a shrinkage in the final drying out of nearly half an inch. Now, if these boards are put on horizontally and thoroughly dry weather boarding is nailed on top of them the piece of weather boarding that covers the crack between two of these sheathing boards is likely to be split by the shrinkage and it is for this reason that wide boards, especially when used for storm sheathing are cut and used biased, or at an angle, say 45 degrees.

This distributes the shrinkage in a different direction and breaks it up so that there is not the same chance for it to concentrate and split the weather boarding.

It is this matter of sheathing that is responsible often for bad looking jobs in weather boarding, of split boards in the side walls when people may think it is the material used in the weather boarding itself. No matter even if it is from boards that are presumably kiln dried, the average sheathing board is seldom thoroughly dried and quite often no effort has been made to kiln dry it. It has simply been stuck up long enough to dry the outer surface so that it can be run on a planer and be reduced to thickness and then it is shipped out and used. To some of the readers this will sound like rehashing something that is perfectly obvious, but there are many others, many who seemingly have not yet realized the exact reason for biased sheathing and among those, those who are arguing about the relative bracing qualities, it should be worth while to consider the matter from a different angle, the angle presented herewith.

Chauffeur—I have been chauffeur for some mighty good people, sir.

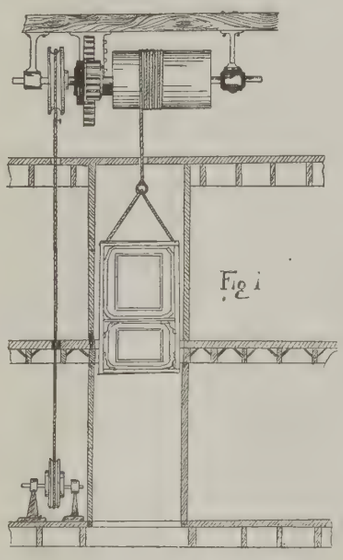
Owner—You have?

Chauffeur—Yes, sir! You just ought to read the stuff on their tombstones, sir!—Puck.

INSTALLATION OF DUMB WAITERS

DUMB waiters are being introduced in buildings more extensively than in former years. The original dumb waiter, intended principally for carrying dining room supplies from a lower floor kitchen has been developed into a power elevator which is being used for a multitude of purposes. One result of the innovation of the dumb waiter in houses, hotels, restaurants, department stores, factories and shops, has been the need of making plans for the same in the original specifications for the construction of the building.

Nearly all the large builders and dealers in power elevators and dumb waiters will explain that one of the difficulties in the installation of the apparatus is that no preliminary arrangements were made for such devices by the architect. Consequently, in the designing of residences and commercial buildings in which power elevators and dumb waiters might be needed, provisions are now made in the walls and floors for the intended conveniency. A blank place is left in the building for the adoption of the lifting apparatus.


Fig 1

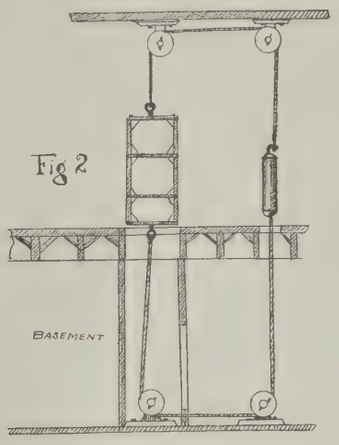
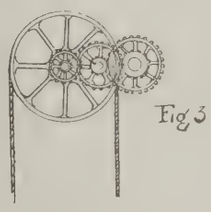


Fig 2


Fig 3

Sometimes the arrangements of timbers in the upper story is planned with a view of attaching the lifting gearing to the same with bolts. Oftentimes, however, the introduction of the dumb waiter or the power elevator means that the machinists who are in charge of the adjusting of the same have to tear out some of the original structure and make room for the machinery and car. All of this is done in a very skillful way in these days. Formerly the saws and axes were used in a reckless manner and considerable damage was done to the floors and other parts of the building in effecting a passage for the car and a lifting point for the gearing. Plastering was torn down, timbers were cut through and masonry was ripped out to an alarming degree. For these reasons, and because of the high cost of the devices, building owners did not interest themselves in power or hand operated elevators to any marked degree. But with the introduction of improved elevators and dumb waiters, with corps of experienced men to put the same in place, and reduced prices for the apparatus, the introduction of the same has increased wonderfully.

It is possible to get first class dumb waiters of simple design, yet good construction, for less than $20.00. The more powerful elevators to be operated by steam or electrical power, of course, run up into higher figures for the apparatus. But when the benefits are considered, users of either the inexpensive dumb waiters or the more costly power elevators seldom complain as to costs. In most cases where your correspondent investigated the users of the devices stated that they would not be without the same at any cost.

In places where trouble was experienced, I observed that reasons existed for the same. In a shoe factory where the management endeavored to rig up a power elevator for the purpose of getting its operatives up and down two flights of stairs in quicker time, and where freight might be lifted and lowered, an attempt was made to put in a second hand car with power-lifting device as in Fig. 1. The cylinder for winding the cable and the gearing for operating the same was of home-made design. It proved to be a dangerous affair and the power operating part was cut out after the car fell a number of times.

Then the rigging was installed for operating the lifting gearing by the rope extending from the grooved wheel keyed to the end of the shaft of the lifting gearing as shown. This rope extends down to the grooved wheel on the lower floor. Hence, someone standing on either floor, outside the car, can run the car up and down by pulling on the rope. This crude arrangement does its work in a half-way manner and saves time and labor. But it is going to drop some day and someone will get injured. In another place I noticed that they had a home-made arrangement as shown in Fig. 2. I was afraid to try this car until I was assured that the car did not have much of a trip anyway, and in case of a drop it would not be more than a dozen feet. The cut shows the crudeness and risk of the device. Of course, it is intended only to carry stock up and down, but the operatives were in the habit of riding on top, steadying themselves with the rope, as this made it easier than going up and down the stairs.

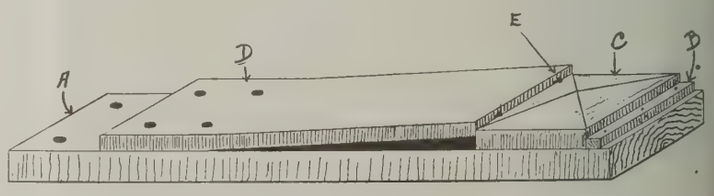
Fig. 3 shows a form of gearing used in some cases for the operation of the cars. The power elevator and the dumb waiter are excellent devices when properly installed and used. First of all I would not trust to elevators constructed by inexperienced local help. In most cases the elevators are purchased from reputable builders, but you will always find a few patched up elevators in use and these will shock anyone who realizes the danger connected therewith. The modern elevator for the home, the factory and the public building is one of the greatest inventions of the age.

A HANDY BENCH CLAMP

By W. A. LANE

ONE often gets bench work that is a puzzle to hold securely and work to the best advantage as the ordinary bench is limited in its clamping arrangements. Not all can afford the patent ones which are double back acting, ball bearing, and if the cost was not of importance they are not always at hand.

I was once in rather a predicament when I found that I had to clamp quite a number of beveled face blocks 2″x6″x6″ by hand, so I put my wits to work and from some scraps I soon had the following clamp that was perfectly satisfactory: A is a piece of



2″x6″ about 3′ 6″ long; about ¼″ from one end nail a strip B, ½″x¾″. This acts as a stop for the block you are to work. Next place your block C against the stop B. Next select a piece of soft 1″x6″x2′x6″ for the spring D; push it tight up to block C, and on the other end nail it down with three or four nails, remove block C and in the end of the spring D drive in two small nails E. Let them project about ½″ and they will block C nicely in place. Now with a draw knife and jack plane you can shape the block as you want it. This clamp can be tacked almost anywhere you need it and with some modification can be made to hold other kinds of work.

Agent—Madam, have you a piano?
Housewife—Yes.
Agent—I am selling an attachment which I am sure———
Housewife—We have one.
Agent—What make is it?
Housewife—Sheriff's.—Cleveland Leader.

THE VALUE OF ZINC ROOFS

By H. M. SANDERS

ANOTHER point about the use of zinc roofs, they are rarely painted, especially steep roofs. Though it is thought that by painting a comparatively flat zinc roof, it would add five years or more to its life. But rarely, if ever, advised for steep roofs, as the painting is more likely to wash off.

The commercial name of the zinc before it is made into sheet form, is spelter, and the quality of the sheets depend upon the purity of the spelter from which the sheets are made.

Iron is one of the alloys of zinc that needs to be eliminated as much as possible, for if present to any appreciable extent, acts upon the zinc, and will eventually destroy it.

But this grade of zinc V. M. is distinguishable from these other cheaper grades because of its light evenness of color. Whereas the cheaper grades are of a darker color, with more or less of a mottled appearance, caused by the presence of alloy of larger quantity, and sometimes of a different character than the alloy in the V. M. zinc, as above analyzed, and hence is more likely to crack at the bends required in working it into shape and form.

When a roof is to be covered with sheet zinc, the roof boards should have close fitting joints and a smooth surface for the zinc to lay upon, and should always run with the pitch of the roof. Otherwise the covering of the roof will not, generally speaking, prove satisfactory. The extra cost of laying the boards properly so as to have a smooth even surface for the zinc to lay on, is a small matter, as compared to securing a longer life to the zinc roof, which is sure to follow such a method of preparing the roof boards, especially if one takes into account that there may be more or less traveling upon it.

Now as to the size of the sheets of zinc used principally for roofs, 3x8 feet is the usual size for flat, or comparatively flat, roofs. On steep roofs the size of the sheets other sizes may better meet the needs and requirements of the case. Though unlike other sheet metals, the number of sizes of sheet zinc is limited to a very few sizes. That in commercial use generally is of the size named 3x7 feet.

As to the weight of the sheets per square foot, that which is generally considered best for roofing purposes, is No. 16 which is about the same gauge of No. 19 sheet iron and weighs 24¾ oz. to the square foot. Any heavier zinc than No. 16 is considered unpracticable to use, as it is more difficult to work in to shape and form, and more likely to crack in turning up the edges of the sheets.

A flat, or comparatively flat, zinc roof, like that of the lead roof, has its roof drips, with the only exception perhaps that the roof drips are closer together on a zinc roof than on a lead roof, as it is put on in smaller sheets. In a lead roof these drips are usually about 10 feet apart, running crossways of the roof, and at right angle with the pitch of the roof; the roof drips of the zinc roof running the same way. But the zinc sheets being usually from 7 to 8 feet long, the roof drips must be about six inches shorter than the length of the sheet zinc used for the roof, in order to provide for the laps and fastening at each end of the same. The depth of the drip vertically, about 2½ inches.

One English writer on the subject says that theoretically speaking, he believes that zinc roofs should be laid without the use of any solder. But in practice it is found that in working around corners and openings of a zinc roof necessitates the insertion of gussets that require to be soldered, to make the roof tight at these points.

"Then again," he says, "there is a small detail in connection with this part of the work where soldering is required, which he claims is often overlooked and often with disastrous results.

For in soldering the zinc, the worker of course uses what he terms a "soldering bit," but what in this country is termed a "soldering iron," or "soldering copper." This "soldering bit" as he terms it, is continually being cleaned with a file, and these fine copper filings, that come from the soldering bit, if left on the zinc roof, set up, when there is rain, a galvanic action which quickly eats through the zinc, leaving a series of pinholes or perforations, through which the falling rain is sure to find its way.

While this fact as instanced might account for the roofs leaking, under the conditions named, be the zinc itself of the purest quality that can be obtained. But we do not wholly coincide, with the idea, that it is difficult to conceive the possibility of remedying the complaint made, some times against zinc roofs, as well as those roofs covered with other kinds of sheet metal. Workmanship must be taken under consideration, as all know who have had any practical experience in such matters.

Poor workmanship means a poor roof, be the material of which the roof is made ever so good a metal. Then again, we must take under consideration the fact that all sheet zinc used for roofing purposes is not of the same quality.

While we are led to believe that practically all the sheet zinc manufactured in this country, is perhaps as pure metal as any manufactured in Europe, yet all the sheet zinc manufactured there is not of the same quality. Owing to the increased demand for zinc roofs in some of those countries has led to the starting up quite a number of manufactures of this sheet metal and some of them, at least, are introducing an inferior quality of zinc.

In any event it behooves the zinc roofer to keep the roof swept clean, and free from these copper filings. There should also be a layer of felt under the zinc roof.

In regard to the method of construction of zinc roofs, there are various kinds. There is the method already spoken of, where

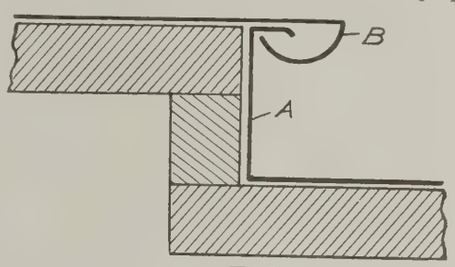


FIG. 1
Zinc Drips

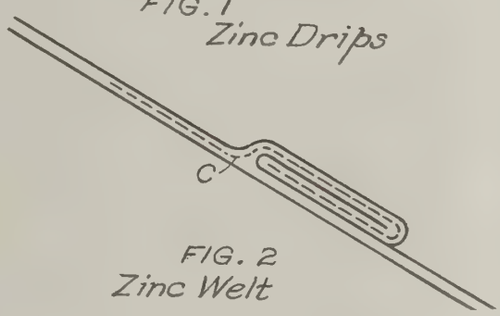


FIG. 2
Zinc Welt

roof drips are employed at intervals along the pitch of the roof and which run crossways from side to side of building, and are constructed as shown in Fig. 1. The distance between these roof dips along the rise or pitch of the roof, are made to suit the length of the sheets of zinc used for that roof, as already explained.

These drips, a section of which is shown in Fig. 1, are from 2 to 2½ inches deep, and so constructed as to allow for free expansion, when the end of the lower and upper end of the two sheets are joined together. The form of the ends of the two sheets is shown in Fig. 1, at a for the top edge of the lower sheet and at b for the bottom edge of the upper sheet.

This method of making cross seams is only used on comparatively flat roofs, as it is not deemed necessary on steep roofs, or where the pitch of the roof exceeds 2½ or 3 inches to the foot. In such cases, the welt seam as it is called, and as shown in Fig. 2, is deemed the best to use. The width of the edge turned up for making these welt seams on top and bottom of the sheets are one inch wide and form a lock seam joint as shown. The top edge of the under sheets being secured to the roof boards by means of cleats, as shown by dotted line C in Fig. 2, and placed from 6 to 8 inches apart. The cleats being 1½ to 2 inches wide and nailed to the roof boards.

(To Be Continued.)

"Do you Americans really appreciate the beauties of nature?" asked the foreigner.

"Sure, we do," replied the patriotic citizen. "Can't you see evidences of our appreciation in the sardine cans and pickle jars that picnic parties scatter over every good piece of scenery?"—Washington Star.

BUILDER'S COURSE IN ARCHITECTURAL DRAWING

RALPH F. WINDOES.

(Continued from January.)

SHADE Lines.—To give drawing a better appearance and to make raised or depressed portions of them show more clearly on the paper, shade lines are sometimes used. They are lines about three times as heavy as full lines, that are often used on detail drawings and elevations, but very seldom on plans.

There are a number of principles used in determining which lines are shade lines, but the most common one is to suppose light rays to strike the object at an angle of 45 degrees from the upper left hand corner. The outlines of those surfaces that the light falls directly upon are put in full lines, but the outlines of those surfaces that the light does not touch are put in shade lines. In common practice it is assumed that the lower and right hand lines are shade lines.

To more clearly illustrate this let us look at Figure 18. Here we have two triangles, one 30x60 degrees and the other 45 degrees, made of material thick enough to cast shadows. Placing the 30x60 degrees on its shortest base, we find that the light would fall directly on sides a, b and c, and miss sides d and e, which would be put in as shade lines. Side f is a right hand side of the material which surrounds it, therefore it would be put in as a shade line.

The 45 degree triangle, placed on its longest base, would have but two shade lines, e and f. F because it is an interior right hand side, and e because the light rays would miss it entirely. It is easy to see why the other lines would not be shaded, bearing in mind that the light rays fall at an angle of 45 degrees from the left.

Shade lines are always drawn outside the original lines of the figure, and should be put in after the figure has been inked (—) entirely with full lines. Dotted lines are never put in as shade lines.

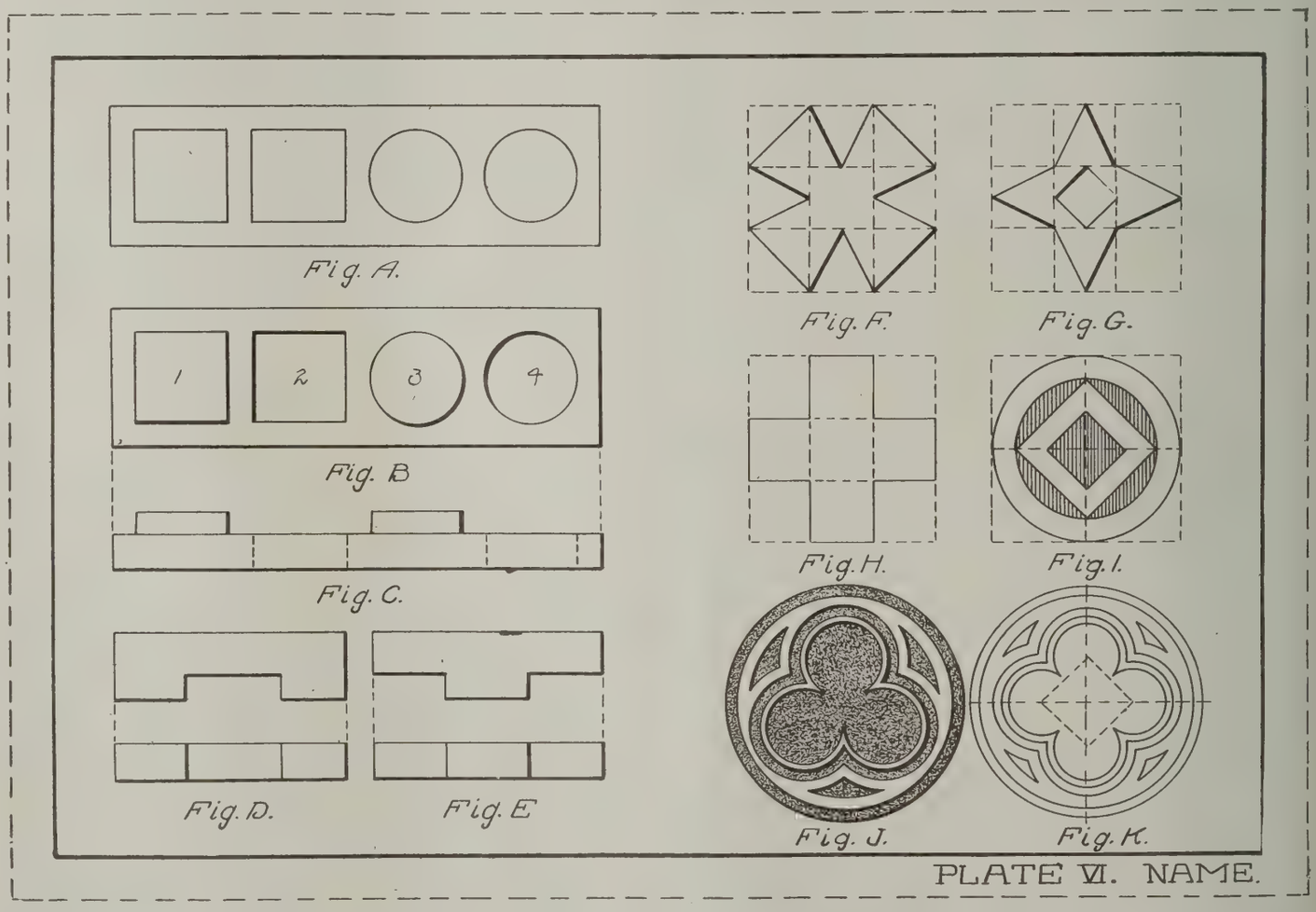


PLATE VI.—SHADE LINES.

Lay this plate out as you did the others and place the figures on it as you think best. No dimensions are here given, this being left to the discretion of the student.

Let us suppose that Figure A is the top view of a block of wood, drawn without shade lines. There is no way for us to tell from this figure whether the block has two square and two round holes in it or whether it is surmounted by two square and two round pieces.

Now let us look at Figure B. Here we find some shade lines used, and bearing in mind the principle which governs them, we can easily see that 1 is a raised square, 2 a square hole, 3 a raised cylinder, and 4 a round hole. As a further proof that we are correct Figure C is given. It is a side view of Figure B and shows which portions are raised and which depressed.

To determine the location of the shade lines on 3 and 4, Figure B, let us consult Figure 19. The shade lines on circles begin at the points where the light fails to strike the edges. These points are determined, as shown, by placing the 45 degree triangle on the T square and holding it tangent to the arc. For an interior

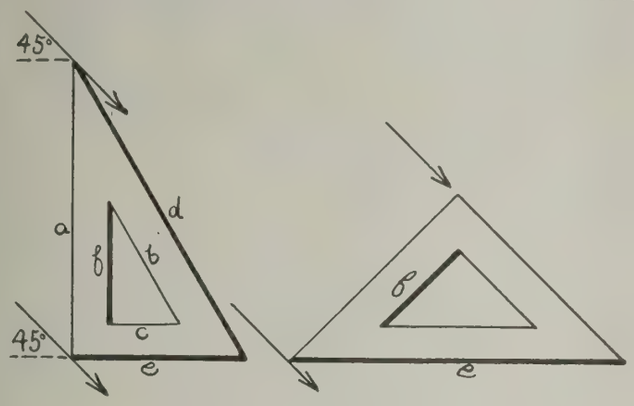


FIG. 18.

circle, the opposite side is shaded, but the points where the shade line begins and ends are found in the same way. In inking them in, a new and distinct center must be made at an angle of 45 degrees from the original center. In Figure 19, 1 shows the original

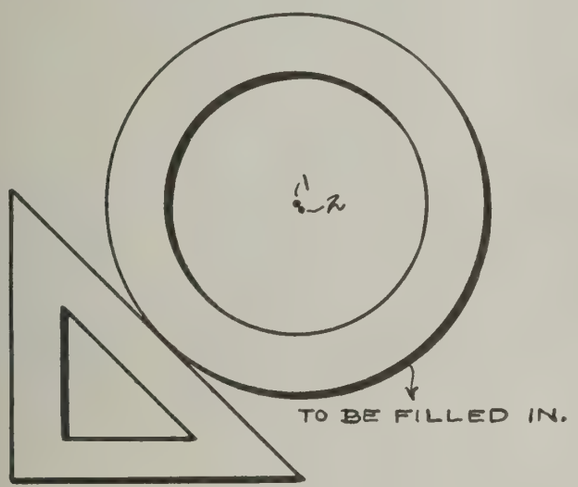


FIG. 19.

center and 2 the shade line center. The heaviest part of the shade is about three times as heavy as the original line, the same as with straight lines.

Figure D gives the top and side views of a piece with a por-



FIG. 20

tion cut out of its lower side. Figure E gives the same views, but with a projection on the lower side. The rules which govern the shade lines on these figures is already known, so no explanation of them is deemed necessary.

The next six figures are given to illustrate the use of these lines on architectural ornaments. They also offer good exercises for the use of the drawing instruments, and great care should be taken in constructing them.

The first three are drawn by producing a square and dividing it into nine small squares. Then certain points on these are connected, giving the desired figures. Figure F is a Maltese cross and Figure G is a star shaped ornament with a square cut out of its center. The shade lines are easily understood as they are all located with the 45 degree triangle.

In Figures H and I no shade lines are given, this being left as a problem for the student to solve. Figure H is a Greek cross and as all the lines are either verticle or horizontal, the rule of the lower and right hand sides can be easily applied. The shaded portion of Figure 1 shows a depression and the shade lines should be put in accordingly.

Figures J and H give good practice for the use of the compasses and they are not difficult to draw. Figure J represents the trefoil of the Gothic style, as used on windows and other decorations. It is here shown with the shade lines in place and the depressed portions shaded. Figure 20 gives the construction of it, and it is formed as follows: Draw the equilateral triangle as shown by the dotted lines a, b, c, then bisect it as at cf, which gives the center for the surrounding circles; a, b and c are the centers of the trefoil curves.

Figure K is the quatrefoil and is formed in a manner similar to the trefoil, excepting that the square is used in place of the triangle. Here the shade lines are omitted, also the background, but the student can easily put them in after copying Figure J.

Throughout the remainder of this course shade lines will be used to a large extent.

(To be continued.)





OUR READERS' PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]

ANSWERS

TIN ROOFS.

From "T. T.," New York.

Replying to R. O. N., Scranton, Pa., I send you the following: In a book recently published I notice that it is not advisable to paint a tin roof until it has been laid at least thirty days. This delay was supposed to be necessary in order to have the tin washed clean, and so get rid of the grease, resin, etc. In the eastern part of the country any such delay results in giving the tin a slight coat of red rust. This, of course, makes the paint flow beautifully. Everybody likes it, but when the tin once gets started there seems to be no end to its rusting. It goes on all the same, whether covered with paint or not. It is all very well for the tinman, but how is it for the man who pays the bills? What we want to do is to make the roof last as long as possible with the least amount of repairs. Paper, tar, asphalt, iron and other kinds of roofings are coming into use largely because of poor tin roofs. It is for the interest of every tin man to put on as good a roof as possible and make it last. Now, to do this rust must not be allowed to start. The tin ought to be painted before the plates begin to show red. Then the roof is safe, and if properly cared for there is no danger that it will give out before its time. I hold that such a roof, painted at proper intervals, will last forever."

Some persons seem to forget that there are two surfaces to a sheet of tin. They see the upper surface and take care of that, but forget that the under surface equally needs to be kept free from moisture. Water on the under side of a tin roof will produce rust about as quickly as water on the top surface. To prevent sweating and condensation of moisture on the under side of a tin roof is a point which must be guarded against by thorough ventilation if we would make the roof last.

SHINGLE ROOFS.

From "Old Hand."

Answering Michael L., Green Bay, Wis. A shingle roof should last at least twenty-five years. Of course, much depends on the shingles themselves and on the locality. Shingle roofs should have a pitch of at least 7 inches to the foot, 12 inches to the foot commonly known as one-half pitch is much better.

It is a well known fact that the steep shingle roof is the one that outlasts all other wooden roofs. The steep roofs afford no place for the lodgment of snow and rain, and soon dries out after the storm has subsided, consequently it is a better water shed and a more durable roof.

Another item in the roofing of a building is the painting. It has long been a custom to not paint shingle roofs. This is probably due to the fact that it is a saving in the expense of building to leave the roof unpainted. The first cost may be reduced by leaving off the paint, but it is no saving in the end. The paint will add to the lasting qualities of the roof much more than the cost of the paint. There is not the slightest reason to show why a shingle roof should not be painted, as well as any other part of the building. It has to take the worst drubbing the elements of destruction can give in almost every case, and the paint will be found to be a great preservative. It is not necessary to put on a high priced paint, but by all means paint the roof if you want it to last. Not only paint it when you build, but give it another coat of paint every two or three years; it will be cheaper than a new roof every six or eight years, or one that has to be frequently patched and repaired.

TAR AND GRAVEL ROOFS.

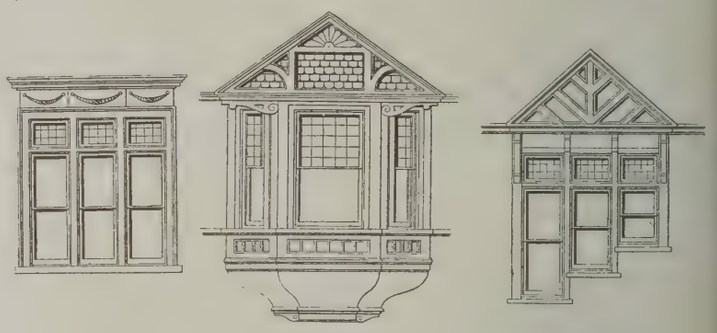
From G. J. B., Valley Stream, Long Island, N. Y.

Answer to A. J. C., Erin Springs, Okla., on tar and gravel roofs. The best method to my mind is the following: Cover the roof boards with a layer of sheathing paper with one inch lap, over which lay two full thicknesses of tarred paper, lapping each sheet seventeen inches and nailing only where necessary; over this spread a uniform coating of pitch, mopped on. Then lay three full thicknesses of tarred felt lapping each sheet twenty-two inches over the preceding one. When felt is laid and secured mop back with pitch the full width of twenty-two inches under each lap. Then spread over the entire surface of the roof a uniform coating of pitch, into which while hot embed slag or gravel. The pitch should be of the best quality of straight run coal tar not less than 120 pounds per 100 square feet. The slag or gravel should not be less than ¼ inch or more than ⅝ inch in size, dry and free from dirt, 300 pounls to the 100 square foot. This is termed a five-ply roofing, and can safely be guaranteed for at least ten years.—Geo. J. Birch.

BAY AND STAIR WINDOWS.

From "W. B.," Hartford, Conn.

In reply to "Joe W.," Manitowoc, Wis., I send you three inclosed designs which I think will be of use to your subscriber.



BAY AND STAIR WINDOWS

FIREPROOF ELEVATOR SHAFTS.

From "Builder," Detroit, Mich.

Answer to "Chicago Man." It would be somewhat difficult in the limited space of an answer in this department to specify and explain all the necessaries required to build a fireproof elevator shaft. It would be better for "Chicago man" to consult some fireproof building expert. However, I send you the inclosed, which will probably be of some use.

The interior of the shaft should be lined with corrugated iron, or, what is better, with bright tin securely fastened to the woodwork. The very best fireproof doors that are made are constructed of wood, upon which sheets of tin are placed in such a manner that the flames cannot penetrate at any point. It has been repeatedly demonstrated that doors of this kind, properly constructed, will resist heat much longer than the ordinary iron doors or doors of any other material. If elevator shafts were constructed in this way, with the openings at the different landings so made as to close tightly, thereby hermetically sealing the shaft, this would then become a great flue to carry away the smoke and flames generated in the building. If at the top of the shaft a glass skylight was placed, a free exit for the flames would be afforded, for the heat would very soon break the glass and make the opening complete. This mode of construction is now required in theaters generally, the skylight being placed over the stage, so that in case of fire the flames may break through the glass and, finding an escape to the outer air, be turned away from the auditorium, thus permitting the audience to disperse without being suffocated by either smoke or flames.

A TOOL TO FRAME ANY ROOF.

From W. E. W. of Parsons, Kans.

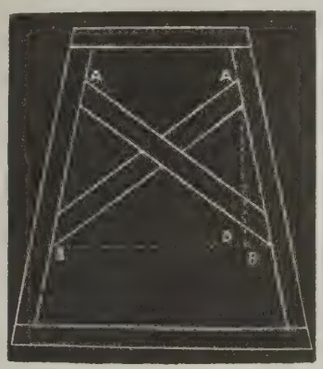
Replying to J. A. B. of Lake Megantic, will say that he might use the method of stepping the rafter with the steel square, but if

he will write the Parsons Manufacturing Company of this city, they will mail him circulars of the Milks Framing Instrument, which will frame any roof that ever was built without a draft. I have been using one for several years and would not be without it for many times the cost of it. Yours truly, W. E. Widmer, contractor and builder.

TAPER FRAMING.

From "W. W.," Buffalo, N. Y.

In answer to "John W. K.," New Ontario, Ont. Your correspondent is rather indefinite, but I think the following will explain his wants: The cut represents a frame, the posts of which incline one foot in six feet rise. Let the distance B B represent seven



feet. The braces are run at an angle of 45 degrees. The post, inclining one foot in six, leaves the distance at A A six feet. In this case the brace would be 8 feet, 5 13-16 inches.

TO GET BEVELS AND LENGTHS OF RAFTERS.

I have seen the question asked by "V. A. B.," Lake Negantic, in the January number of THE NATIONAL BUILDER, and in reply will say that I have bought one of the ABC protractor squares manufactured by Crookston Tool Company, Crookston, Minn., and with it I can get any length or bevel for hip, valley, jack and common rafters, as well as any other cut needed. The directions with the tool describes fully how to do it.—Edwin S. Baker, Pasadena, Cal.

PICTURE BY RUBENS.

From "W. H. H." Huntington, L. I.—In reply to "Clam-digger," South Norwalk, Conn.—The following tradition regarding this picture may be of interest to you. It was given to me some years ago.

"Ruben's Great Picture in Antwerp Cathedral."

St. Christopher, who I own to being an especial favorite of my own, died July 25, A. D. 250, and hence of course, had no more to do with taking down the crucified Christ from the cross, than I did. Yet it is perfectly correct a large representation of him upon the outside of "Rubens" greatest picture the "Taking down from the cross," now hung on the east wall of the south transept of Antwerp's celebrated cathedral, may be seen by all who care to look thereat.

It may be asked in passing why St. Christopher, of all the saints, is my particular favorite? I will tell you. The gentleman in question was originally known as "Reprobatus." He was a heathen giant, of immense strength and apparently a very good sort of a man into the bargain. Somehow he had long possessed a sort of a hankering after religion and on one occasion called at a monastery near where he resided and asked the monks who lived there what he had better do. "Join us. Come in here and spend your time like us in prayer and fasting." "Not me," replied the mighty man contemptuously, extending as he spoke the knotted muscles of his brawny arm with pride. "Not me. I don't want to become one of a milk and water pale faced lot like you chaps are." So he went away. Months afterwards he returned still in some trouble of mind. The matter was again talked over, but the well meaning Hercules absolutely refused the renewed proposition that he should join the community and waste his time in their midst, in meditation. Then a sudden idea struck the chief priest. "Reprobatus," he said, "God has blessed you with great strength. He commands that you use it in his service. You know that dangerous ferry not far from here where so many poor people have been drowned from time to time in vain attempts, on stormy nights, to gross? Go there and build thyself a hut—reside in it and do thy best to help those who are anxious to go across." At this Reprobatus fairly jumped for joy. "Oh, if that is religion," he said, "I am on the job at once, but I do draw the line at praying!" So the priest having blessed him, he did as he was bid. One very rough night long afterwards as he lay sleeplessly in his hut he heard the voice of a child crying. He went out and under a bush found a little lad. The youngster implored him to carry him over the waters, whither his parents had already gone, having left him behind. So he got his staff, lifted the wee one on his shoulders and entered the stream. But the waters arose, thunder and lightning raged, and his burden got as heavy as lead, so much so indeed that "Reprobatus," sturdy man as he was, was in great anguish and was afraid the pair of them would be drowned. By tremendous efforts, however, he at length reached the opposite shore safely, and as he sat down the child and wiped the rolling perspiration from his brow he remarked: "Why, you seem to have weighed as heavy as the whole world." "Well said," was the reply. "I it was who created the whole world; I redeemed the world; I bear the sins of the world." Then the fair boy vanished from sight and the strong man realized it was the child Christ he had borne over the stream. Thus then it come about that his name forever afterwards was changed from its original to "Christopher," the Christ-bearer. The moral of this fable (for, of course, a fable it is) is most excellent. It points out that it is not absolutely necessary nor given to every man to pull a long face and pretend to feel nine times out of ten what he does not feel. I know good men belonging to all sorts of Christian denominations, from self-denying Salvationists to earnest Roman Catholics, and honor each and every one from my heart and I have further met on my travels good people of other religions not within the Christian pale. Parsees and Mohammedans, who, as a rule, are often a deuced sight more religious than are the majority of ourselves. It is well, therefore, to realize that every man has his particular vocation in this life. He may not be a regular attendant at a place of worship, he may not be a praying man, but still there is work for him to do, be it ever so humble, and if he exercises self-denial and in ever so small a way benefits his kind, his life is not altogether in vain. Let us therefore always remember the story of Christopher. He refused to pray, he declined to fast, but when he cheerfully devoted his bodily strength and energies to the assistance of the weak and in helping those in trouble God honored his modest efforts more than ever man was honored before or since, for he it was who saved the child Christ from drowning. And now, after this somewhat lengthy digression, let us go back to Rubens' celebrated picture.

First of all, let us see who the man himself was. Peter Paul Rubens was not an original native of Flanders, but a German born in A. D. 1577 at Seigan in Wassau; he died A. D. 1640. He came to Antwerp in early life and his genius was so pronounced that at the age of twenty-eight he was made the master of the Painters' Guild there, i. e., he occupied much the same position in the Flemish school at Antwerp, as does the president of the Royal Academy in London, England. I do not mean by this that Royal Academicians are always great men. Kissing goes by favor, and it is well known that some men who have written R. A. after their names are mere duffers and pictures worth little more than the frame they are hung in. But Rubens was admittedly a man of great genius. He was appointed court painter to the governor of the Netherlands in 1608, and some twenty years later Charles I had him over in London, knighted him, and gave him the commission to decorate the Royal banqueting hall at Whitehall. Now it must not for a moment be thought he did everything himself. Van Dyke, Teniers, Snyders, Broueghel and others bearing honored names in the history of Flemish art were his pupils. Every man has his hobby—or ought to have—quite outside of his usual vocation, and Rubens spent much of his leisure in gardening. He was a great florist as well as a celebrated painter. The ground adjacent to his own residence at Antwerp belonged to an ancient society known as the "Arquebussers," an old Flemish guild still somewhat in evidence in Flanders. But it was a wealthy sort of a club and when Rubens approached it, anxious to extend his borders and buy the land, the members distinctly declined to listen to his tempting offers. But although insensible to money, they consented at last to relinquish possession on condition that he painted

them a large picture representing their patron saint, St. Christopher. This he readily consented to do, but what this particular saint had to do with Arquebussiers, i. e., crossbow shooters, he could not for the life of him make out, nor could anyone tell him, so for a long while he was at a loss for a suitable subject. At length the very etymology of the word, Christopher, a Christ or cross bearer, afforded him a sort of hint and on this he immediately began his great picture entitled, "The Descent From the Cross." For months he worked laboriously at it, taking an interest in every detail such as he confessed he had never devoted to any other work.

He felt it was to be his "chef d'oeuvre" and as he proceeded he began to eagerly anticipate the moment when he should display it before its future possessors and he would receive their congratulations upon his success. At last the day came. The Arquebuss men assembled in a body in Rubens' studio. The curtain was drawn away and the triumph of the great painter's genius stood unveiled before them.

Tableau: Not a person spoke—indeed, every face showed intense dissatisfaction—and at length as it were with one accord the question came from every lip: "But where is St. Christopher?" In vain the painter explained that the picture was the greatest he had ever accomplished, far superior to what he had contracted to give them. To a man they stood obstinate. St. Christopher they wanted and St. Christopher they would have. Some of the more moderate ones suggested that as there was a small space left on the corner to the left of the painting their patron saint might be introduced there, but Rubens explained such an anomaly would ruin the whole composition. Hence he rejected the proposition in distinct disgust.

So the Arquebuss men departed, refusing to accept the picture or part with the land the painter yearned for.

For a long time afterwards things remained in this unsatisfactory state.

It was the Burgomaster of Antwerp, a great admirer of Rubens' genius, who at last came to the rescue, said, "Why not paint St. Christopher on the outside of the shutter, to be seen when the picture is closed, as it mostly will be, save only on state occasions.

"There is plenty of space there and you can make him as large as you like." Rubens laughed at the proposal, seized his brush and sketched it on there at once. The Arquebuss men were then once again asked to visit the studio, this time at once beholding their patron in fine fettle, they professed themselves perfectly satisfied. Then it was a bargain for the land immediately concluded, and the picture in due course was hung up in a place of honor by the members of the club in the Cathedral. There it has remained ever since, save that during the French invasion it was carried off to the Louvre in Paris, from which, after the proclamation of peace, it was brought back to its original home.

QUESTIONS

OLD MISSION PULPIT.

From "S. R. R.," Spur, Texas.
Editor NATIONAL BUILDER:

I would like if possible to see a pulpit in "old mission" style, if some of our readers could furnish a design.

NURSERY CHAIR.

From "G. E. W.," Huntington, Pa.
Editor NATIONAL BUILDER:

Would some kindly disposed fellow reader give a sketch of an "infant nursery chair"?

DETAILS FOR SIDEBOARDS, KITCHEN CABINETS, ETC.

From "F. M. S.," Sacramento, Cal.
Editor NATIONAL BUILDER:

Would like to see printed some details for dining room china closet, sideboards, etc., and also for kitchen cabinets, shelvings and sink arrangements.

CLEANING OFF CEMENT.

From "J. D.," Buffalo, N. Y.
Editor NATIONAL BUILDER:

Would some one kindly tell me if there is a better method of cleaning cement mortar off rough faced brick than by the use of muriatic acid?

DRAUGHTSMAN.

From "S. S.," Lagrange, Ind.
Editor NATIONAL BUILDER:

Am anxious to become a draughtsman. Would like to get some pointers as to the first steps to be taken and would be pleased if any brother reader who has gone through a course of "sprouts" could kindly oblige by giving me suggestions or hints to begin with.

INTERIOR FINISH.

From "C. E. H.," Urbana, Iowa.
Editor NATIONAL BUILDER:

Would like to see something more on inside finish, cupboards, pantries, etc., and the kind of woods used for these purposes.

SHINGLE DIP.

From "C. G. W.," Rome, N. Y.
Editor NATIONAL BUILDER:

Will some one please give recipe for making shingle dip or stain that does not contain linseed oil?

TO FRAME A CIRCLE PORCH.

I would like to know the best and most substantial way to frame a circle porch.—J. P. Gardner, 723 Thirty-seventh street, Cairo, Ill.

WHAT THE EDITOR WOULD LIKE TO KNOW.

1. What has been to you the most interesting and helpful information given during the last year?
2. What do you think would be most interesting and instructive to you during the coming months?
3. Why do mechanics in general neglect to keep abreast of times, by study; while we find ministers, lawyers, doctors and all professional men studying hard with their daily practice?
4. What new tools do you know of that are not, or you have never seen, advertised?

CEMENT CRACKING.

From "J. R. J.," Bridgeport, Conn.
Editor NATIONAL BUILDER:

I am writing to find out why the cement cracks on the exterior of a new cement job. The structure had been clapboarded. These were removed, the sheathing was laid diagonal, and on this were 1x2 laid 12 inch centers perpendicular, 16 inch horizontal to take the width of expanded metal lath, put out by the Northwestern Expanded Metal Company. The cement was proportioned thus: 3½ sand, 1 cement (Atlas Portland), 1 lime putty; second coat, 4 sand, 1 Blancho cement, 1 hyd. lime dash. It has cracked in three directions at different angles, some of the cracks 12 feet long. If you could tell the reason and a cure you would oblige a constant reader.

WATER FRONT TROUBLES.

To the Editor:—As your questions and answers have been of great value to others I am going to write you my troubles and see if you cannot be of benefit to me.

The hot water for bath and general use is heated by a coil of the city water running through the front of our range, but the trouble occurs for the simple reason that in about a year's time the pipes get all limed up, and we have to put in a new coil, which is not only some expense and bother, but if not attended to at once there is great danger of a real blow-out, as has occured right when my wife was arranging a big dinner for a full house of company. Now the last coil was put in with more than usual care and the plumber was a good one and he felt sure it would last three years at least, but I took it out last night so we can get a Sunday dinner today and will have the plumber put in a new one tomorrow. Now what I want to know is how to keep the coil from getting limed up. Somebody surely ought to know something, but I will admit with all my experience as a builder I am up against it in this proposition and have been for years.

Of course, I know I can get a regular water front for the range instead of the coil of pipe, but every plumber I have asked about it has told me it would be no better. Yours,

D. L. STODDARD.

REVIVAL OF THE PAINTED WALL

TO LENGTHEN the span of life and the pursuit of happiness is the dominant passion of man. Its inspiration is a love for the beautiful. Its incentive, the works of nature. Its expression, his imitative genius. Its realization, the splendors of modern architecture, the grandeur of public and private buildings, the magnificence of homes.

An empty room with barren walls and ceiling, however it be fashioned, is nothing, but possess such room with decoration, color, draperies, and it becomes fitting for the inhabitance of man. It is in evidence everywhere that the revival in favor of tinted walls is in full favor. The soft restful shades and tints in plain effects, or embellished with borders, stencils, scrolls and freizes, or in delicate traceries, are the fashion of the day.

Kalsomines have had their place for a number of years and their restful tones are desirable, and their price an incentive, but they are not durable and, therefore they are not really economical. Kalsomines are said to be made of decomposed animal matter (glue), and after application they easily powder and rub off. If they become soiled they cannot be washed or cleaned.

Everything in this world is a development, as everything and every idea is possible only because other things and other ideas preceded it. Nothing happens by chance. Cold water paints have been right in their way, but they lack some of the material points necessary for modern interior decoration. Washable Flat Paints are devised to meet the shortcomings of water paints and they do it well.

MODERN PAINT FOR FLAT EFFECTS IN INTERIOR FINISHING.

Beautiful to look upon, restful to the eye, marvelous in wearing power, simple of application, remarkable in covering capacity, economical and satisfying in every way, are the manifold attributes which are possessed and made possible in washable Flat Wall Paints.

Washable Flat Wall Paints are the modern flat drying paints, with which are produced the finest effects in the finishing of wall board on walls and ceilings.

They make a soft-velvety finish of surpassing richness and beauty. They look like pastel. They combine the gentle restfulness of kalsomine or water paint with the really washable qualities of oil and varnish.

When the finish becomes soiled or stained it is to be scrubbed down with soap and water in the same manner as any varnished or painted surface. This is accomplished without in any degree diminishing the quality of the finish.

After deciding upon Wall Board for the wall surface, the next question is its treatment.

The flat, uniform surface of Wall Board offers splendid opportunity for economical finishing. In fact, superior to plaster or metal.

In the special treatment that wall board undergoes, the material is of like porosity throughout and when the paint is applied it dries with an evenness of finish that is impossible with plaster, owing to the difference in the lime or manner of troweling.

The change in wall decoration has been slow but sure, developing first in the more pretentious buildings, later being used in the best and most modern residences, and now since the necessary materials are being provided in better form, come within reach of the average home builder.

Formerly the only painted wall possible was the glossy kind, suitable only for kitchens and lavatories, so that this change is due to two reasons; first, the demand for a more artistic finish of reasonable cost and, second, the successful effort of manufacturers to supply that demand.

A plain flat painted wall has many advantages; it forms an ideal background for pictures; it is soft and restful to the eye and it adapts itself readily to a variety of color schemes.

Where there is a preponderance of plain surfaces, one can easily obtain the necessary balance by stenciling in some neat design, or the usual plan of paneling wall board overcomes this trouble itself.

The greatest advantage of having and producing painted wall board lies in the pleasure of individual treatment and decoration.

Washable Flat Wall Paints are made in many beautiful shades which will harmonize with any plan of interior furnishing and are prepared in liquid form ready for the brush.

BOOK NOTICES

AUTOMOBILE MECHANICIAN'S CATECHISM.—A series of examination questions and answers prepared expressly for the use of owners, chauffeurs, garage men, and automobile machinists. More than 400 questions and answers covering every detail of automobile design, construction, operation and repair work. Will be found to be a most valuable aid to all persons contemplating an appearance before a board of examiners for the purpose of obtaining a chauffeur's license. By Calvin F. Swingle, M. E. Published by Frederick J. Drake & Co., Chicago, Ill.

While this book, which contains over 110 pages is built up somewhat on the principles of a catechism, it is very much more, covering as it does the definitions and explanations of many complex questions, and is really more of a book of solid practical instruction regarding all difficult matters in caring for and running successfully an automobile.

Indeed the book seems to be as necessary to the machine for every day use, as the monkey wrench or the screw driver. Not only is it a valuable addition to the chauffeur's outfit, but it should also be a part of the outfit of every man having to do with an automobile. The book is well bound in limp leather covers; finely printed. Price post-paid, $1.00.

WOODCRAFT: for January, is one of the very best issues of this excellent journal, and contains among other interesting and useful matter a brief, but lucid history of the growth and development of wood-working machinery since the introduction of the crude saws, planes and other wood-working contrivances of Bentham, Newberry and others in England, and the Woodward planer and other American improved machines, from the early part of the nineteenth century to the present date.

This historical account of the development of woodworking machinery —connecting as it does the names of the old makers of the last century with the machinery of the present—must prove both interesting and instructive to all operative machine workers of today and a copy of the paper should be in the hands of everyone concerned. Much thanks are certainly due to the editors of Woodcraft for gathering and stringing together so much real history of the woodworking machinery.

This history is illustrated by upwards of 120 reproductions from photos of the old time manufacturers and inventors of woodworking machinery.

CONCRETE WALL FORMS. By A. A. Houghton, author of "Concrete From Sand Moulds," etc. Being No. 1 of a series of practical hand-books on concrete work. The Norman W. Henley Publishing Company, New York. Paper cover. Price 50 cents.

This is a very useful little book, and for its size (62 pages) contains quite a bunch of the very best information on the subject on which it treats. These manuals or hand-books, of which there will be about a dozen, are intended for the use of beginners, and are illustrated in such a manner that any intelligent workman should find no difficulty in following successfully.

CONCRETE FLOORS AND SIDEWALKS. By A. A. Houghton, author of a number of works on concreting and reinforcing, etc., being No. 2 of the series. The Norman W. Henley Publishing Company, New York, N. Y., 63 pp., paper covers. Price 50 cents.

This is No. 2 of this series of hand books, and may be placed on the same footing as No. 1; only, of course, this deals with laying concrete floors and sidewalks, giving quantities of the various materials, also methods of preparing ground or base, and reinforcing, making and laying concrete tiles of various shapes and forms and molds for the purpose. A number of illustrations, drawn to scale, are shown, to assist the workman in his operations. This series of hand-books on concrete work should find its way into the hands of every concrete worker and building contractor.

CEMENT PRODUCTS EXHIBIT AT CHICAGO

The outlook for the success of the Fourth Annual Cement Show in Chicago, February 16-23, is very bright. The show will again be held in the big Coliseum. All the main floor, annex and balcony space has already been disposed of. A new and very beautiful scheme of ceiling and wall decorations has been designed, and the next cement show will undoubtedly surpass in beauty any that has thus far been held. The same general equipment for booths will be installed as was used at the New York Cement Show December last. The corner posts and railings will all be made of cement and the show will be truly a cement show. There will be about two hundred exhibitors.

Inquiries from all parts of the United States, particularly from the territory in the middle west, indicate that the out-of-town attendance will be very heavy. The show comes just at the right time for the contractors who are in the market for machinery for the opening building season.

Two important conventions will be held in connection with the Chicago show. The annual meeting of the National Builders' Supply Association will be held at the Auditorium February 21-22, and the Sixth Annual Convention of the Interstate Cement Tile Manufacturers' Association will be held at the New Southern Hotel, February 21-23.

LATEST LEGAL DECISIONS

Since a provision of a building contract that, if the work was delayed for certain causes, the time fixed for completion should be extended for a period as fixed by the architects if a claim for extension was made to the architects within a certain time, was made for the owner's benefit, he waived it by himself agreeing with the contractor as to the time of extension, so that such extension did not discharge the contractor's surety.—Boppart v. Illinois Surety Co., 126 S. W. (Mo.), 768.

Under Rev. St., 1895, Art. 3301, providing that mechanics' liens shall attach to the improvements for which the materials were furnished in preference to any prior mortgage on the land, but that no mortgage on the land or improvements at the time of the inception of the lien shall be affected thereby, mechanics' liens do not have preference over a prior lien or incumbrance on the land at the inception of the mechanics' liens, and a mechanic's lien is not superior to a prior vendor's lien.—Hubbell v. Texas Southern Railway Company, 126 S. W. (Texas), 313.

Technical or immaterial variations from the strict letter of the contract of a surety for hire will not discharge his obligation, a substantial compliance only being required, and, where a building contract provided for changes in the specifications to be made in a certain manner, that one or two unimportant changes were made therein which were not made as provided by the contract, one being paid for by the owner and the other consisting of two areaways around windows constructed by the contractor to prevent water running into them, would not discharge the contractor's surety, though made without its consent; it not destroying the identity of the contract.—Boppart v. Illinois Surety Company, 126 S. W. (Mo.), 768.

In proceedings by a subcontractor to enforce a mechanic's lien, the contractor is a material party defendant to the bill.—Godfrey Lumber Co. v. Kline, 125 N. W. (Mich.), 682.

If a place is made unsafe in the progress of work, and an employe, injured by reason thereof, participated in the act which caused the accident, he cannot recover.—Lewis v. Gehlen, 122 N. Y. S., 89.

A board of education contracting for the erection of a schoolhouse had a right to pay liens for work and material furnished, and have allowance therefor as for moneys paid upon the contract for the erection of the building.—Goodrich v. Board of Education of Union School District No. 3, of Towns of Greenwich and Easton, 122 N. Y. S., 50.

In an action to foreclose mechanics' liens against moneys due to a contractor upon a contract for building a schoolhouse, brought against the board of education, no personal charge of costs against the members of the board could be made.—Goodrich v. Board of Education of Union School District, No. 3, of Towns of Greenwich and Easton, 122 N. Y. S. 50

The fact that a party furnishing labor or material in the erection of a schoolhouse under a contract with the contractor subsequently became a member of the school board did not deprive him of the full right to enforce his rights for the labor and material furnished.—Goodrich v. Board of Education of Union School District, No. 3, of Towns of Greenwich and Easton, 122 N. Y. S., 50.

Rev. Laws, c. 197, Sec. 6, prescribing the requisites of statement or certificate of lien, does not forbid several from joining in one certificate; and so long as there is a statement by each of several claimants, containing the particulars required, it is sufficient.—De Vingo v. Hall. 91 N. E. (Mass.) 390.

In the accounts of petitioners for liens for labor in a statement under Rev. Laws, c. 197, Sec. 6, the inversion of the names of the petitioners and of the contractors as debtor and creditor was an obvious mistake, and did not invalidate the liens.—De Vingo, v. Hall, 91 N. E. (Mass.) 390.

When work under special contract is done in a cellar, under the dwelling of one who was at the time the owner and occupier, his continued possession of the dwelling and use of the cellar will not necessarily amount to acceptance of the work done.—Merritt & Co. v. Layton, 73 A. (Dela.) 795.

In an action on a contractor's bond for breach of his contract to erect a house for plaintiff, where plaintiff claimed damages for expenses incurred in a lien suit against him for labor and material furnished, he cannot recover any item as costs incurred in that suit that was not taxed or legally taxable as costs.—Sheard v. United States Fidelity & Guaranty Co., 107 P. (Wash.) 1024.

In an action on a contractor's bond for breach of his contract to erect a house for plaintiff, where plaintiff claimed damages for expenses incurred in a lien suit against him for labor and material furnished, he cannot recover costs for resisting a claim for work and material not covered by the contract.—Sheard v. United States Fidelity & Guaranty Co., 107 P. (Wash.) 1024.

A servant, injured by the falling of a platform, struck by a passing train, cannot recover of the master for failure of the railroad company's flagman to give warning of the approach of the train, where there was nothing to show that the flagman was acting for the employer, or in the discharge of any duty intrusted to him by the employer.—Colfred v. New England Structural Co., 91 N. E. (Mass.) 409.

Where an employe helped to remove the support for certain crossbeams in a building, and within an hour and a half was injured by their giving way, he cannot recover on the ground of his employer's negligence in failing to inspect the place in the time between the removal and the injury—Lewis v. Gehlen. 122 N. Y. S., 89.

Where, by a bond, a guaranty company agreed to indemnify plaintiff for any pecuniary loss from the breach of a contract to furnish material and labor, and erect a house for plaintiff, a cause of action on the bond did not accrue until the damages by the breach of the contract were judicially determined and actually paid, and an action on the bond commenced two months after this occurred was not unreasonably delayed.—Sheard v. United States Fidelity & Guaranty Co., 107 P. (Wash.) 1024.

Where a servant knew that the work in which he was engaged was highly dangerous, and he with his fellow workmen put in place the plank which constituted the staging on which he was sitting and the blocks or timbers on which the plank rested, and he knew that if the plank was not high enough the trains passing under it would hit it, and that for his own safety he must see to it that the plank was high enough to clear the trains, he cannot recover on common-law courts.—Colford v. New England Structural Co., 91 N. E. (Mass.) 409.

A note was given by a contractor erecting a schoolhouse to a bank for money advanced to him to pay his employes. The note was authorized by the president of the board of education, and was to be deducted from the next estimate paid the contractor, and the note contained the words that it be charged to the bond account, which consisted of moneys applicable to the payment of the contractor. The next estimate was fully paid to the contractor. Subsequently, the treasurer of the board, who was the cashier of the bank, paid the note out of the bond account. Held, that the authority still remained with the bank after the payment of the first estimate in full to collect the note out of any moneys remaining in the bond account due or to become due the contractor, and its payment was good as against lien claimants who filed their liens subsequently.—Goodrich v. Board of Education of Union School District, No. 3, of Towns of Greenwich and Easton, 122 N. Y. S., 50.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

974,233. Portable house. R. R. Brewer, St. Louis, Mo.
974,359. Door-opener. C. Cleary, Ironton, Ohio.
974,750. Door. J. B. Clermont, assignor the Yale & Towne Mfg. Co., Stamford, Conn.
974,569. Draft-sill. J. J. Irvin, Bellwood, Pa.
974,673. Flask for building cement walls. J. C. Joslin, Keene, N. H.
974,404. Fire-escape door. L. R. Loughborough, Rochester, N. Y.
974,451. Adjustable hinge. A. Vanderveld, assignor Grand Rapids Show Case Co., Grand Rapids, Mich.
974,542. Support for disappearing doors. A Vanderveld, assignor Grand Rapids Show Case Co., Grand Rapids, Mich.
974,868. Filling-block for fireproof constructions. H. Ericsson, Chicago, Ill.
975,150. Show-window or store-front, D. J. Murnane, St. Louis, Mo.
975,307. Reinforced concrete structure. H. E. White, Youngstown, Ohio, and W. H. Ham, assignors the General Fireproofing Co., New York, N. Y.
974,941. Roof-climber. T. A. Wilkerson, Bonham, Tex.
975,502. End-cut brick-machine. J. Bensing, Malinta, Ohio.
976,029. Sheet-metal pipe. H. Birnbaum, Rapid City, S. D.
976,040. Floor finishing and polishing machine. Wm. O. Canfield, Chattanooga, Tenn.
975,510. Revolving door. Fred Clymer Belmar, and J. Degen, Trenton, N. J., assignors United Revolving Door Co.
975,514. Reinforced-concrete pile or column. R. A. Cummings, Beaver, Pa.
975,615. Cement-mold. R. F. Hanneman, Detroit, Mich.
976,074. Folding scaffold-ladder. H. F. Hartman, Milwaukee, Wis.
975,954. Window cold-air refrigerator. Wm. M. Howland, Eckington, D. C.
976,108. Floor-drain trap. Wm. Weller, Dayton, Ohio.
976,503. Bar spacer and supporter for reinforced concrete. F. H. Schroeder, Jr., Tacoma, Wash.
976,308. Sectional metallic window-frame. W. D. Smith, assignor of one-half to J. M. Triggs, Huntington, Ind.
976,233. Portable folding window-scaffold. J. Volk, St. Louis, Mo.
978,003. Apparatus for making hollow building blocks. F. Burchartz, New York.
977,611. Sheet-metal window. A. Fromhold, Rutherford, N. J.
997,794. Bonding and tie plate for building blocks. Geo. M. Griswold and H. C. Beagley, Kingman, Kans.
978,352. Moisture-proof wood floor. J. W. Brady, St. Louis, Mo.
978,823. Scaffold-support. Eugene M. and D. F. Cavanagh, assignor to New York Scaffolding Co., New York City.

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REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce oc—Ontario cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. BM—Board measure. S 1 S—Sized one side. D 4 S—Dressed four sides. KD—Kiln dried. RG—Rough. C—Clears. Cdr—Common cedar.

	Philadelphia, Pa. Corrected by N E. Duffey.	Chicago, Corrected by J H. Touchstone.	Los Angeles, California, by Courtesy of B & C.	Omaha, Neb. Corrected by I P. Hicks.	Southern Ontario. Corrected by F.C Frants.	Buffalo, N. Y. Corrected by J. W.	New York, N. Y. Corrected by F. M. Sammis.	Cleveland, Ohio. F. O. B. Yard Courtesy P. T. Co.	Seattle, Wash F.O.B. Mill or Yard Corrected by Courtesy F. T. Bradley
Dimensions, Hemlock Lumber	M ft. BM S 2 S	M. ft BM S 2 S	M ft BM RG	M ft. BM S 2 S	M t. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S.	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	h $23 00	yp $20.00	op $22 00 to 24.00	yp $26 00	h $23 00	h$22.00	yp. $28.50	yp $26.00	F $13 50
2"x4" to 8" up to 16', No. 2	23 00	16 00	21 00	24 00	21 00	20 00	*	24.00	11 50
2"x4" to 8" 18 & 20', No. 1	26 00	21 00	23 00	28 00	25 00	26.00	31.50	28.00	13 50
2"x10" up to 16', No. 1	24 00	21 00	24 00	29 00	24 00	22.00	31.50	27.00	13 50
2"x12" up to 16', No. 1	*	22 00	24 00	31 00	25 00	23.00	32.50	29.00	13 50
2"x14" up to 16', No. 1	*	24 00	25 00	*	26 00	25.00	34.00	35.00	14.50
Each 2 ft. over 20 ft., add per M	2 00	1.00	1 00	1.00	1.50	1.50	1.25	2.00	up to 32"1 00
Select stock as above, add per M	*	5.00	10 00	*	*	*	3.75	*	2.25
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft BM D 4 S	M ft. BM D 4 S.	M ft. BM S 4 S.	M ft BM D 4 S
1"x3" to 1"x8", No. 1	e $48.00	yp $35 00	rw $35 00	yp $45 00	wp $35 00	wp $43 00	wp $62.50	wp $48.00	F $33.25
1"x10", No. 1	*	35 00	36 00	44 00	40 00	49 00	66.00	50.00	36 00
1"x12", No. 1	*	40 00	37 00	46 00	42 00	50 00	70.00	50.00	36 00
1¼"x3" to 1¼"x12", No. 1	60 00	42 00	50 00	46 00	45 00	48.00	70 00	52.00	36 00
1½" and 2" same as above	60 00	42 00	52 00	48 00	42 00	52 00	73.00	55.00	36 00
1" drop siding, No. 1	53 00	25 00	26 00 to 30 00	31 00	35 00	35 00	38.00	49.00	27 00
½" lap siding, No. 1	37.50	18.00	18.00 to 20 00	29.00	30.00	36.00	35.00	37.00	rc 27.00
Enclosing and Fence Boards.	M ft BM S 1 S	M . BM S 1 S	M ft BM D 2 S	M ft BM S 1 S	M t BM S 1 S	M t. BM S 1 S	M ft. BM D 4 S.	M ft. BM S 1 S.	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	npc $40.00	yp $18 00	op $25.00 to 30 00	yr $25 00	wp $30 00	wp $35 00	wp $32.50	wp $37.00	F $13 50
1 x8" to 1"x10" No. 1	50 00	18 00	25 00 to 30 00	24 00	h 23 00	h24 00	38.00	39.00	13 50
1"x10" No. 1	50 00	18 00	30 00 to 35 00	24 00	24 00	26 00	38.00	34.00	13 50
1"x10", No. 2	45.00	15.00	25.00 to 30 00	22.00	22 00	24.00	36.50	35.00	13.50
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D 4 S.	M t. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM. D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
⅝", T. & G. Flooring No. 1	yp $43.00	yp $30 00	op $10 00	yp $40.00	wp $40 00	yp $40 00	yp. $28.00	wp $35.00	$34 25
⅝ T & G Flooring No. 2	40.00	25 00	35 00	36 00	wp 30 00	35 00	26.00	30.00	29 75
Add for ceiling per M	*	1 00	1 50	2.00	1 00	1 00	1.50	2.00	M ft 27 00
Add for partition per M	*	2 00	2 50	2 00	2 00	2 00	2.25	2.00	29 25
⅜"x4", Ceiling No. 1	*	25.00	27.50	30 00	np 30.00	30 00	28.00	31.00	24.50
	100 ft. run	100 ft. run	100 ft run	100 ft run	100 ft run	100 ft run	100 ft. run	100 ft run	100 ft run
4¼" Moulded Casing	wp $3.00	yp $1.85	rw or op $3.00	yp $2 00	wp 2 00	yp 2 00	$2.25	wp $3.00	$2 75
4¾" Moulded Casing	3.75	2.10	3.00	2 50	2 25	2 50	2.50	3.25	2 75
7¼" Moulded Base	6.00	3.25	6.00	3 50	4 50	4 00	4.50	4.20	3 50
⅞"x9½" Moulded Base	7 50	3.75	8.00	4.00	6 00	5.00	5.75	6.00	4 50
1⅛"x4½" Moulded Window Stool	5.50	3.00	7.50	4.00	4.00	4.00	4.75	5.00	3.50
Miscellaneous List.	Per M.	Per M.	Per M	Per M	Per M	Per M.	Per M	Per M.	Per M.
Shingles, No. 1	rc $16.00	re $3.50	rw $2.75	$4 25	bc re $3.75	t $4.00	bc $5.00	rc $4.75	rc *A*c $2.25
Shingles, No. 2	13 00	3 00	2.00	3.75	*	3.50	4.00	4.25	*A*e 2 00
Shingles, fancy	18.00	5.00	rw 4.00	4 50	8.00	7.50	9.00	5.50	2 75
Lath, 4 ft., No 1	6.00	yp 3.60	4 50	F 5.50	wp 5.00	h 4.00	5.00	5.25	F 2 25
Lath, 4 ft No 2	4.00	2 75	3.50	5.00	e 3.7	3.80	*	4.75	2 25
Pickets, 1"x3"x4' 6", dressed	h 40.00	40.00	25.00	30.00	*	wp42 00	40.00	wp 45.00	25 00
Pickets, 1 x3"x4' 6", rough	30.00	*	20.00	*	*	38.00	36.00	30.00	20.00
	Piece.	Piece.	Piece.	Piece	Piece.	Piece.	Piece.	Piece.	Per 100.
6"x8' Post split	*	Cdr $0.13	re $0.30	Cdr $0.30	*	$0.25	.28	Cdr $0.15	re $12 50
8"x8' Post split	*	.20	.40	.35	*	.30	.32	.22	12 50
8"x8' Post whole	*	.44	.50	.40	Cdr $0.30	.50	.50	.40	Above prices prevail with a 10% discount.
6"x8' Post whole	*	.25	.40	.35	.25	.40	.45	.30	
Hardware List.	Cwt.	Cw	Cwt.	Cwt.	Cwt.	Cwt	Cwt.	Cwt.	Cwt.
Nails, wire, common	$2.10	$3.50	$3 00	$3.00	$2.85	$3.50	$2.25	$2.30	$2.95
Nails, cut, common	2.00	4.00	3.10	*	3.00	*	2.10	4.10	2.95
Nails, wire, fine finishing	2.30	1.60	3.50	3.50	4.00	3.50	2.50	2.20	2 95
Sash Weights, cast iron	1.80	1.50	1.60	1.50	2.00	1.60	New 1.50 S. H. .90	1.60	1.75
Tarred Felt Paper, best 2-ply	Roll $ .90	Roll. *	Roll *	Roll $1.00	Roll *	Roll .60	Roll $1.25	Roll $0.60	Cwt $5 00
Tarred Felt Paper, 3-ply	1.15	*	*	1.25	*	1.75	1000' 0.95	.80	Cwt. 5.00
Red Rosin, Atlas brand	1.60	.90	*	.90	$3.50	0.90	1000' 1.15	1.20	*
Red Rosin, durable brand	1.25	.75	*	.75	.60	1.75	Per lb. .02¼	.90	*
Black Neponset	2.25		*	*	.75	*	250 ft. 1.15	2.60	*
Masons' Supplies.	Per M.	Per M.	Per M.	Per M.	Per M.	Courtesy, Buffalo Bldr's Supply Co. Per to	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	$9.00	*	Hudson River	Not used	$6.50	*	*
Brick, blue, at kilns, No. 1	*	*	6.50	*	" "	" "	6.00	*	*
Brick, blue, at kilns, No. 2	*	7.50	6.00	*	New Jersey	" "	Pressed 22.00	*	*
Brick, white, delivered, face	30.00	7.00	*	7.50	*	7.50	" 25.00	$40.00	$45.00
Brick, red, delivered, backing	9.00	7.00	*	*	*	7.50	14.00	18.00	8 00
Brick, delivered, dry pressed	22.00	18.00	*	18.00	$17.00	18.00	25.00	22.00	35 00 to 45 00
Brick, vitrified, dry pressed	*	*	*	24.00	*	25.00	18.00	*	20.00
Lime, best gray	bu $0 27	bbl. $1.30	bbl. $1.80	bbl. $1.25	bbl. *	$ .80	bbl. $1.40	bu $0.27	bbl. $1.65
Lime, best white	27	1.40	2.00	1.25	*	1.00	145 to 190 Atlas-	.27	1.85
Cement Portland	bbl net 1.75	*	2.25	1.85	1.75	bbl. 1.60	1.50 pr bbl.in wood	bbl. net 1.60	Cwt. 4.00
Plaster, calcined	" " 1.90	2.40	2.25	1.80	bbl. $1 85	ton. 6.00	(In bags $1.80 per	ton 5.50	bbl. 2.50 to 2.65
Hair, 8 lb. per bush	.25	.25	0.48	.25	*	.32	bbl., 4 bags to bbl.,	*	*
						Note, Plaster $5.00 ton. Portland Cement $1.75 barrel. All other prices correct to date.	with rebate of 7½ per bag.)		

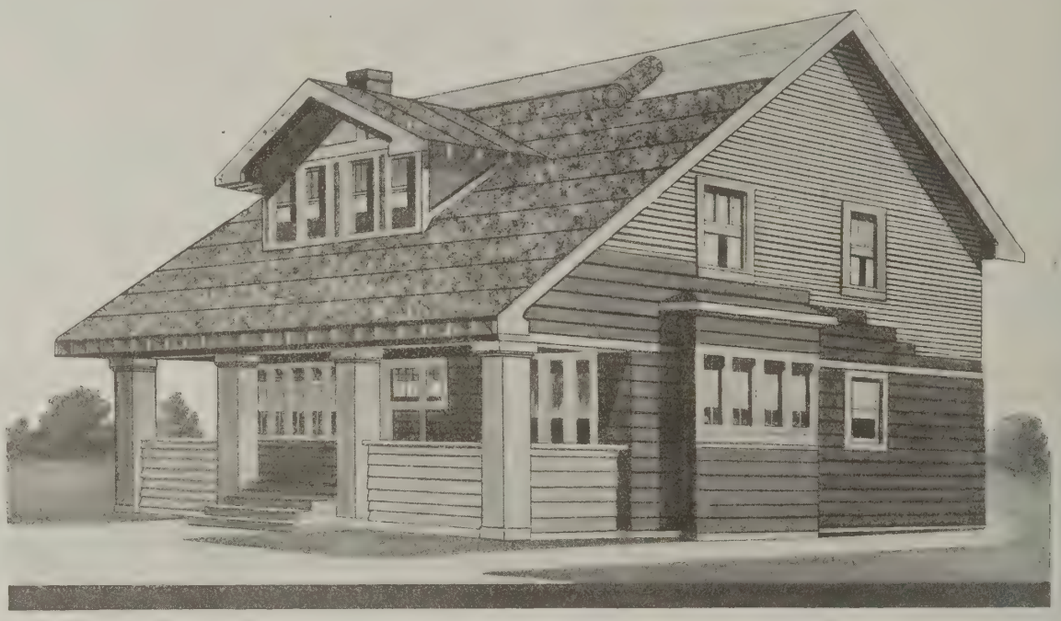
NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

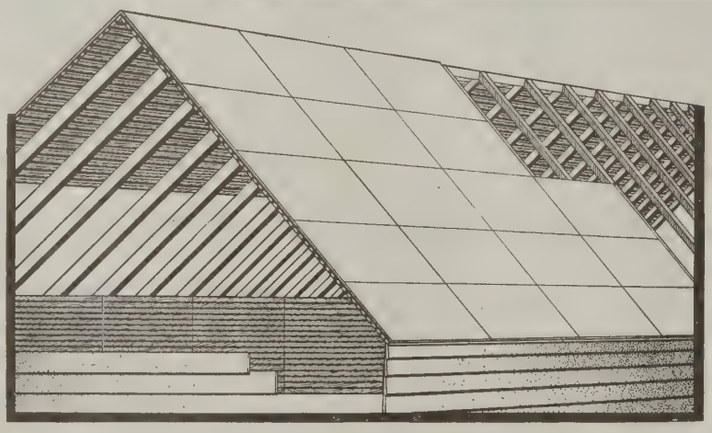
NEW USES FOR WALL BOARD.

If ever there was a handy and good material made especially for people of modest means, it is wall board. This does not mean that wall board cannot be used by people of means in building construction, for they have been even quicker to see its advantages and are using large quantities of it, but in introducing a building material into new territory, wall board has certain advantages which gives it a natural market or use for certain purposes. For instance, the architect or contractor might not like to take a chance or believe it the proper material to place in every room of a $50,000 residence, but there would be many rooms or places in that home where wall board could be used to splendid advantage with a little thought.

Contractors and builders have been quick to recognize that wall board gives them a clean, conveniently handled, and money-making material to specify and use. The property owner, on account of the saving in time of construction and in price and because of the different decorative effects that can be had, likes wall board.

The wall board described in this article is used with good results as a foundation for flooring. It is nailed to the joists, protecting the health of the women, as well as the children, who find their greatest pleasure in playing on the floor. It is also used with the best results as a foundation for ready roofing. For this purpose it is nailed to rafters with smooth side of sheathing up. Over this smooth, hard surface, the roofing is easily nailed and is sufficiently strong to hold up anyone walking or standing on it. This combination of wall board and ready roofing keeps out cold and summer heat.





With wall board, therefore, the entire interior of the house may be lined—floors, roof and sides. When the wall board shown here is built for wall protection, it is nailed to outside of studs with lath and asphalt mastic sides exposed to the weather. This leaves a dead air space between laths and boarding, as shown in both illustrations.

This wall board is made of kiln-dried, dressed laths, imbedded in hot asphalt mastic, under pressure of 500 pounds to the square inch, and surfaced with sized cardboards. It is cut at the factory into sheets of uniform size (4x4 ft.) and uniform thickness (3/8 inch). These sheets, which insure a perfectly smooth wall surface, are easily and quickly nailed to studding ready for immediate application of wall paper, burlap or dull coat paints, the latter being the ideal material and the most preferred.

The illustrations shown on this page will explain at a glance the different exterior uses of wall board.

LIQUID MARBLE.

Mr. E. R. Stowell, Portland, Indiana, is offering to sell one formula with instructions in each city or county for making Liquid Marble, which is claimed to be an air drying enamel for cement, plaster, brick, wood or wallboard, to be applied with a brush.

Mr. Stowell states that this Liquid Marble dries hard in a few hours, looks just like marble and is as hard as marble. It is naturally white, but can be made in colors. It can be applied as a flat finish or it can be polished like marble.

It is claimed to be perfectly sanitary, absolutely fireproof and that copper can be fused on this enamel with a blow pipe and not ignite the wood or wallboard.

Mr. Stowell states that Liquid Marble can be made for fifteen cents a gallon, without the use of machinery and no special skill is required. Because it must be made up on the job and should be used within twenty-four hours after it is mixed, the formula and instructions are sold to the builder who wants to use it.

An influential woman member of a fashionable church in Philadelphia had gone to her pastor with the complaint that she was greatly disturbed by one of her neighbors.

"Why," said she, "that man in the pew behind ours destroys all my devotional feelings when he tries to sing. Couldn't you ask him to change his pew?"

The pastor reflected. "Well," said he, at last, "I naturally feel a little delicacy on that score, especially as I should have to give a reason. But I tell you what I might do—I might ask him to join the choir."—Brooklyn Life.

THE EUREKA SPECIAL SCREW DRIVER.

The Decatur Coffin Co., Decatur, Ill., are mailing circulars descriptive of their "Eureka" Special Screw Driver. This screw driver is made in two sizes—No. 1, 14 inches long opened and 9 inches closed, and No. 2, 19 inches long opened and 12 inches closed. "Eureka" Special Screw Drivers are simple in construction, durable, powerful, and very reasonable in price. They can be used as an ordinary screw driver. Just push on the end of the "Eureka" and the screw goes in.



As the Eureka is one of the oldest and best drivers on the market, many hardware dealers carry them.

BERGER'S NEW CATALOGUE.

A new, thoroughly up-to-date catalogue has been issued by the Berger Manufacturing Company of Canton, O. It deals with the products of that concern's steel office furniture department.

Besides being a typical example of high class typographical art, it is clear, concise and succinct. It supersedes all previous editions of catalogues of this company's steel filing devices and office equipment. It contains a wealth of information and is a valuable reference guide to purchasers or prospective purchasers.

The new catalogue shows many new and especially useful combinations, gives dimensions, etc. It well illustrates the progressive steps taken by the Berger company in the steel office furniture department.

The NORTHWESTERN TERRA COTTA COMPANY

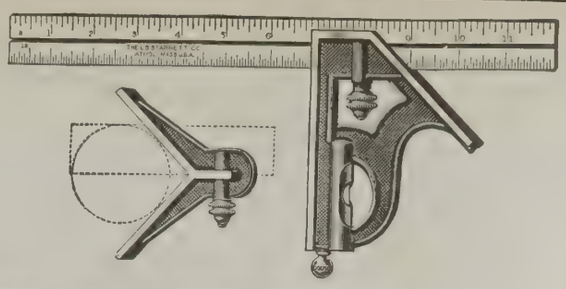
Manufacturers of High Grade

Architectural Terra Cotta

Enameled Work a Specialty

Main Office and Works, 2525 Clybourn Ave.
Branch Office, Room 1415 Railway Exchange

CHICAGO, ILLINOIS



STARRETT TOOLS for Carpenters are made with just the same superiority in respect to accuracy, workmanship, design and finish as Starrett Tools for Machinists. And that's saying a good deal.

Complete Catalogue No. 18-M sent free

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Sanitary Steel Medicine Cabinet or Locker FOR YOUR BATHROOM





Handsome Beveled Mirror Door. Snow white everlasting enamel inside and out.

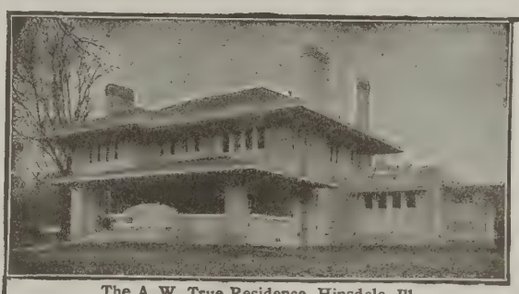
Costs less than wood and is better. Should be in every bathroom. Is dust, germ and vermin proof and easily cleaned with warm water.

Made in four styles and three sizes. **PRICE, $7.00 and up**

SEND FOR ILLUSTRATED CIRCULAR

HESS, 907L Tacoma Building, CHICAGO

Makers of the Hess Steel Furnace. Sold on Approval. Free Booklet



The A. W. True Residence, Hinsdale, Ill.

143 Cities USED "Stonekote" ROUGH CAST in 1910

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be: Gray, Silver Gray, White, Buff, Red, Brown.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce, CHICAGO, ILL.

ASBESTOS "CENTURY" SHINGLES

"THE ROOF THAT OUTLIVES THE BUILDING"

Do you know that two hundred million Asbestos "Century" Shingles were used on all types of buildings all over the world during the past twelve months?

In all parts of the United States you will find residences, industrial plants, public and business buildings roofed with these shingles—the Government Buildings, West Hingham, Mass.; the Pabst Stock Farm, Oconomowoc, Wis.; the William Rockefeller Estate, Tarrytown, N. Y.; the Hartman Stock Farm, Columbus, Ohio; Miller Bros., "101 Ranch," Bliss, Okla.; Municipal Water Plant, Columbus, Ohio; Y. M. C. A. Building, Ardmore, Pa.; Plant of the Cleveland Hardware Co., Cleveland, Ohio; Atlantic City Pumping Station, Absecon, N. J.; Power House of the Great Northern Elevator, Devil's Lake, N. D.; High School, Marion, Ill.; Brewster High School, Brewster, Pa.; St. Martin's Parish School, Chicago, Ill.; Office Building of the Will and Baumer Co., Syracuse, N. Y.; Union Passenger Station, Salt Lake City, Utah; St. Vincent's Hospital, Portland, Oregon, etc.



Asbestos "Century" Shingle Roof—Residence of Dr. J. B. Porteous, Atlantic City, N. J.; H. A. Stout, Atlantic City, Architect; Atlantic City Cornice Works, Atlantic City, Roofers.

Asbestos "Century" Shingles are the first practical lightweight roofing of reinforced concrete. You can get these shingles in shapes and sizes to fit any architectural scheme. Three colors—Newport Gray (silver gray), Slate (blue black), and Indian Red. Ask your Roofer for new quotations. Write for Booklet "K. & M. 1911."

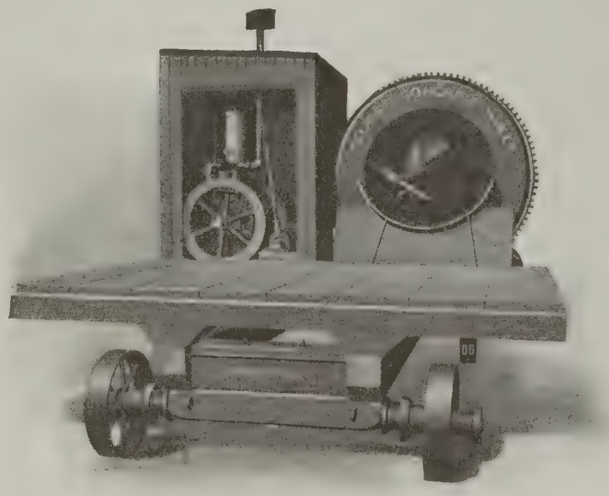
The Keasbey & Mattison Company, Factors, Ambler, Pa.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ECLIPSE CONCRETE MIXER.

The Eclipse concrete mixer as illustrated herewith is a machine especially adapted for various classes of work and is at present attracting large attention from the concrete contractors throughout the country. The special features of this machine are the low charging drum which makes it necessary for the charging platform to be only about 24 inches high when the mixer is mounted on truck, and high enough to discharge into wheelbarrows at the discharging side.

This charging platform is mounted on the truck, the mixer is always complete ready for operation as soon as it arrives on the job. The large opening in the charging end of the drum is another advantage because the entire batch can be seen while mixing and it can be determined before discharging that the concrete is in the condition desired. It is not necessary to discharge part of the batch to see whether it is too dry or too wet as often happens with mixers with small openings. The fact that the entire batch can be seen while mixing enables the contractor to produce uniform high-grade concrete insuring good reputation for first-class concrete work which is important. The batch being visible also avoids any loss or damage which is liable to happen if the concrete is not uniformly mixed.



CONCRETE MIXER ON TRUCK WITH GASOLINE ENGINE—REAR DISCHARGE WITH ENGINE BESIDE THE DRUM.

The discharging arrangement on this mixer is semi-automatic in that the discharge door is held in either mixing or discharging position by a strong spring under tension and all that is necessary for the operator to do is to throw this door past the center of the tension in either direction and the spring will complete the movement and hold the door until it is again thrown by the operator. This door can be thrown open for discharging and left open until the entire batch is discharged or as the mixer is made to discharge about 3 cubic feet or one wheelbarrow of concrete per revolution, the door can be closed when a barrow of concrete is discharged and left closed until the next man has placed a wheelbarrow in position when he throws the door securing another wheelbarrow of concrete in one revolution of the drum and closes the door to prevent any more discharging until the next barrow is in position. It is not necessary to have a special man operate the discharge door as the men wheeling can throw the lever without any difficulty whatever. When wheeling the material away in wheelbarrows or when they are discharging the concrete all in one batch the man who is feeding the mixer throws the door by the discharge lever which you will see at the charging end of the drum and for this reason one man less is required to operate the mixer.

From this description the contractor will very readily see that this mixer is very simple to operate.



SHOWING CONCRETE MIXER ON REINFORCED CONCRETE JOB AT CHICAGO.

We have given this description to enable the contractor to determine what can be accomplished by using the Eclipse concrete mixer as the selection of a concrete mixer resolves itself into using a machine so designed and equipped as to put through the greatest amount of uniform thoroughly mixed concrete with the lowest cost for labor and also for repairs which are kept at a minimum when using the Eclipse mixer on account of the simplicity in construction and freedom from complicated charging hoist. While the machine as described would be the ordinary outfit mounted on truck, the Eclipse is built in various styles, capacities and is mounted to suit special conditions, also furnished with hoist for handling the mixed concrete when desired. The mixers are also furnished with either gasoline, steam or electric power. The contractor will appreciate that the materials, cement, sand, gravel and water are constant as to cost and the reduced cost of mixed concrete must be accomplished very largely through the use of an economical mixer that is one that is economical in mixing materials and also in handling materials to and from the machine, hand mixing being too expensive to be used.

One other feature about the Eclipse mixer is that it will operate on either wet or dry mix and with any kind of material. It can also be used for mixing cement mortar or top dressing for sidewalks, the smaller sizes being especially adapted for sidewalk work where a light portable machine is preferable. The Eclipse mixer is manufactured by The Standard Scale & Supply Company, 1345 Wabash avenue, Chicago. They will exhibit at the Cement Show, Chicago, February 17-23, and visitors should not fail to see their display. Those in the concrete business are handicapped unless they investigate the Eclipse concrete mixer. A postal sent to the company will secure full information and testimonials. In writing please mention THE NATIONAL BUILDER.

PEARSON SHINGLE NAILER.

The Pearson Manufacturing Company, Robbinsdale, Minn., call attention to their shingle nailer and to the following letters from satisfied customers:

From Robert Christopherson, Sioux City, Iowa.—"I have one of your Pearson's Improved Nailers and can recommend it very highly."

From John Miller, Wauwatosa, Wis.—"I have received the Nailer some time ago; am well satisfied with it."





From George H. Moore, Chatfield, Minn.—"I have one of your Nailers and I would not do without it. Please find enclosed forty cents for new plunger. I got this Nailer about a year ago."

And from John G. Most, Martland, Neb.—"I would like to get the agency for your Nailing machine at this place. I have the only Nailer in this county and it is one of the best things there is going, I think."

This nailer has been on the market for many years and its usefuness for shingle nailing in both cold and warm weather is evidently fully established.

SEE THE HOOSIER MFG. CO.'S EXHIBIT.

The Hoosier Mfg. Co., Goshen, Indiana, will have an exhibit at the Chicago Cement Show, Booth 276, where they will be glad to meet everyone interested in their Colonial Porch Columns, described in this issue.

These porch column molds have many good features which are well worth inspecting.

A NEW IDEA FOR CONTRACTORS AND BUILDERS.

In the past it has been quite a problem for contractors and builders to reach the prospective builder and to create new business for the future and do it in a dignified and inexpensive way. The use of the Lithograph Postals has at last solved this problem. The contractor, builder or architecture of it, but put it before the home owner just as the building home builder and show him beautiful colored views of the work he is doing.

The lithograph process will not only show the building and the architecture of it, but put before the home owner just as the building appears, when completed with all the natural color effects of both building and grounds.

Every man in the building field will realize the advantages of being able at first to show a client views in colors of what he has built, thus getting the attention of the prospective home builder and standing a better chance of securing the order.

Particulars and samples can be had by addressing the American View Card Makers, 334 Dearborn St., Chicago, Illinois, who are specialists in this line.

IT TELLS ABOUT THE ROOF.

The Cortright Metal Shingle Advocate is out for January and as usual it begins the new volume with a new and very attractive cover design. This little publication, issued by the Cortright Metal Roofing Company of Philadelphia, is devoted to roofing and roofing interest.

It is sent free to any of our subscribers who are interested in these subjects and will take the trouble to drop them a line. Better send a postal today.

THOSE CONTRACTOR-BUILDERS WHO HAVE GRIMM WOODWORKERS SAY THEY CANNOT AFFORD TO BE WITHOUT THEM

NEITHER CAN YOU

THE GRIMM WOODWORKER



ON THE JOB—CUTTING FRAMING

WHAT USERS SAY

RUSTON, LA.

GRIMM MFG. CO.,
Buffalo, N. Y.

Gentlemen:—We beg to state that we are pleased with the Grimm Woodworker beyond our expectations. The fact is we can get out any special work with this machine that goes in a building, and I can't understand, since getting this machine, how contractors can get along without one. We can set up this machine in the building and in nine cases out of ten we can get out material with it in the time it would take us to go and buy it from the lumber yard. Another thing about the Grimm Woodworker is that we can work up everything clean with it. The machine pays for itself in a job or two. It is absolutely indispensable to a contractor who is doing any work.

Yours truly,
[Signed] J. R. RANDOLPH.

We can send you a photographic reproduction of this letter and many others like it.

NINE MACHINES IN ONE

RIP SAW CROSS-CUT SAW
DADO HEAD JOINTER MOULDING KNIVES
SANDER EMERY WHEELS JIG SAW
BORING ATTACHMENT

GRIMM WOODWORKERS

are built in three sizes, furnished with all or any selection of attachments, with or without power, equipped with gasoline engines (our own make), 4 to 10 H. P., or with electric drive.

Our Booklet and Selling Plans Sent on Request

GRIMM MANUFACTURING COMPANY, 42 Erie St., Buffalo, N.Y.

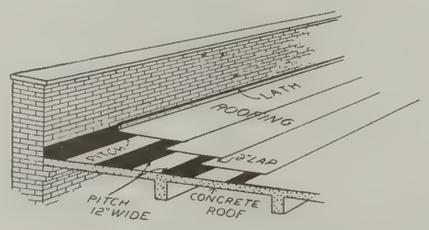
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BURMITE ROOFING AND SIDING APPLIED TO CONCRETE.

We take pleasure in bringing to the attention of our readers a valuable use to which "Burmite" roofing and siding is being successfully put. Since bungalows, factories, warehouses, residences, etc., constructed of concrete, are proving so popular, the next important step quite generally agreed on by architects and contractors, is a suitable covering for the concrete roof, which, if left in its finished condition, is very susceptible to the weather and other agents of a deteriorating nature. It is claimed by the manufacturers, Bermingham & Seaman Company, 1212-1226 Tribune Building, Chicago, Ill., that "Burmite" will meet the most extreme weather conditions and is, therefore, not affected by summers' greatest heat or winters' most rigid cold. It can be applied in the winter as well as in the summer, without danger of buckling, expanding or contracting—a feature which cannot fail to be appreciated by the architect and builder. Among the other qualities claimed for the material are that it requires no painting, is odorless, is easily applied, requiring no expert to lay it, is inexpensive, always remains in a flexible state, and is strong and durable.



"Burmite," it is claimed, is the only material used as a roofing or siding, having a natural permanent color of either slate, red or green, making a very attractive appearance. The slate chips for one and the bird sand covering for the other are imbedded under great pressure through steel rollers in the asphalt. In the center of "Burmite" is imbedded an 8-oz. Calcutta burlap, to give added strength and carefully protected on the top as well as on the bottom by heavy layers of pure asphalt. It is referred to as the only material, except one, having a cement composition between the burlap and the cement base, the felt being thoroughly saturated with pure asphalt and the claim made that it will not dry out. Not only is the material adapted for flat or pitched roofs, but it can be laid over old shingles or tin. Galvanized nails and lap cement with instructions for laying the material are packed in the center of each roll for all package shipments.



APPLICATION OVER CONCRETE.

6

An idea of the appearance of a bungalow roofed with "Burmite" may be had from a glance at the above picture we show, also the application over concrete. For further information and ideas address Bermingham & Seaman Company, 1212-1226 Tribune Building, Chicago, Ill.

A WONDERFUL WOODWORKING MACHINE FOR CONTRACTORS' USE.

The introduction of the No. 20 Famous Universal Woodworker marks the beginning of a new era in the history of woodworking machinery, as it is safe to state that this machine will revolutionize the entire business. This statement will be better realized and appreciated when the fact is considered that the No. 20 Famous embodies the salient features of sixteen different woodworking machines. In other words contractors can install a complete machine shop by buying the one machine.

The autocratic planing mill, with its charges and vexatious delays will now cease to be the bugbear of the carpenters, builders or contractors' existence, as the wonderful adaptability of the Famous woodworker allows the contractor to do practically all his own millwork upon his own promises, in a fraction of the time, at a fraction of the cost, and without any of the inconveniences attending planing mill service.

The advantages of a universal woodworker—particularly the No. 20 Famous—over individual woodworking machines are apparent to everybody. In the first place is the first cost. It seems incredible that any contractor will buy sixteen machines when he can buy one which will do the work of sixteen. Another point to be considered is the saving in floor space; then there's the saving in power transmission equipment such as belting, shafting, pulleys, motors, etc. Last, but not least, is the saving in labor. But one machinist is required to operate the Famous—and he does not have to be an expert or require any previous experience. The simplicity of construction and absence of complicated parts is assurance against trouble, and makes it one of the most simple woodworking machines to operate. You are requested to write the manufacturers, the Sidney Tool Co., of Sidney, Ohio, for some interesting literature and full particulars.

IMPROVEMENTS IN BUILDING CONSTRUCTION

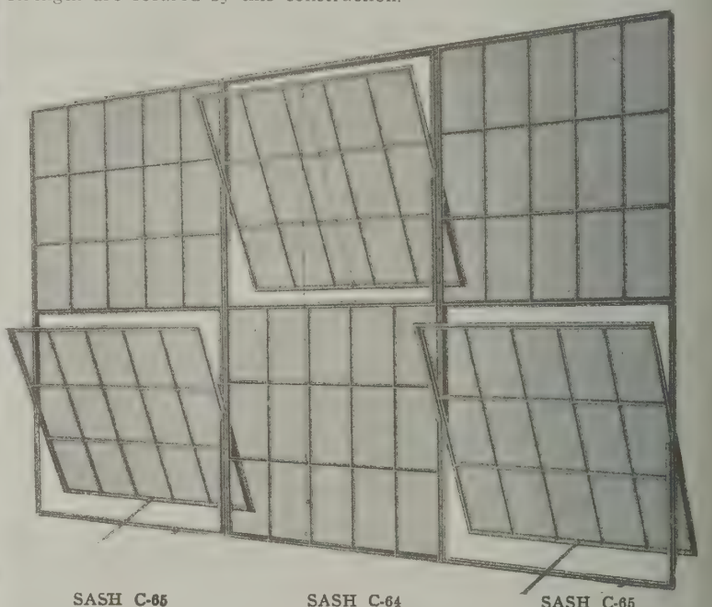
That public sentiment in the United States is awakening to the folly of the enormous fire losses that have been a heavy tax upon every community, is shown by the activity in the invention and development of fireproof materials.

In this movement for fire prevention the leading materials are steel and concrete, and their application to building construction has engaged the attention of some of the best inventive minds of the day, while capital and business ability, without which the best inventions are fruitless, have been secured in the manufacture and introduction of these improvements.

In the line of improvements in building construction no concern has forged to the front more rapidly nor more successfully than the Trussed Concrete Steel Company of Detroit, manufacturers of the Kahn system of reinforced concrete, and of other products destined to be as favorably well known.

One of the more recent improvements in building construction introduced by the Trussed Concrete Steel Company is their United Steel Sash, a fire retarding product of the greatest strength and rigidity; its transverse strength is so great that twenty-one men have been unpheld by a sash frame of sixteen feet span, while eight men have been balanced upon a single open ventilator in a sash frame.

The illustration shows the application of the United Steel Sash to a bay. It is evident at a glance that the maximum of light, ventilation and strength are secured by this construction.



SASH C-65 SASH C-64 SASH C-65

One of the many typical bays of United Steel Sash made up of three standard units, combined by Standard Mullions.

The United Steel Sash gives the greatest possible resistance to wind pressure and suction; the joints are made weatherproof by the force of powerful pressing; the glass is held firmly by special spring steel clips, easily applied. United Steel Sash are made in standard units combined by mullions to fit openings of any width or height. The units are made in many standard types, such as unventilated sash, sash with ventilators at top or bottom, extending the full width of unit, and sash for monitor and sawtooth roofs. Special sash are made to suit all needs.

The Trussed Concrete Steel Company has just issued a new catalogue of their United Steel Sash which is very comprehensive and will be found useful by all architects, engineers, builders and contractors who will be interested in investigating this invention. It has been used successfully and with the utmost satisfaction in the many important buildings shown by the illustrations in the catalogue. A copy of this catalogue should be in the hands of every progressive builder, and will be sent on request with information of the other novel products of the Trussed Concrete Steel Company. Don't forget to paste THE NATIONAL BUILDER dome on requests for catalogues. "It will help."

THE STAR EXPANSION BOLT CO.

The principal plant of the Star Expansion Bolt Company, located at Bayonne, New Jersey, was almost entirely destroyed by fire early Friday morning, January 20th, the loss to buildings and machinery being almost complete. The stock of manufactured merchandise, however, was but slightly damaged, and they report that they were enabled to resume deliveries without interruption Monday, January 23rd.

The general and executive offices of the concern are located at 147-149 Cedar street, New York, with branch offices and warehouses in Chicago, San Francisco, New Orleans, Montreal, Toronto, Winnipeg.

DOORS

Windows and All Staple MILLWORK

Direct From Gordon-Van Tine Co.

50% Below Dealers' Prices

And Our Building Material Catalog—Sent FREE—

PROVES IT!



We now occupy our great new five-story concrete warehouse, **seven times larger** than the one destroyed by fire. It is filled from roof to basement with Doors, Windows, Mouldings, Flooring, Inside and Outside Finish, Roofing, Lumber.

We will supply carpenters and contractors with everything in building material at actual **wholesale prices.** This saves you an average of 50 per cent on a complete house bill.

Do you realize that right here in Davenport is the Largest Independent Building Material Plant in America?

Millwork and Lumber for Finest Modern Homes

Carpenters and Contractors in every state in the Union send their orders to us **by mail.** You owe it to yourself to investigate the big values we offer—to see the high quality of the goods. **We will save you big money and give your orders special attention.** Orders for complete house bills can be shipped within 48 hours.

We have no expensive force of traveling salesmen We do not have one price for **dealers** and one price for **Carpenters** and **Contractors.** Everybody gets the **wholesale price** and a Guarantee of Satisfaction backed by Three Big Banks.

Ask for Grand Catalog of Building Material

The variety and extent of our stock is unequaled in all America. Wholesale prices in any quantity, large or small. In justice to yourself, **INVESTIGATE.**

The latchstring is always out to Carpenters and Contractors who are able to visit our plant.

Our Price

On This Strong, Well Made, 2 ft. 6 in. x 6 ft. 6 in., 1 3/8, Y. P. Door.

Quality Guaranteed

(Your Dealer Asks Double)

$1.38

GORDON-VAN TINE CO.

560 Federal Street (108) **Davenport, Iowa**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

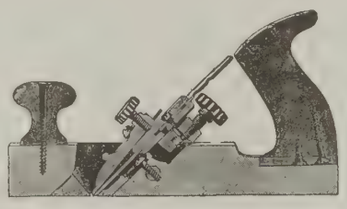
$1.00 ON A PLANE FOR A DOME.



The Gage Tool Co., Vineland, N. J., are offering to give our readers $1.00 credit on any purchase of their planes, where one of the little NATIONAL BUILDER domes is sent in with the order. These domes are a sort of NATIONAL BUILDER trade mark and are to be found at the bottom of every advertising page. The offer made by the Gage Tool Co. in their advertisement in this number is the first of its kind and makes a real bargain. The buyer of a Gage self-setting plane, by simply sending in a little dome, secures a $1.00 reduction by so doing. The Gage Tool Co. are doing this in order to introduce their well-known planes in new localities and the domes will also tell them which paper the buyer saw the ad. in.

The following description is taken from a circular sent us by the Gage Tool Co.

"The Self-Setting Plane is not like any other plane, having many superior points. It is simple, easier, better. It don't require the "know how" to set it, as other planes do, but can be used by the inexperienced and beginner. It should be in every manual training school, mechanics kit, on every farm, in every home, because all can easily set it and set it right. It is self-setting in every respect; and can be perfectly set for the finest work wthout trouble. Dropping the plane bit and cap into their place sets it exactly right and does it instantly. When properly adjusted, it's hard to set wrong. The cap and cutter may be removed, replaced and accurately set in five seconds, by actual trial; this alone would save every carpenter many days a year spent in trying to set other planes, and saves the beginner the time to learn how to set them. The adjustment is such that the cutting iron may be set square with the face of the plane, even if the cutting-iron is not ground square with itself. The mouth is prevented from wear by being within the adjustable iron throat or bit-holder which extends through the plane and holds the self-setting device.



"The cap is not attached to the cutter, but remains stationary while the cutter is moved up or down. Even while at work, the thickness of a shaving can be changed by a simple movement of the thumb and finger, without breaking the shaving or stopping the plane. A shaving a foot long can be taken with a dozen changes in thickness, all done without removing the plane from the board and without breaking the shaving. This variation of thickness may be made less than one-thousandth or more than one-hundredth of an inch in one second.

"So accurate is the self-setting device that one can take six or more shavings, removing and resetting the cap and cutting-iron after taking each shaving, and the extreme variation of thickness of the six shavings will be less than four-one-thousandth (.4000) of an inch. Can you do this with any other plane?

"This Self-Setting Plane can be changed from a double to a single iron, or from a single to a double iron plane in two seconds. It is adapted to the coarest or the finest work, and will smooth cross-grained, eaty, hard or soft wood, against the grain, working perfectly on both hard and soft wood. Every plane is tested, and ready for use before leaving the factory. This saves the time and trouble spent in fixing so many new planes. If you want to save muscle, time, temper, and do better work, try the Self-Setting Plane.

"Old-fashioned wood-planes can be changed to Self-Setting Planes by any mechanic who has our attachments. Such planes having been seasoned for years, make the best tools.

"We send beech-wood self-setting planes, or attachments for remodeling old planes, on trial where not sold by dealers, on receipt of list price. If, after a thorough test on your own bench, you do not want it, or if for any reason you prefer your money, to the plane, return it at our expense, as sent, within thirty days' of receipt, and we will refund the entire amount sent us. And the trial costs you nothing."

DIEHL NOVELTY 1911 SPECIALTIES.

Hinge No. 20 is the hardware specialty that the Diehl Novelty Co., Sheboygan, Wisconsin, are advertising in this number. Like all the other Diehl specialties, this is a well made, easily working hinge. The storm sash hangers No. 1, screen door catch No. 51, basement window hinge, etc., manufactured by this company are all well known, and being carried with the rest of the line by many hardware dealers, can easily be had when asked for. And it is worth asking for the hanger, catch or hinge that you know is right both as to quality and price. If the dealer cannot find these hardware specialties on his shelves, he will be glad to set them for the carpenter or contractor who will tell him about them.

The Diehl Novelty Co. have just added several new things, which it is claimed will make their line a most complete one, and from which the builders can get nearly everything needed in hardware specialties. We are not at liberty now to mention what these new things are, for it is the wish of the company to first have plenty in stock before beginning to advertise them. However, a new catalogue is being printed and will be ready for distribution about March 1st. It always pays to be on the mailing lists of the different building material manufacturers and the Diehl Novelty Co. of Sheboygan, Wis., should be no exception. They will put you on their mailing list upon request.

THE KEYNOTE OF SUCCESS.

A Few Side-Lights on Level-Making, by "The Man from Akron."

A carpenter, mason, concrete worker, or any other craftsman who would attain high rank in his chosen profession must be accurate in every detail of his work.

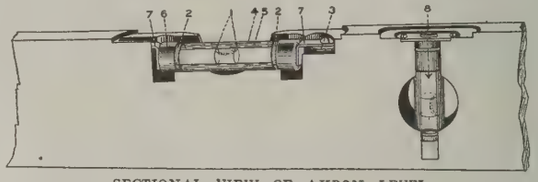
Absolute accuracy is particularly essential where "plumb" or "level" is concerned. In no other details of building construction are losses of time and money so likely to occur as where careless work is permitted in the "plumbing" of a wall or the "levelling" of a beam.

If the work is to be accurate, good tools must be used. No matter how painstaking the mechanic may be, if his level or plumb is inaccurate, all his efforts are in vain.

There is an old saying that a man is judged by the tools he uses. If this is true, then the man who uses an Akron Eclipse Spirit Level is surely entitled to be considered a first-class workman. These levels have attained world-wide renown for accuracy.

Not only is the Akron Level a marvel of accuracy, but it has many other points of superiority. A glance at the diagram below will show why Akron Levels should be the first choice of every good workman.

The attainment of this remarkable accuracy is due to the employment of workmen who are careful and painstaking in their work. The level maker, to a certain extent, is responsible for the good or bad work of his brother craftsman who uses the level he has produced in building a house or any other kind of constructive work.



SECTIONAL VIEW OF AKRON LEVEL.

1.—"Quicker finder." Two fine silver lines running around spirit tube. The exact width of air bubble is marked by these two lines.
2.—Rubber bearings between spirit tube and outer tube.
3.—Special device for adjusting spirit tube.
4.—Outer tube of heavy steam-gauge tubing.
5.—Spirit tube of clear-as-crystal glass.
6.—Brass caps in which spirit tube is set. Elastic bearings between the two tubes and between outer tube and brass cap insures against breaking.
7.—Suspending arms. Spirit tubes in Akron Levels are suspended in the stock instead of being set as in ordinary level construction.
8.—Plumb.

The "quick finder" is an exclusive feature of Akron Levels. This is obtained by running two fine silver lines around the spirit tube, exactly in the center, so that the workman can tell exact level instantly. Nothing is left to guesswork in the reading of an Akron Level. A man does not need to depend upon his eye to know whether the spirit bubble rests exactly in the center or not. The silver lines relieve him of this responsibility. The "quick finder" is a great help on a cloudy day or when working in a dark corner, particularly for the man whose eye-sight is not as good as it might be.

Another feature that should commend Akron Levels to every careful workman is the superior construction. For instance, the spirit tube is not an ordinary thin glass tube, mounted in an ordinary way, but is made of heavy clear-as-crystal glass and is mounted in an outer tubing of heavy steam-gauge glass. The spirit tube is carried on rubber bearings, so that absolute accuracy is assured at all times, while the double tubing prevents all danger of breaking from the falls and jars incident to daily use.

Akron Levels are made in thirty-three styles and sizes to meet the needs of every workman. Some are made with a plumb in either end in addition to the regular level in center, so that the stock can be applied either end up. The materials used in Akron Levels are the finest money can buy, and the workmanship and finish are above criticism in every detail.

More of the improvements in spirit levels are due to the Akron Level than any other source. The makers of Akron Levels have always led in the effort to produce a more durable and accurate level and a careful study of the situation shows that where other manufacturers have improved their product, it is undoubtedly the result of studying the many improvements in the Akron Level.

Akron Levels are made by The Baker, McMillen Company of Akron, Ohio, who will be glad to mail their interesting catalogue to anyone upon request.

TEST THE AUTOMATIC SASH HOLDER.

The expense of putting in sash weight, the annoyance of breaking cords and ribbons and the cost of repairs may be avoided by the use of the automatic sash holder made by the Automatic Sash Holder Co., 279 Broadway, New York City. The manufacturers claim that the automatic holder is better, cheaper, more convenient, less troublesome, and more reliable, durable and satisfactory than weights. They are the modern remedy for cumbrous sash weights, kinking cords, useless pockets, poor pulleys and balking balances. The automatic saves much time, labor and expense. They prevent rattling and permit the window to be moved both ways easily. They are meeting with much success among architects, contractors and builders, carpenters, sash and planing mills. The automatic sash holder is perfectly adapted for use in new as well as old buildings. For a short time the company will send a sample on request. Could anything be fairer? Better send today.

Simonds Saws

(Si-monds)

Did you ever try the grip and balance of a Simonds Saw?

It makes you feel that you want to use it right away.

The careful process of tempering the special high grade Simonds made crucible steel, the grinding, the shaping, the finishing, does not cover all the painstaking care bestowed in making Simonds Saws.

It's the Simonds way to slight nothing, and in proportion the handles have just as much discriminating care bestowed upon them as the blades—all goes to make a perfect saw. THE SIMONDS SAW.

Your dealer sells you satisfaction when you buy a Simonds Saw—none better, and it is sold the world over. Buy it.



Every carpenter should be sure to write for a free copy of "Guide for Carpenters"

Simonds Mfg. Company
Fitchburg, Mass.

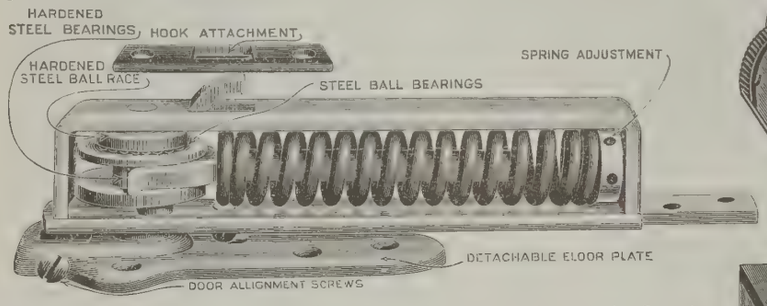
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Portland, Ore,
Vancouver, B. C.
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Montreal, Que.
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$10.00 FOR 100 WORDS.

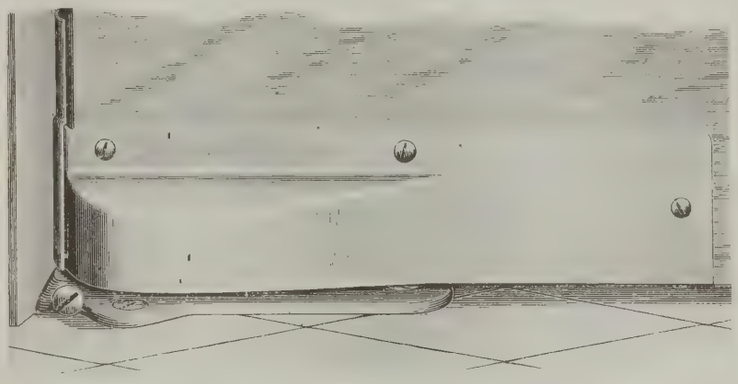
The Standard Manufacturing Company, Shelby, Ohio, offered in the January issue of THE NATIONAL BUILDER $10 for a 100 word article descriptive of their Standard Spring Floor Hinge. This offer was made to carpenters and builders and the idea being to get the man who placed the hinges on the doors to tell why he always bought them in preference to others. The article did not have to contain exactly one hundred words. If it only had seventy-five words or even less and gave the best reasons why Standard Spring Floor Hinges were best, the $10 prize would be given for that article, but a limit was placed on 100 words.



The Standard Manufacturing Company claim that their Standard Spring Floor Hinge controls the door perfectly and allowing it to swing in both directions, smoothly and without noise; that Standard Hinges are positive in action; are adjustable to doors of various weights, holds doors open in either direction and are easily and quickly put on.

Standard Hinges are of all-steel construction. The case-hardened ball-bearings and wearing surfaces not only take care of the weight of the door, but the spring thrust, too. Notice is called to the alignment feature in the door plate. This allows a door to be adjusted to its proper position without changing the position of a single screw. The floor plate is flexible on the hinge post to accommodate itself to uneven floors. Perfect silence in operation is accomplished by means of a short flexible plunger which is not rigidly fixed in the hinge frame, but takes the same side movements as the coil spring.

A hook attachment obviates the necessity of making a finished mortise up the rear edge of the door when attaching the hinge to the door. This feature also allows the weight of the door to increase the strength of the fastening. The finish plates are applied to the surface of the door with wood screws, after the hinge is on. This method covers any defects in cutting the wood in applying.



The two illustrations shown here are so plain that any carpenter or builder can see the many good features claimed for the Standard Hinges, but, of course, the company's circulars will give much fuller particulars and besides that $10 offer for a 100 word article is worth trying for. Ten cents a word is mighty good pay, and besides, the article is not expected to be any brilliant piece of literature. Just plain every-day words, telling why you prefer Standard Hinges to others is all the manufacturers want. The one giving what they consider are the best reasons why Standard Hinges are the best will bring down the $10. All articles must be in by March 15.

ESTIMATING AND PLAN READING TAUGHT.

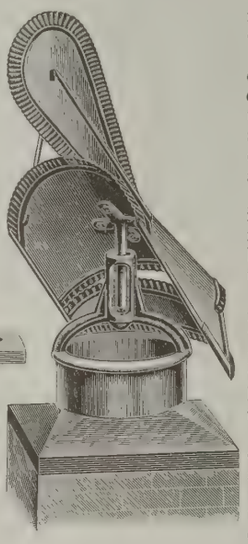
Realizing the fact that now-a-days a builder-carpenter, bricklayer or foreman must have a good knowledge of drawings and draughting, the St. Lous School of Draughting, 554 Century Bldg., St. Louis, Mo., designed a special builders' course, enabling a working man to spend the dull winter or early spring months profitably in learning how to read blue prints, to lay out all kinds of buildings from blue prints, to prepare plans, specifications and estimates, and special attention being also given to building and general business laws.

February, March and April are often cold, stormy months, and there is, therefore, time left to take this course of special and individual instructions at the St. Louis School of Draughting. On entering this school the student is immediately placed at practical work in the draughting room and at the same time he is given enough theory of design to enable him to master his profession. There is no red tape or unnecessary rules and regulations for the student to remember. He is not expected to recite before a room full of other students—for each student is working out his particular course—and each receives individual attention from the instructor.

IWAN VOLCANO REVOLVING CHIMNEY TOP.

A poor drawing chimney, or shall I say a thoughtless builder, is responsible for many inconveniences in the house.

A low chimney placed near a building considerably higher than the chimney itself, or the opening of the chimney being larger than the flue, will cause the chimney in either case to do its worst.



In the first instance the wind descending over the wall of the high building will blow directly into the low chimney. In the second, the first foggy, drizzly day with the heavy atmosphere will act like a blanket over the chimney, and the smoke instead of going out at the opening will back into the house.

These are very unsatisfactory and annoying conditions to the owner and tenant; they reflect on the builder of the house and should be studied carefully and provided against in the early stages.

Some chimneys which in good weather do fairly satisfactory work, will in cold, wet weather with a depressing atmosphere be practically useless, and the failure to heat the house properly gives the occupants ill-health through colds and insufficient ventilation.

These conditions are common and too frequent in houses where the occupants, cannot afford expensive and costly devices to make the building comfortable, and for such as these, and in fact for all houses thus poorly equipped, the Iwan Volcano Revolving Chimney Top is a cheap and effective remedy. It has already cured these identical deficiencies in thousands of chimneys.

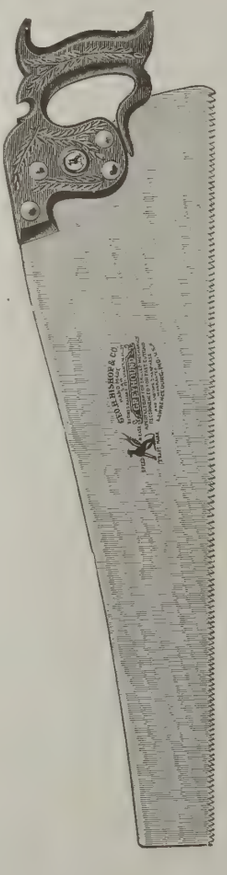
In most cases it is advisable to have the tinner construct a galvanized sheet iron base or stack from 3 to 5 feet high to fit the chimney, the upper part being made round to permit of the Volcano Chimney Mounting to be attached. The mountings are made in 6, 7, 8, 9, 10 and 12-inch sizes, and the opening in the stack should be made to correspond with the chimney opening and the size of the chimney top mounting.

The vane keeps the top always with its back to the wind; the wind blowing through the upward sloping opening in the back of the hood creates a partial vacuum at the chimney opening consequenly making a continual upward draft. The sloping opening also serves to blow the ascending smoke away from the chimney opening. Rain or snow are also excluded by the hood.

While the stack and hood if made of galvanized iron will last a few years, it is better if they are made of copper, as they will then last much, longer. Iwan Bros., makers, South Bend, Ind.

GREYHOUND SAW PRIZES.

The Hardware Show—to be held at the Coliseum, Chicago—February 28th to March 4th inclusive should be attended by every carpenter and contractor who wants to see many of the latest tools and builders' hardware specialties.



Geo. H. Bishop & Co., manufacturers of the Greyhound Hand Made Hand Saws, of Lawrenceburg, Indiana, with a branch office at 134 E. Lake street, Chicago, are anxious that all the Chicago readers of the NATIONAL BUILDER see their exhibit of saws, saw clamps, and other specialties. They will furnish 50-cent tickets of admission for 10 cents to our readers who will write, or call at their Chicago branch, 134 E. Lake street, Chicago. This means quite a saving. Besides, by asking your hardware dealer for a card which Geo. H. Bishop & Co. are distributing through their Chicago hardware dealers, you may walk away with a $5.00 set of Greyhound Hand Made Saws. Over five hundred prizes will be distributed among the carpenters and builders who will remember to ask their dealers for the cards Geo. H. Bishop & Co. are handing out through their Chicago hardware dealers.

Besides being able to inspect the entire line of Greyhound Hand Made Hand Saws; see demonstrations made of the new saw clamp No. 750 and stand a good chance at a prize, every carpenter and builder who attends will enjoy the whole hardware show and be benefited by a closer knowledge gained about the different tools, etc., through personal acquaintance with the manufacturers.

So don't overlook getting one of the 50-cent admission tickets for 10 cents, which Geo. H. Bishop & Co. so kindly offer to our readers, not only in Chicago but to any outside builders who may be in Chicago at the time.

ANY of OUR READERS

WISHING TO ATTEND THE

Hardware Show

COLISEUM, CHICAGO

February 28 to March 4, inclusive

Can Get a 50 Cent Ticket of Admission for 10 CENTS

by calling at the CHICAGO OFFICE of

GEO. H. BISHOP & CO.

134 E. Lake Street

Geo. H. Bishop & Co. will distribute over 500 prizes among the visiting tool users who secure proper tickets of their hardware dealers or at the above address.

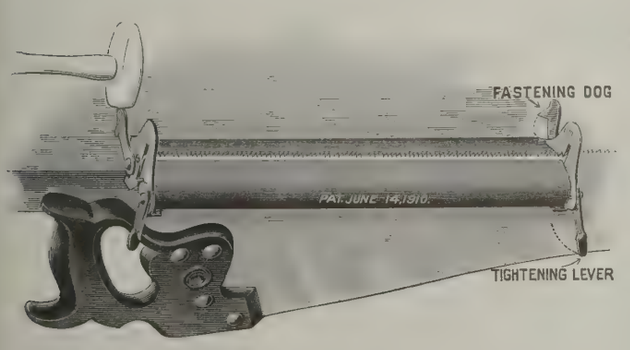
Prizes will run from a $5.00 set of Bishop Saws, $3.00 Greyhound Saws, through Bishop & Co. specialties.

EVERY SAW CLAMP USER

Should see our No. 750 Clamp

Weighs 20 ounces. Two blows of a hammer fasten it securely on any wooden support.

Gives an absolutely straight edge and firm grip.



GEO. H. BISHOP & CO.

BRANCH OFFICE, 134 E. LAKE STREET, CHICAGO

LAWRENCEBURG, INDIANA

There's a Reason Why

Architects, Engineers,
Contractors, Builders, Roofing Experts and
Owners are Specifying, Recommending and Using

Ready-To-Lay

Burmite

(REG. U. S. PAT. OFFICE)

FLEXIBLE-CEMENT-BURLAP INSERTED MATERIAL

For ROOFING and SIDING



Garages, Bungalows, Summer Homes, Residences, Business and Factory Buildings, Barns, Outbuildings, Churches, Plants, Depots, Etc.,

IT IS BECAUSE *Burmite* HAS BEEN FOUND

The BEST *by* TEST

ARTISTIC and ATTRACTIVE in Appearance—DURABLE and ECONOMICAL, with Superior Fire-Retardative and Storm-Resisting Qualities to meet Extreme Weather Conditions—Sparks, Hail, Sleet, Sliding Ice, Rain, Snow, or the Extremes of COLD and HEAT do not affect the superior Upper Coating of "Burmite," which is made with two Separate and Distinct Surfaces, i. e.,

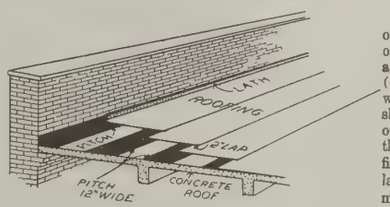
BIRD-SAND and "*Twolayr*" SLATE-CHIPS

(PATENT PENDING)

For the "*Twolayr*" Slate-Surfaced Material, Colored Slate of Unfading Quality is used, the fine slab-shaped Slate Chips being imbedded into the pure Asphaltum Composition so thoroughly—and put there to stay—that a smooth, even, upper Mineral Surface (there being two layers of Slate Chips) is the result, thus securing the well-known IMPERVIOUSNESS AND WEATHER-RESISTING QUALITIES OF SLATE AT ONE-FOURTH THE COST.

The RESISTING QUALITIES of our Slate-Surfaced Material are such that it is especially recommended for, and is being largely used as a Roofing on PULP MILLS, CHEMICAL WORKS, ACID and FERTILIZER PLANTS, and other buildings used for like purposes, where the roofs are affected by Acids, Gases or Fumes.

APPLICATION OVER CONCRETE.



There are several methods of applying our material over concrete surfaces. The one in general use (see illustration) is to first apply a mixture of tar and pitch at the joints (consistency of same depending upon the weather) 12 in. wide and the length of the sheet. Place the material over these bands of pitch, lapping sheets 2 in. and cementing the joints with lap cement. Press down firmly so that the material will stick and lay smoothly. No nails are used when the material is applied over Concrete.

2 Permanent Natural Slate Colors—SLATE-RED and "Stoddard" SLATE-GREEN

UNIFORM SOLID SLATE Surface. Requires no Painting. Kept Clean and Bright by the Rain.

GUARANTEED FOR 10 YEARS WITHOUT COATING.

THE FIRST COST—THE ONLY EXPENSE. Sold on its Merits and Lasting Qualities.

As a rule, other grades must be coated at least three times in from seven to ten years; and if the cost of paint and labor is added to the original cost of Material and applying it will be at once apparent that "Burmite" is not only the most LASTING, and INEXPENSIVE, but more PRACTICAL THAN OTHERS.

To make yourself acquainted with this up-to-date Material for Roofing and Siding Buildings of Concrete, Brick, Stone, Wood, or other construction, WRITE TODAY for our SAMPLES and BOOKLET,

"BURMITE QUALITY COUNTS"

Illustrated with buildings, beautifully printed in colors, showing effect of BURMITE MATERIAL applied as a Roofing and Siding, mailed free of all charges and obligations.

Bermingham & Seaman Co., ROOFING MFRS.

GENERAL OFFICES, - - - - 1208-1226 Tribune Building,
PLANT, - - - - - - 56th, Armitage and Grand Avenues, **CHICAGO**

DISTRIBUTORS OF BEAVER BOARD.

PAINT for Structural Iron Work. ROOFING BRUSHES.

CHICAGO BUFFALO CINCINNATI DETROIT, MICH. GREEN BAY, WIS.
GRAND RAPIDS, MICH. PITTSBURG, PA. ST. PAUL, MINN.

CUT AND USE THIS COUPON

Bermingham & Seaman Co., Tribune Building, Chicago.
Mail to my address, Samples and Booklet. This places me under no obligation.

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Address .....

Business ..... N. B. 2-11

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE DISSTON TRADE CONFERENCES.

An informal banquet was given early in January by Henry Disston & Sons to representatives of the big saw and tool-making concern, who went to Philadelhpia from all parts of the Union and from Canada to attend a series of trade conferences.

Besides the corps of salesmen, there was present at the banquet a large number of saw experts who spend their time in lumber camps and sawing centers to aid millmen in any and every way that their experience and knowledge enables them to render assistance.

All the executive departments of the great home organizations were also represented at the banquet.

It is the general sentiment of all Disston salesmen and representatives that the next twelve months will be the best selling year of their experience despite the fact that 1910 was a record breaker.

Business reports brought in from every section of the United States are optimistic, and men who are in the closest possible touch with actual conditions are confident of boom trade for the lines they represent.

One of the western salesmen said: "Mr. Toastmaster, I want to say that I am proud to be in the Disston employ. It is an honor to be associated with this management and to have the privilege of selling Disston goods. I have had no difficulty whatever in obtaining and maintaining our full share of the business in my section, and this by reason of the well known high quality and efficiency of the Disston goods. The future looks even brighter than the past. The treatment accorded us by the management makes us loyal to the core and we shall ever stand by the house of Disston and its goods. In saying this, I know I am echoing the sentiment of everybody here."

During the week all representatives have made careful study of the manufacturing processes and executive policies of the great plant in Tacony. Officers of the company have spared no effort to thoroughly acquaint their men with the principles, purposes and ideals of the great organization of which they are a part.

Mr. Robert J. Johnson, second vice president, acted as toastmaster at the banquet.

With Mr. Johnson at the head of the table were Mr. William Miller, secretary; Frank Gould, manager of shelf goods, and E. F. Cooper, manager of the mill goods department.

The toastmaster called upon some thirty of those present for responses to toasts appropriate and of interest to the occasion. These represented all sections of the country and evidenced the widespread demand for the Disston saws and tools.

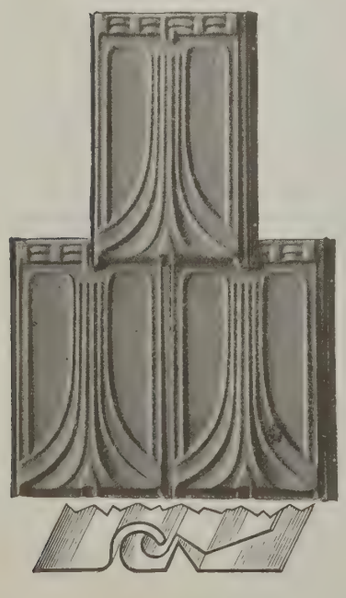
CIRCLE SWING DERRICKS.

Sasgen Bros., 2053-57 Racine avenue, Chicago, Ill., are mailing circulars descriptive of their Circle Swing, "Pole A," frame and setter derricks. These derricks are designed to lift loads with the least exertion—do it quickly and with perfect safety to the workman on the building, the men below and the material being hoisted. Every derrick that leaves Sasgen Bros.' factory is carefully made of high class materials, and the fact that Sasgen derricks are now found in use wherever there is building going on, speaks decisively for the satisfaction they are giving.

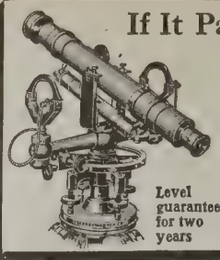
It's a good plan for the contractor to order his equipment before he really needs it. Very often building operations start in much earlier than expected and the contractor finds himself trying to keep up with his work with the same old knotted ropes and creaky pulleys, even after he had sworn never to go through another year without a good outfit. Sasgen Derricks make the job of hoisting so much easier and handier for the men that they work faster, and being in better humor, things go along smoothly and with a rush that saves time and money for the contractor.

The Circle Swing Derrick which Sasgen Bros. have been advertising for $36.00, all complete ready for use, is said to be an unusually good one and a derrick which is not only very reasonable in price, but unusually well made. The Sasgen Pole "A" Frame and Setter Derricks are described fully in circulars issued by Sasgen Bros. and these circulars can be had for the asking.

EDWARD'S "AJAX" METAL SHINGLES.



In the January number of the NATIONAL BUILDER mention was made of the Ajax Interlocking Shingles, the new product of the Edwards Manufacturing Company, 430-450 Eggleston avenue, Cincinnati, O. Unfortunately, the cut was printed upside down, which tended to give a wrong impression of these handsome interlocking shingles. Examination of the accompanying cut will show how the shingles look and how they interlock. The lock provides automatically for expansion and contraction, securing tight joints which rain and snow cannot penetrate. To be sure that you get these improved shingles, specify Edwards "Ajax" Loose Lock Shingles and insist on having them. Remember to mention the NATIONAL BUILDER.



If It Pays Over 1,000 Contractors to Use Convertible Builders' Levels

it will pay you to investigate why the "STERLING" is the strongest and most accurate Convertible Level made, and how its use will save you its cost in one season's work. Send for Catalogue, Manual and special offer for this month.

Level guaranteed for two years

PRICE Complete, $60.00

ISZARD-WARREN CO., Inc.,

136 No. 12th St., Sole Makers Philadelphia, Pa.

ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requir ments, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS



and Dumb Waiters, Automatic Hatch Gates

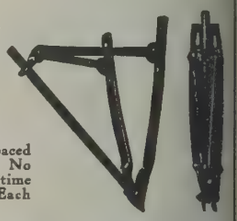
SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa

1000 Pounds Easily Carried on

THE ASHLAND Folding Scaffold

Put up with Four 10d. Nails.



Strongest and Best Bracket made. Instantly adjustable to any spaced studding or pitch of roof. Can be used on any kind of siding. No pins or bolts used in adjusting. No boring holes in siding. Saves time and money on every job. Special Discount for First Order in Each Locality. Write for Circular N and Prices.

Ashland Folding Scaffold Co., : 17 Washington Street ASHLAND, : OHIO

"Diamond N" Expansion Shields



Have increased holding power on account of the corrugated ribbed exterior surface.

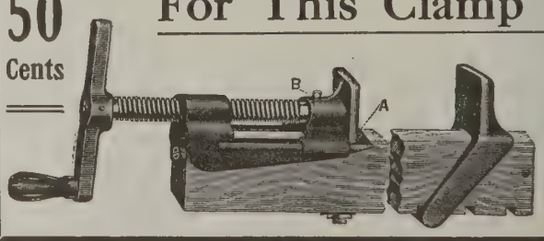
Securely clamped together without the use of springs or wires.

A better shield at the same price.

DIAMOND EXPANSION BOLT COMPANY

90 West Street, corner Cedar, - - - NEW YORK

50 Cents For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO.

321 N. May St., CHICAGO

SPEND THE WINTER WORKING

Come to our Resident School and be prepared for next Summer.

COURSES IN

Architectural and Mechanical Draughting

Special Courses for Builders in preparing Plans, Specifications, Estimates, Etc.

554 Century Bldg.

SAINT LOUIS SCHOOL of DRAUGHTING

It actually costs less to lay a Slate Roof and to **keep it in perfect condition** during the whole life of any building—than to get similar results with any other roofing material.

Sea Green and Purple Slate

is the toughest and best roofing slate ever quarried. It is easy to handle—easy to lay—outlasts any building. Its first cost is the only cost—there are no paint bills—no repair bills. It is fire-proof—lightning proof.

Let us give you the **proofs**—tell you why it will pay you—how it will please your trade—and send you our book "Roofs" giving interesting facts on comparative roofing costs and values. All free for the asking.

American Sea Green Slate Co.
150 Clark Street, - GRANVILLE, N. Y.

THE BEST SHINGLES ARE OF WASHINGTON RED CEDAR

Building real homes—homey, attractive homes—is an art; a work for skilled men. It is the architect, the contractor, the builder, the carpenter—all of their efforts combined—that really build the home; but without the tools and the right material they can do nothing.

And how true it is that the roof is one of the most important parts of any home.

A well laid roof of Red Cedar Shingles can be safely guaranteed for twenty years, and many such roofs have stood the test for much longer.

"BUCKEYE BRAND" RED CEDAR SHINGLES

Awarded the only Double Grand Prize given shingles at the Alaska-Yukon-Pacific Exposition, Seattle, 1909, are made from Washington Red Cedar.

They are the best of the best.

Ask your retail dealer for them.

R. J. MENZ LUMBER COMPANY
SEATTLE, WASHINGTON, U. S. A.

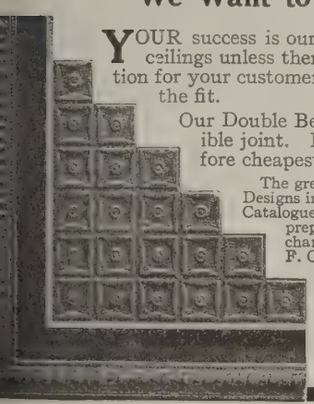
Pacific Coast Lumber and Timber Lands

Menz Timber Gold Bonds
Profit Sharing, Interest Bearing, Deed Protected

Buckeye Brand Red Cedar Shingles

Your Success is Our Necessity

We Want to Show You Why



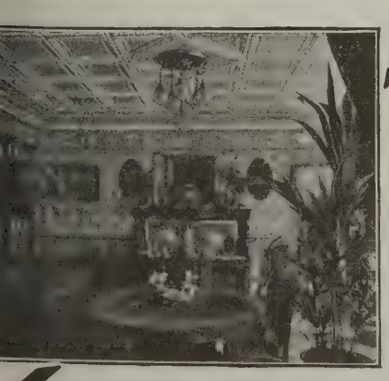
YOUR success is our necessity, because you will not buy our ceilings unless there is profit in them for you and satisfaction for your customers. Most of your success depends upon the fit.

Our Double Bead Lap produces a dust proof and invisible joint. It is simplicity itself. Easy to fit, therefore cheapest to erect.

The great variety of our Art Metal Ceiling and Sidewall Designs insure the customer's preference when shown our Catalogue. Send us plans with measurements and we will prepare drawings of appropriate ceilings, without charge, and name you low price on all material, F. O. B. your station.

Get our catalogue B and agency proposition

The TIFFIN ART METAL CO.
Tiffin, Ohio



The Home Beautiful

can also be made the home durable by erecting

"BERGER'S Classik" METAL CEILINGS

which have been developed by twenty years of constant manufacturing by The Berger Mfg. Co., the largest sheet metal works in the world.

Get one of our handsome illustrated catalogues and show your customers what artistic, durable, sanitary, fire-proof steel ceilings you can furnish.

New York
Boston
Philadelphia
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There's profit in it. Write today.

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Chicago
San Francisco
Atlanta
Minneapolis



CORTRIGHT METAL SHINGLES SELLING TALK No 10

NO RAIN OR SNOW CAN GET UP UNDER HERE

See where I'm pointing?

It's absolutely impossible for any snow or rain to beat in under either the tops or sides of

CORTRIGHT METAL SHINGLES

It is equally impossible to lay two shingles with flat surfaces like wood, slate, etc., one on top of the other without leaving space enough for both rain and snow to penetrate.

For instance, wood shingles, in 9 cases out of 10, split right down the center first, and that is just where the joint of the two overlapping shingles comes.

What's the answer? An immediate leak of course.

Now just stop and consider that Cortright Metal Shingles are joined on the sides by an absolutely waterproof side-lock and protected at the top and bottom by an overlap equally impenetrable.

By this means you see we get just as tight a roof as though it was covered with one solid sheet of tin.

Now if Cortright Metal Shingles are going to make you money now's the time you want to find it out.

If they will make you money you're losing every day you delay investigation of them.

Why don't you find out? We print two good sized books just to help you and the only reason we haven't sent them to you is—you haven't sent us your name.

That's why we've attached the coupon. Sign it right now

¶ This is one of a series of Selling Talks published to help you make more profit through Cortright Metal Shingles. Next month's talk will tell why Cortrights are fireproof.

Cortright Metal Roofing Co.
Philadelphia and Chicago

COUPON

Gentlemen: Send me the two free books, adv. Nat. Bldr. Feb.

Name.....
Street Address.....
City.....
Business.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NEVER LEAK METAL SHINGLES.

The Tiffin Art Metal Company, Tiffin, O., claim to produce the most perfect metal shingle on the market. This is a broad statement which the manufacturers say is but the opinion daily reaching them from builders and contractors of long experience and critical viewpoint. The reports come from many states and refer to all classes of buildings. The shingles are of galvanized iron, I. C. & I. roofing tin and are so carefully made in one of the newest and best plants that their appearance is surely attractive. The clear advantages of metal shingles needs no explanation. The chief question which always interests the builder and contractor, whose reputation for "knowing how" and using only dependable building materials, is where he can be sure of getting goods of highest quality, promptly shipped and at a minimum price.



This company has gotten down the cost of production to a fine point. The plant, while extensive, carries but light overhead expenses, and, as their ideas of a manufacturing profit are modest, their prices ought to be attractive to the prudent buyer. The Tiffin Art Metal Company are also makers of many splendid lines of metal ceilings, combining some special features of value to all contractors and builders. It is not strange that their products have met with the instant approval of the trade and it would doubtless pay the enterprising builder to correspond with them and get the exclusive contract of their goods in certain sections.

The buyers who have tested Tiffin products say that they are right in all respects, the makers admit that this is true, hence the NATIONAL BUILDER records the facts as brought in evidence.

BIG STEEL MILL FINISHED.

One of the Biggest Moves Ever Made by the Manufacturers of Simonds Saws.

A complete new steel mill for Simonds Saws has been built and is now in operation at Lockport, N. Y. The steel making part of the Simonds Manufacturing Company's Chicago factory was entirely too small to meet the constantly growing demands for Simonds Saw Steel.

The problem has to be met. It was a question of more steel; consequently plans were at once made for a new mill. Lockport, N. Y., was selected as the location. Work on construction began early last summer. The first steel was rolled Monday, January 2d.

At Lockport there is a separate rolling mill for band saw plates, cross-cut saw plates and circular saw plates. Ample room is also provided for plates for Simonds hand saws and steel specialties.

One general building is located adjacent to the ends of the rolling mills for the making of steel ingots.

A considerable proportion of the iron used is the famous Dannemora iron imported direct from Sweden, on which there is a high duty. Nothing that bears the name of "Simonds" has ever been made from anything but the very best of materials and in a crucible furnace.

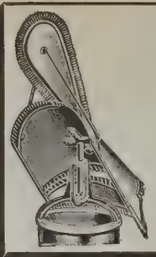
Uniformity is Simonds constant watchword. To make sure of this desired uniformity, careful chemical analysis is made on every heat turned out of the mill. The physical properties of the steel are also tested out. We know of no other steel mill in the United States that is so thorough as the Simonds Lockport mill in the testing of steel.

A modern gas producing plant is in operation next to the crucible furnace building and there is produced the great amount of gas used in the furnaces.

The machinery of the Lockport mill is thoroughly modern. All that is latest and most up-to-date in scientific crucible steel making is made use of here. New machinery and new methods enable them at once to double their former steel production. Direct from Niagara Falls to the Simonds steel mills, high voltage wires carry current sufficient for four thousand horse-power, and an electric plant of no mean size is required to house the transformers and necessary switch boards.

At the entrance to the grounds at Lockport, a substantial two-story brick building has been built to accommodate the office force and the laboratory. The laboratory has always been one of the chief points of interest around Simonds steel mills, as experts make careful tests of every lot of steel produced for saws that bear the name Simonds.

For passenger traffic an electric line has half-hour fast service direct to Buffalo. All trains stop at the Simonds station. The New York Central railroad has freight connections with the Simonds private switch track, which has four spurs, running right into the buildings of the steel mill, so that raw material may be unloaded and finished plates shipped with the least possible delay.



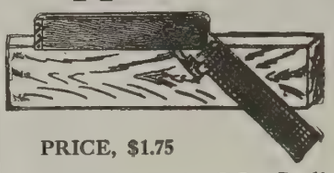
The Chimneys Most Frequently having no draft or a very poor draft are those situated on a low building next to a higher one.

The remedy and a very sure one, is a Volcano Revolving Chimney Top. We know it, as we have proved it, and thousands of others have proved it.

Sizes, 6 to 12 inches in diameter. Write for catalogue now.

IWAN BROTHERS, 1541 Prairie Ave., South Bend, Ind.

Topp's Framing Tool A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



PRICE, $1.75

Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS

It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.

G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.

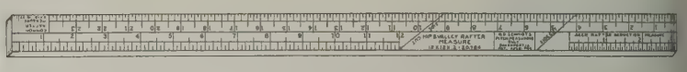
ARCHITECTURAL DRAWING MADE EASY

By I. P. HICKS 94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over

170 PAGES—CLOTH BOUND—PRICE $1.00

I. P. HICKS, Box 22, Station A Omaha, Neb.



SCHMIDT PITCH MEASURING RULES
For Framing Rafters

ROOF FRAMING is easy, accurate, and quicker with these rules, no figuring or setting. Use it like a common rule. The pitch on one foot run is divided into 12 inches of pitch measure for hip and common rafters. The rules are from 1 inch rise to a foot run and up, two different measurements on each. Roof framers should not be without them.

They are time savers. Price per rule $3.00 postpaid

Send for circular telling about the rules, and how to make roof framing easy

R. D. SCHMIDT, 738 West Fourteenth Street, Davenport, Iowa

ARCHER'S "QUICK ACTION DOVE-TAILER"



FOR WOOD TURNING LATHES

Only tool known making perfectly square shoulder and dove-tail true to size and taper on balusters. Can dove-tail 1000 balusters per day of 10 hours.

Price, $15.00 F. O. B. Richmond, Va.

DAVIS & ARCHER, 2515 Hanover St., Richmond, Va.

CARPENTERS' Ready Reference For Roof Framing

is a copyrighted book that gives lengths of common, hip valley and jack rafters, and the figures to use on square for all cuts for following pitches:

1 1 1 3 5 3 / 4 3 2 8 8 4 Also octagon rafters for same pitches and a scale for polygon miters up to ten sides. Can be carried in vest pocket. A handy and time-saving book for anyone to have. Sent postpaid, for 25c.

E. OEHRLE, 2567 Dodge St., Omaha, Neb.

PHŒNIX INSIDE SLIDING BLINDS

COMFORT CONVENIENCE ECONOMY

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

Write for Catalogue P-T.

PHŒNIX SLIDING BLIND CO., Phœnix, N.Y.

Send Coupon Now For Free Samples of Johnson's Artistic Wood Finishes

EVERY practical contractor and builder can better his work, better his profits and better his reputation by using Johnson's Wood Finishes. You can prove this at our expense—it will cost you nothing—save you much. We want to send you free working samples and Johnson's Illustrated Color Book—"The Proper Treatment for Floors, Woodwork and Furniture"—giving complete directions for their use. We want every contractor and builder to accept this free offer. Mail coupon or postal today.



Johnson's Wood Dye

is not a mere surface stain—but a deep-seated dye, penetrating the wood and fixing a deep, rich, permanent color entirely different from ordinary stains, which are only skin-deep.

Made in fourteen attractive shades.

When used in combination with Johnson's Prepared Wax or Johnson's Under-Lac, inexpensive soft woods such as pine, fir and cypress may be made as beautiful and artistic as costly hard woods.

Ask your dealer for free samples and prove it for yourself.

Johnson's Under-Lac



A spirit finish vastly superior to shellac and varnish—not thick, sticky and slow drying like varnish, neither does it dry too quickly like shellac. Under-Lac should be used over Johnson's Wood Dye and Paste Wood Filler where a higher gloss than a waxed finish is desired.

For a first-coater, where varnish is to be used, Under-Lac is unsurpassed—one coat of Under-Lac and one coat of varnish will give a better finish than three coats of varnish without the Under-Lac.

Under-Lac is particulary adapted for finishing linoleum and oil cloth—dries hard so the floor may be walked on in an hour.

Ask your dealer for free samples and convince yourself of the merit of Johnson's Under-Lac. Gallons $2.50

Johnson's Color Panels and Illustrated Book

Let us send you free a complete set of wood panels showing all shades of Johnson's Wood Dye on various woods. These panels are conveniently put up so that you can easily show them to prospective customers—by doing so we are sure you will procure many contracts at profitable prices for work to be finished with Johnson's Artistic Wood Finishes. The dye *always* matches the panels.



We will also send you a copy of our new book illustrated in many colors and containing color plates of the dye. This book gives full instructions for finishing and refinishing all wood—soft and hard. It is invaluable. Present the attached coupon to your leading paint dealer for samples, wood panels and book. Or mail coupon to us giving dealer's name and we will send them to you from Racine.

COUPON

(N.B.-2)

For S. C. Johnson & Son's Free Illustrated Book and Wood Panels—also free samples of the following Johnson's Wood Finishes.

(State plainly just which samples you wish to try.)

.....

Name.....

Address.....

Dealer's Name.....

Dealer's Address.....

Present this coupon at your dealer's, or mail direct to us for free samples.

S. C. Johnson & Son - - - - - Racine, Wisconsin

Wood Finishing Authorities

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE C. H. & E. LINE.

The C. H. & E. portable saw rig is the machine which is doing a lot of millwork for busy contractors, and doing it on the job and doing it in first class shape. The rig is very strong and rigid and will stand the very hardest of usage. It has the reputation among its users of being a complete and economical operating mill. It requires no line shafts and takes up very little floor space. It is always ready to do sawing and one crank of the engine fly wheel makes it run, the three-horse power engine pulling the saw with ease. The C. H. & E. Mfg. Co. claim that over two years were spent in getting this rig to balance perfectly and that there is a total absence of vibration when in operation.



The cylinder and frame of the engine is cast in one piece of special grey iron, making it very rigid. The piston is grey iron, accurately machined and fitted with three spring packing rings. The connecting rod is made of malleable iron which insures it against breaking. The crank end of same is lined with Parsons' White Brass, which is the highest priced bearing metal on the market. Crankshaft is high carbon drop forged steel. The main bearings are genuine babbitt metal and the studs are fitted with double check nuts, insuring safety. Igniter, Jump Spark, high grade plugs and coils are furnished. Governor, hit and miss type; bore, 3¾ inches; stroke, 4¾ inches. Revolutions, 500 to 600. The weight of the engine complete is 350 pounds and cannot freeze or overheat.

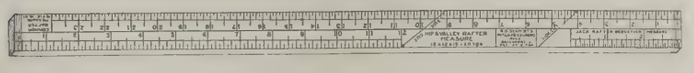
The C. H. & E. Mfg. Company is located at 321 Mineral street, Milwaukee, Wis. Their No. 2 all iron saw rig and their 1,000 pound capacity builders' hoist are fully and attractively described in illustrated folders, which will be mailed on request.

SCHMIDT'S PITCH MEASURING RULE.

Schmidt's Pitch Measuring Rule is a rule for measuring and laying off rafters of certain pitch. It is made of hard maple wood ⅜-inch thick, 1⅜-inch wide and three feet long. It has brass tips on the ends and is finely finished.

Mr. Schmidt states as follows in his circular regarding his rule:

"If a roof has hips and valleys, the best way to frame rafters is to make a roof draft to go by. It does not require a fine drawing. A line on the outside of the building and the measurements thereof, and a line of every rafter and ridge board, such as the dash lines shown in the circular drawing. This will give you the number of rafters required, the side cuts there are to be made on the jack rafters and also on the hips and valleys, and by a little figuring you can get the run of them all. Mark how many feet and inches there is in the run of every rafter and ridge board. When you know the run of the rafters, it is a simple matter to frame them with a pitch measuring rule. It gives every inch, every half, quarter and eighth of an inch there is in the run of a rafter on this rule, common rafter or hip and valley rafter.



The common rafter that has a run of 5 feet ¾ inch, or 6 feet 1 inch, and the hip rafter that has a run of 3 feet 11¼ inch, or 2 feet 11 inch, is just as easy to get the length of with this rule as if they had an even number of feet in the run and just as easy as if you were to measure off a joist of that many feet and inches with your every day rule.

It gives the correct side cuts of the hip and valley rafters, and also of the jack rafters; how much to deduct from the jack rafters to allow for the thickness of the hip and valley rafters; how much to allow for the thickness of the ridge board on common rafters and also on the hips and valleys; how much to let extend over the plate to allow for the cornice, either common rafters or hips and valleys. It gives all of this to a fraction of an inch.

There is no setting to do to this rule, one side of it can only be used for a certain pitch roof. No figuring after you know the run of the rafters, but it gives you all you want to know except the plumb and bevel cuts, those you will have to get with a square, otherwise the square is not needed at all. Measure the ridge board with your every day rule, and measure the rafters in a like manner with a pitch measuring rule, and the rafters will all be right and fit in their proper places, providing the building is square. If a building is not square, no hip rafters will fit even if they are cut right.

If a building is out of square and has hips and valleys, find out by measuring from corner to corner or along the hip or valley run with a tape line, then divide the difference by four and cut the two on the short run that much shorter and the two on the long run that much longer, and the rest of the rafters will fit all right.

Getting rafters not just right is where the trouble comes when you come to put them up, and this is where the time is lost, when you have to cut them again.

It is easy to frame all the rafters on the ground if you make draft of the roof and use a pitch measuring rule. You can get eve rafter and get it right.

Mr. Schmidt claims that his rule will last a life-time and th there is no better rule or tool made for roof framing. It is the si plest thing out and any carpenter can frame rafters with his ru His circulars are so plainly written and his rule so simple that seems well worth while to order one and save both time and mon Address, R. D. Schmidt, 738 W. Fourteenth street, Davenport, Iow

KEYLESS LOCKS FOR DOORS.



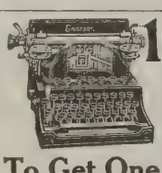
It is as easy as it looks to touch one or more of those lit projections on the side of t lock, and the door is instan opened. Besides being a prot tion against burglars, and a gr convenience in many other wa the Dayton Keyless Locks finely made and finished and a an ornament to any outside do

The Dayton Keyless Locks be easily opened by a child. the same time, the most exp lock man who did not know t combination, would be unable figure it out. There is no ma of combination figures to be membered. There are no keys carry around or be left about.

The Dayton Keyless Lock 804 W. B. building, Dayton, Oh are selling their locks large through agents, and some of th best agents are contractors a carpenters, who, being well a favorably known to the proper owners, are in a position to recommend them, and put them on doors. Many letters are received by the Dayton Keyless Lock Co pany from satisfied customers all over the country, along the lin of the following communication from Dr. W. A. Kaake, a well know dentist of Duluth, Minn.:

"The locks you sent me are certainly very fine and more th make good all that you claim for them. Many who have seen the operate, and the locks do in a way that seems to indicate intelligen are anxious to have a lock or two on their homes. Others desire act as state or local representatives for you. We have tried the loc thoroughly and to say that we are well pleased is to put it ve mildly."

Circulars fully describing these wonderful locks can be had request. And, if you want the agency for your town, ask for pa ticulars.



10 CENTS A DAY buys the Emerson Typewriter. Made in our own factory, at Woodstock, Ill. **$50 now—later the price will be $100.** The best typewriter made. Entire line visible. Back Spacer, tabulator, two-color ribbon, universal keyboard, etc. Agents wanted everywhere. One Emerson machine free for a very small service. No selling necessary.

To Get One Free and to learn of our easy terms and full particulars regarding this unprecedented offer, say to us in a letter, "Mail your FREE OFFER."

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BOX 80. - - - - - - WOODSTOCK, ILLINOIS

Drawing Materials Surveying Instruments

Drawing and Blue Print Papers, Architects' and Builders' Level, Drawing Instruments, T Squares, Triangles, Scales, Inks, etc. Steel and Metallic Tapes. Builders' Levels. Repairing promptly executed. *Catalogue on application.*

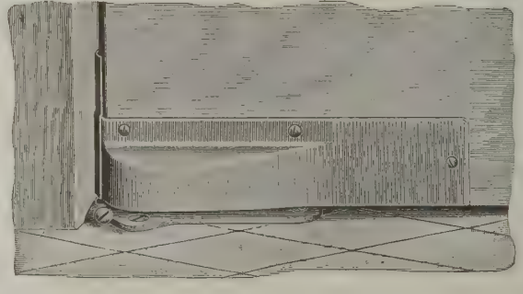
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KEUFFEL & ESSER CO.

General Offices and Factories Hoboken, N. J.

CHICAGO 111 East Madison St. | ST. LOUIS 813 Locust St. | SAN FRANCISCO 48-50 Second St.

1910 "Standard" Floor Hinges



sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio



Amatite ROOFING

Buy It—and You'll Never Need Roof Paint

When a man is under the necessity of ing a lot of roofing, he is pretty sure to udy the subject with great care. That is ny Amatite is so often used on the big ready ofing contracts. A man who has only a w hundred feet of roof will often be careless his choice of roofing, but when it comes thousands of square feet (as above), matite is sure to be used.

The following is a typical instance:

Waterbury, Conn.,
Nov. 19th, 1909.

rett Manufacturing Company:

DEAR SIRS:—We wish to inform you that the "Amatite" ofing which we have used on our office, storehouse, lumber d and barn has given most satisfactory service. The area these roofs cover is about 15,000 square feet. The roofing nusually attractive in appearance, and in our judgment is the most durable and satisfactory made. The fact that it requires no painting appeals to us very strongly, and this feature makes it by far the cheapest ready roofing on the market.

Yours truly,
CITY LUMBER & COAL COMPANY.
[Signed] F. B. Boardman, Treasurer.

The economy of Amatite is not only in its durability and its price (lower than any other mineral surfaced ready roofing on the market), but also in the fact that *it requires no painting.*

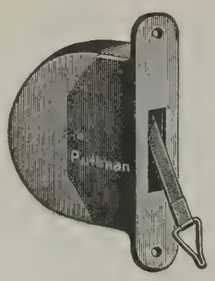
You may be sure it would cost something to paint their big roofs if they used a roofing that needed painting. All that is saved with Amatite.

A sample of Amatite and further information will be sent you for inspection, free, if you will send name to the nearest Barrett office at once.

BARRETT MANUFACTURING COMPANY

New York Chicago Boston Philadelphia Cleveland St. Louis Cincinnati Minneapolis Pittsburg
New Orleans Seattle Kansas City London, Eng.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



PULLMAN SASH BALANCE

Fits Where Nothing Else Will

INVESTIGATE the PULLMAN! It will be a time and money saver for you on many jobs where you cannot use the old style cord and weights.

The most modern new work calls for PULLMAN Sash Balances in all windows, for they are absolutely reliable, never wear out or get out of order. All dealers sell them.

CIRCULAR FREE

Pullman Mfg. Co., 10 Allen St., Rochester, N. Y.

THE LITHOGRAPH POSTAL WILL INCREASE YOUR BUSINESS

By using Lithograph Postals you convey the natural color effects to the prospective home builder as well as the architectural construction.

This is an entirely new idea for the contractor and builder.

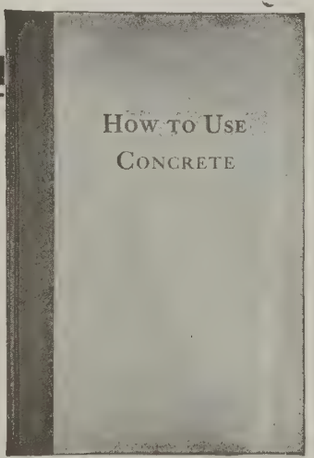
It is a very effective way to advertise and create future business at small cost.

Write for free samples.

AMERICAN VIEW CARD MAKERS

334 Dearborn Street :: :: :: :: CHICAGO

HOW TO USE CONCRETE



Price $1.00

Every carpenter, builder and contractor should have this book. Over 240 pages telling how to make concrete steps, walks, balusters, laundry tubs, vases, porch columns, wainscoting, blocks, tile, brick, etc. Full instructions for making molds, proportioning mixtures and placing the concrete.

WRITTEN IN PLAIN ENGLISH

This is a book for the man who works with his hands. The instructions are clearly given and illustrated with a hundred diagrams and pictures. The book is printed in large clear type on fine paper. Bound in cement-colored cloth.

One Dollar per copy. *We pay the express.*

CONCRETE PUBLISHING CO.

501 Owen Bldg. DETROIT, MICH.

The VOLTZ UNIVERSAL SASH BAR





Makes any angle, allows for settling of building—keeps windows from frosting. The most beautiful, practical and durable bar in the world. Made in metal.

"Holds with a grip of iron, yet with a touch of v vet." Glass set from the outside. More good featur explained in our catalog — it's fine — send for a co before you build or repair. Write today.

VOLTZ MFG. CO

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ST. LOUIS, MO. BALTIMORE, M

F. Weber & Company

1125 Chestnut St., Philadelphia, Pa.

DRAUGHTING AND ENGINEERING SUPPLIE

Drawing Tables and Boards

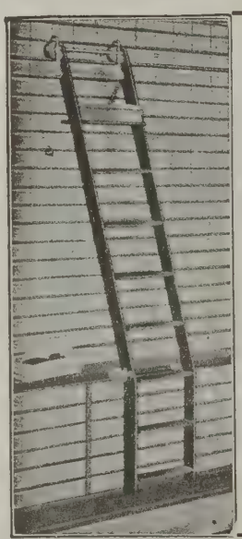


Filing Cabinets and all Drawing Room Requirements

Detail Drawing, Blue, Brown and Black Print Papers

The "UNIQUE" direct BLACK PRINT PAPER requires only one bath. Best on the market. Write for samples.

BEST MAKES OF BUILDERS' TRANSITS AND LEVELS. Complete catalog Vol. 300B sent on requ



Mr. Carpenter and Builde

Why Not Make Some Extra Money

by inducing your local merchants t modernize their stores? By doing so yo will not only make money on selling the the **rolling ladders** that they may re quire, but also on the shelving that it ma be necessary for them to extend to ceilin or rearrange.

It is only necessary to send us th measurements and we will do the rest Ship you the ladders complete and read for use and guarantee them in ever respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPAN

1442 N. Eighth St., ST. LOUIS, MO.

WHEN YOU GET TO **SASH CORD** USE **SILVER LAKE**

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

Was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"On The Level" Talk

By the Man from Akron



"HERE, gentlemen is the best spirit level ever made—the only level that completely and perfectly fills the bill. It is the standard of accuracy to which others are compared. No other level has those clear, distinct Silver Lines which show L-E-V-E-L, or otherwise, instantly, and can be seen at a considerable distance. No other level is so scientifically accurate, or so well adapted to every use that a level can be put to.

Akron Eclipse Levels

Notice the construction. The spirit glass is carried on perfectly adjusted elastic bearings and enclosed in a heavy glass tube which is practically unbreakable. Thus it will endure the falls and jars incident to daily use, without injury. This is the level that introduced the idea of using two plumbs, so that stock can be applied either end up. All glasses are adjustable so that accuracy is assured under all conditions. Akron Eclipse Levels are made in 33 styles and sizes for carpenters, masons, concrete men and everybody who uses a level.

And yet, with all the big advantages possessed by Akron Eclipse Levels, they cost no more than the ordinary kind.

Sold by Hardware Dealers Everywhere

If your dealer does not sell Akron Eclipse Levels, write us for catalog, mentioning dealer's name. You want the best level that money can buy, so find out about Akron Eclipse Levels before you purchase. Write us today. A postal will do.

See those 2 lines around spirit tube?



This quick "finder" shows L-E-V-E-L or otherwise, instantly

THE BAKER, McMILLEN CO.
Dept. A AKRON, OHIO
U. S. A.



Look for this Trade Mark

Get Out of the Shovel Class

Some men dig, dig, dig, all their lives and never get out of the rut. Always striving—never succeeding—they need but a helping hand to point the way. Are you doing the same? Every carpenter, bricklayer or any man in the building trades who wants to get out of the rut should devote his idle time this winter, when work is slack, to a course in DRAFTING. The course is short, but complete, and includes



Estimating, Plan Reading

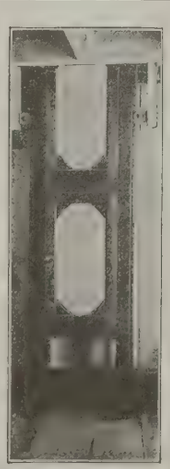
Building superintendence, building materials, carpentry, stair building, re-enforced concrete, masonry, estimating, contracts and specifications, the law of contracts and liens, hardware, plastering, painting, heating, ventilation, steel construction, elevators, sheet metal pattern drafting, mechanical and architectural drawing and blue printing.

Most practical course ever planned. Hundreds of plans of buildings in actual course of construction at disposal of students. Individual instruction. Personal attention given each student. Classes now forming—students can enter any time. Write for catalogue—not to-morrow, but to-day. DO IT NOW!

CHICAGO TECHNICAL COLLEGE, 605 Athenaeum Bldg, Chicago, Ill.



MILLER'S
AUTOMATIC DUMB-WAITER



Is especially adapted to medium sized homes and hotels where it saves running up and down stairs for eatables. It is conveniently shelved—well made—sanitary—big space saver—and rat and fly proof.

Drop Me a Line

for a circular. I will prove to you that

Miller's Automatic Dumb-Waiter

is the easiest operated and most economic waiter made, and why it will pay architects and contractors to specify and install it.

JOHN H. MILLER
MANUFACTURER
HAMBURG, PA.

Open—in the kitchen or livingroom Closed—down in the cool cellar



The Beginning of His Success

Success has dawned for many a man with the marking of the I. C. S. coupon. It was a simple act—an act that placed him under no obligation—but it proved to be the beginning of a career.

Trained men are in demand everywhere. There is not an important labor-employing concern in the world that has not openings for men prepared to make good in positions. "We always need trained men," said a prominent manufacturer recently to a young man applying for a position. "There are not well-trained men enough to meet the smallest part of the demand," declared a leading magazine in a strong editorial. The Help Wanted columns of trade papers teem with advertisements for trained men.

Draftsmen are wanted. Can you trace out a machine or a building? Foremen and Superintendents are wanted. Can you plan and direct work? Chemists are wanted. Can you make an analysis or build up a useful compound? Trained Electricians are wanted. Would it be safe to turn you loose in an electric plant? Civil, Mechanical, and Mining Engineers are wanted. What does that mean to you? Advertising men are wanted. Can you write a business-pulling ad? The Civil Service needs men. Are you prepared to pass a Civil Service examination?

The marking and mailing of an I. C. S. coupon has been the beginning of success for thousands. Why not find out about the I. C. S. plan? It will place you under no obligation whatever but will bring to you a full explanation of the I. C. S. salary-raising system that has been used by thousands to change poor jobs into good positions and "wages" into salaries.

Mark and mail the coupon NOW.

International Correspondence Schools
Box 1332, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

Architect	Telephone Expert	Mining Engineer
Arch'l Draftsman	Bridge Engineer	Mine Foreman
Contracting & Building	Civil Engineer	Railroad Constructing
Building Foreman	Surveying & Mapping	Textile Manufacturing
Building Inspector	Mechanical Engineer	Chemist
Structural Engineer	Mechanical Draftsman	Commercial Illustrat'g
Structural Draftsman	Stationary Engineer	Bookkeeper
Concrete Construction	Electrical Engineer	Stenographer
Plumb. & Steam Fitting	Electric Wireman	Advertising Man
Heating & Ventilation	Electric Lighting	Window Trimming
Plumbing Inspector	Electric Railways	U. S. Civ. Serv. Exams.
Estimating Clerk	Heavy Elec. Traction	Automobile Running

Name _____

Street and No. _____

City _____ *State* _____

Present Occupation _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PRODUCERS OF

ROOF SLATES

BLACK GREEN PURPLE RED

Slate Blackboards

Guaranteed Strongest and Best Finish

Pamphlet with setting instructions on application

The E. J. Johnson Co.

Main Office:
38 Park Row - New York
Branch Office:
626 Park Bldg., Pittsburg
Quarries:
Pennsylvania and Vermont

$1.00 Good For $1.00

TO INTRODUCE

The SELF-SETTING PLANE

(As long as this Ad appears.)

Any dome in this paper is good for one dollar, in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our Planes are not sold.

If you want more than one Plane and they are not sold in your town we will allow you dealer's discount.

List price of **Beech Wood Planes:** Smother $3.25, Jack $4.00, Fore $3.75 and Jointer $4.50.

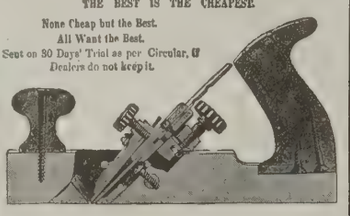
Do not say the price is too high until you try it, then if the Plane is not worth to you, twice its cost, return it at our expense and the trial won't cost you a nickel.

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

If you don't want a **Self-Setting Plane** now, send us a dome and the addresses of ten carpenter friends, no matter where they live, and we will send you a hard, tough, carpenter's pencil and circulars.

THE BEST IS THE CHEAPEST.

None Cheap but the Best.
All Want the Best.
Sent on 30 Days' Trial as per Circular, if Dealers do not keep it.



Gage Tool Co. VINELAND, NEW JERSEY

The Excelsior Dumb Waiter



Sent complete to a nail $18.50

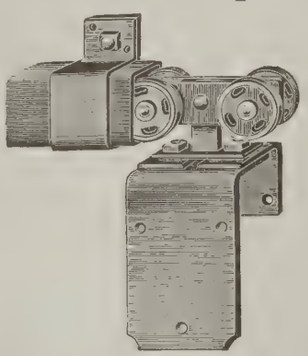
Knocked down, ready to erect

Self-Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. Send for Descriptive Pamphlet.

R. M. RODGERS & CO.

175 Washington Ave., Brooklyn, N. Y.

When Carpenters are in need



of information on door hangers to hang those garage, warehouse or school room sliding doors, they ask their dealers for the **Richards-Wilcox** products.

They cover every requirement.

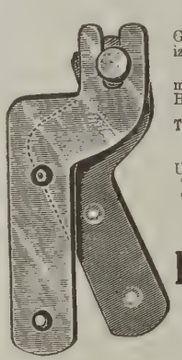
Get our Catalogs. They solve you proposition.

Richards-Wilcox Manfg. Co., Aurora, Ill.

THE "E-Z-way" SCREEN HANGERS

NEVER ALLOWS SCREEN TO BIND OR STICK WHEN HUNG—
ALWAYS FIT SNUG TO BLIND STOP

Everything Done from the Inside of the Building

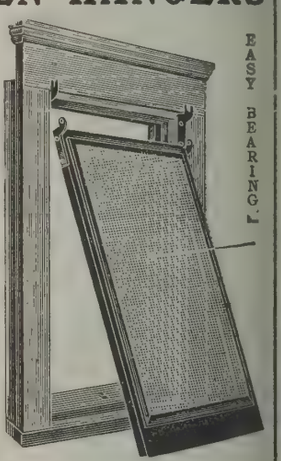


"E-Z-way" Hangers are made of 18 Gage Black Iron and are electro galvanized. THEY WILL NEVER RUST.

You can hang one-half to two-thirds more screens in a day with "E-Z-way" Hangers than with any others.

TRY TWO DOZEN SETS FOR $1.00—NO PERSONAL CHECKS

Use a No. 1 Hanger on a 1 Inch - Casing
" No. 2 " " 1¼ "Brick Mould
" No. 3 " " 1½ " " "



PETERS & GRANT

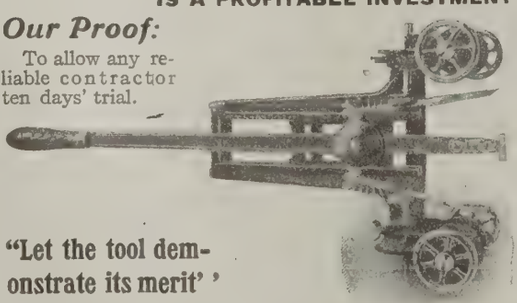
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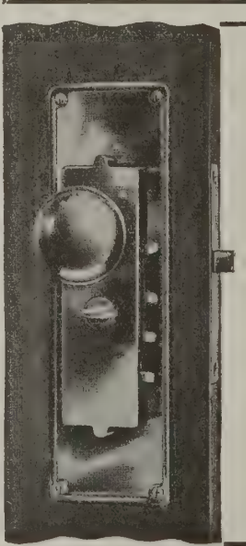
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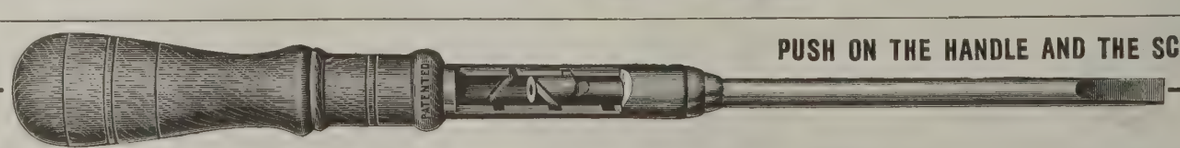
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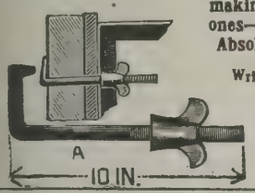
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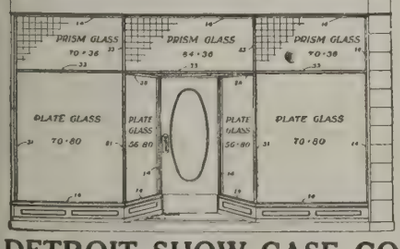


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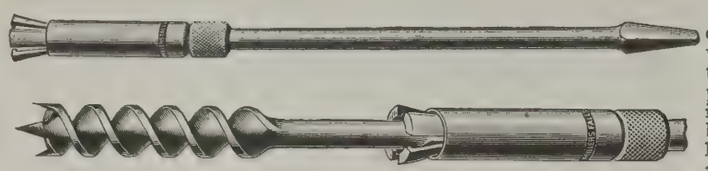
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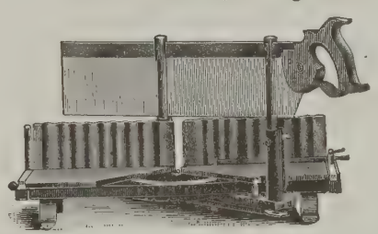
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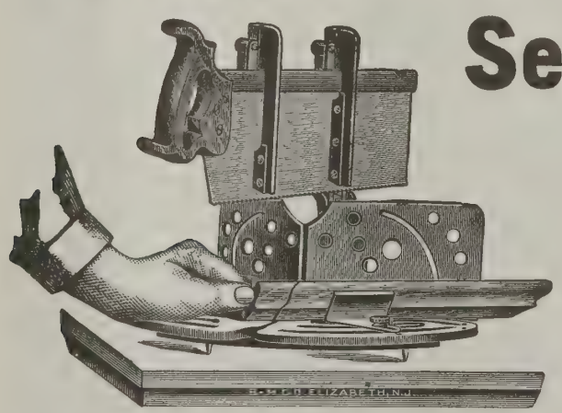
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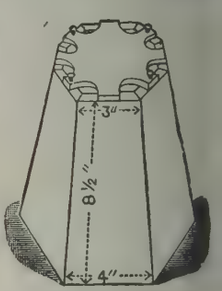
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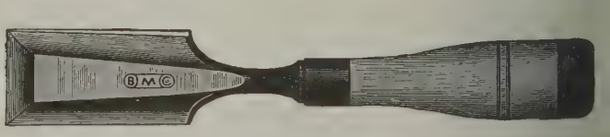
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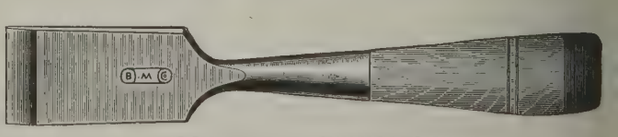
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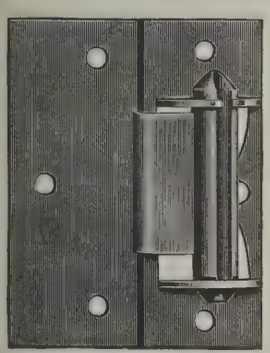
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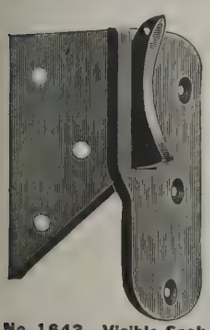
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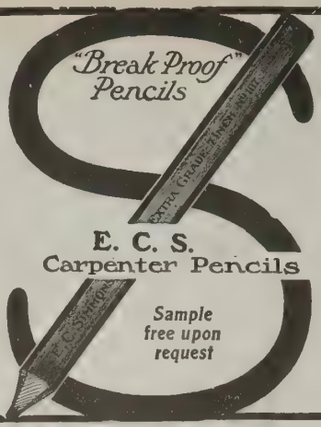


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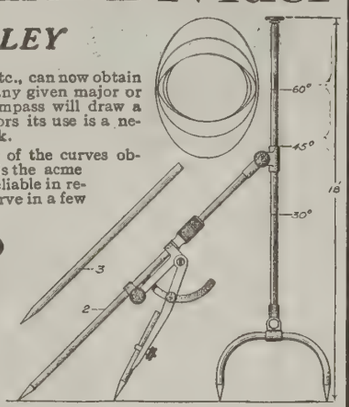
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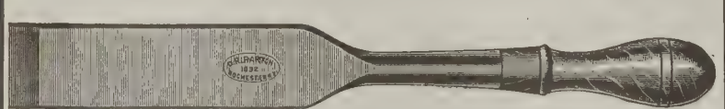
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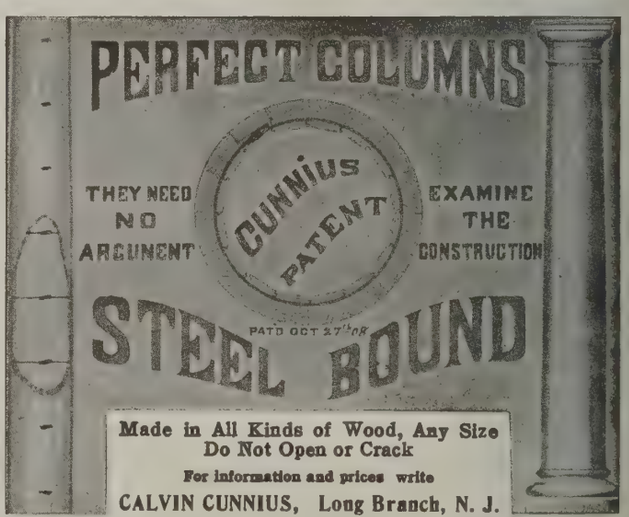


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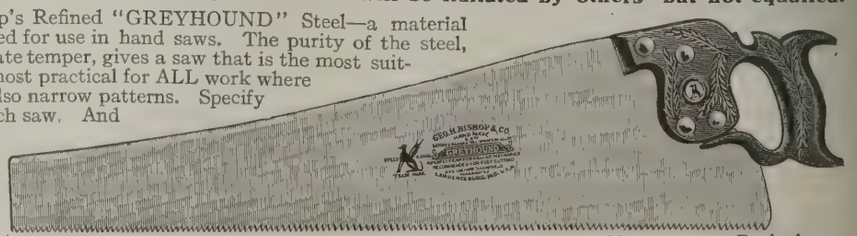




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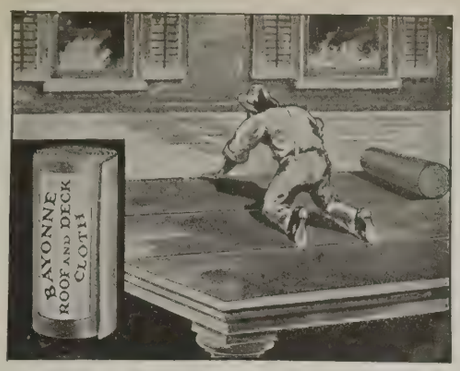
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Man has tried to *make* lasting waterproofers—and always failed. Ordinary ready roofings show you what happens. They are made of mysterious "compositions" or coal tar; and they soon crack, break, leak and go to pieces. Yet as for looks they are mighty good imitations.

It pays to know about waterproofing when you buy roofing; it is a waste of money *not* to know.

The life and backbone of Genasco is Trinidad Lake Asphalt—the *natural* everlasting waterproofer—and that makes Genasco last.

Genasco is made with mineral and smooth surfaces. Guaranteed, of course.

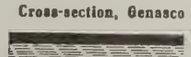
The Kant-Leak Kleet waterproofs the seams of roofing thoroughly without the use of smeary unsightly cement, avoids nail-leaks, and gives the roof an attractive appearance.

Ask your dealer for Genasco Roofing, with Kant-Leak Kleets packed in the roll. Write us for the Good Roof Guide Book and samples.

THE BARBER ASPHALT PAVING COMPANY
Largest producers of asphalt, and largest manufacturers of ready roofing in the world.

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Cross-section, Genasco Smooth-surface Roofing



Trinidad Lake Asphalt
Asphalt-saturated Wool Felt
Trinidad Lake Asphalt



Samson Spot Sash Cord

IS made of extra quality fine yarn, and warranted free from imperfections of braid or finish. It can always be distinguished by our trade mark, the Colored Spot. Carried by all dealers. Send for samples and tests.

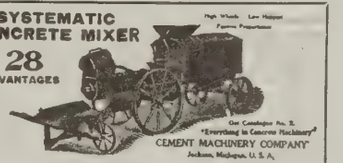
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BOSTON, MASS.

CONCRETE MACHINERY

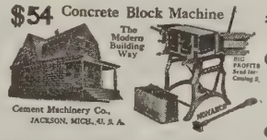
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28 ADVANTAGES



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Jackson, Michigan, U. S. A.

$54 Concrete Block Machine



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MIRACLE CONCRETE



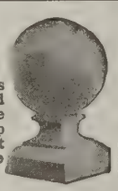
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have revolutionized pipe making. Cement pipe can be made for one-third the cost of clay.

24" concrete pipe costs 35c per foot to make.
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An outfit for making 24" cement pipe costs $50.00, other sizes in proportion.
Every size profitable.

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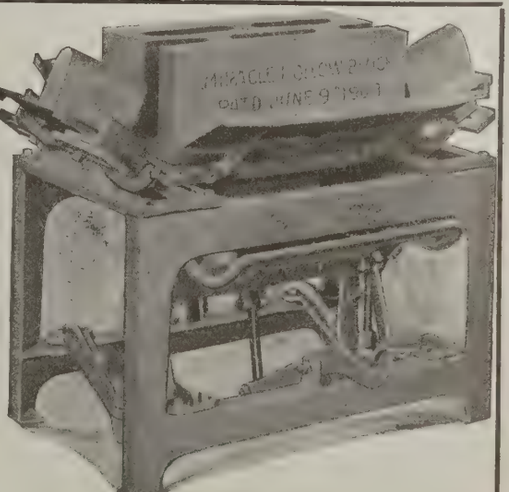
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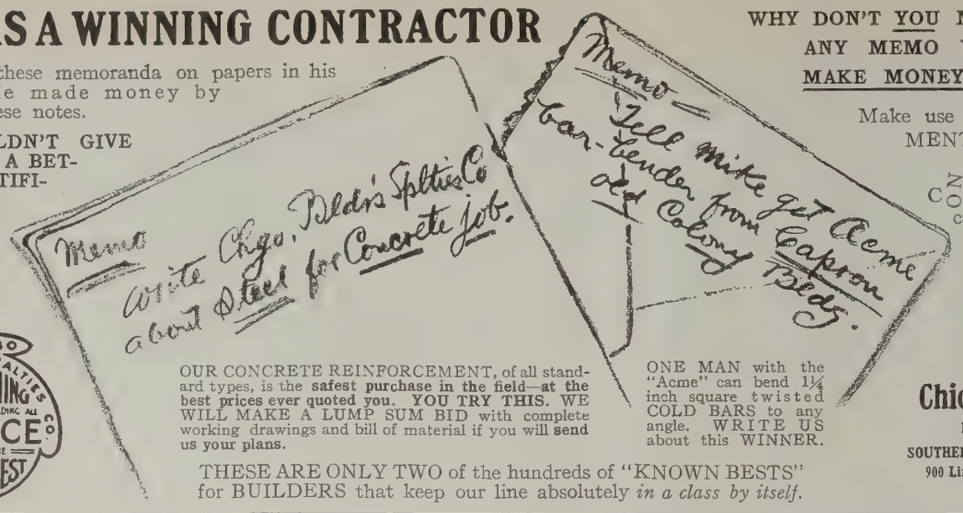
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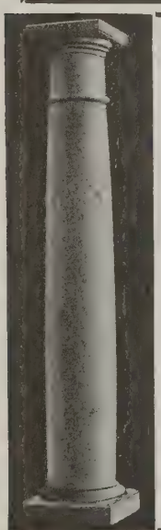
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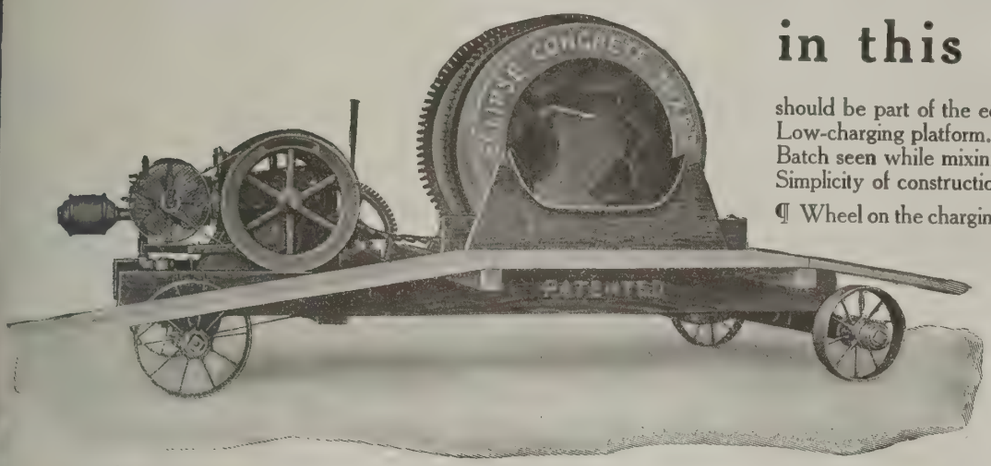
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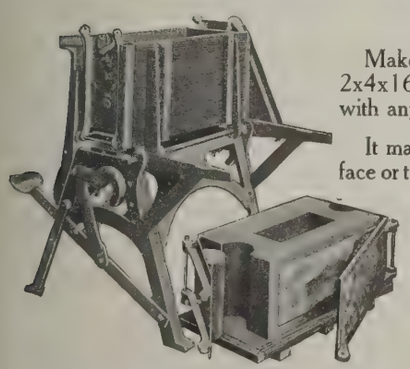
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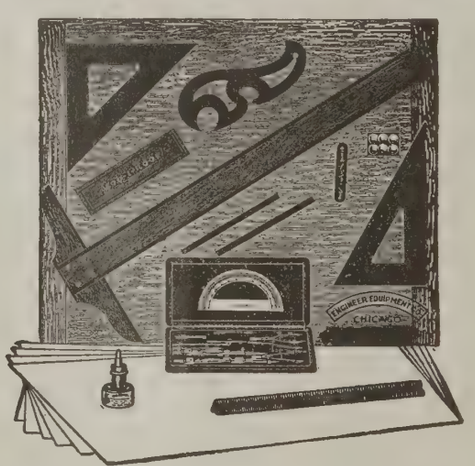
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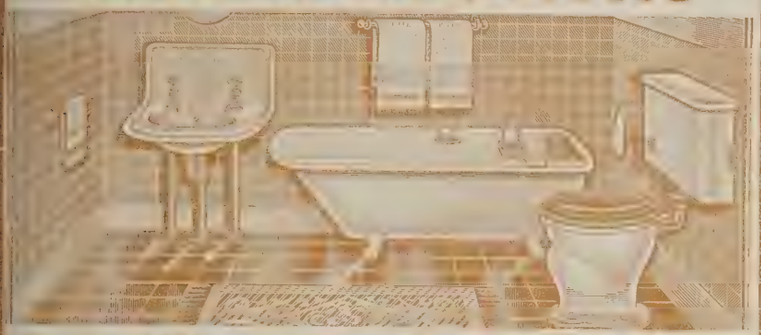
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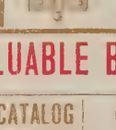
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Each .....$0.10 Per dozen $1.10



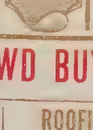
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Illustration shows "I" Beams which are made in standard sizes ranging from 3 to 24 inches high.

STEEL CHANNELS



Cut shows Steel Channels which are made in standard sizes, ranging 3 to 15 in. high.

STEEL ANGLES

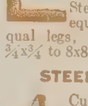


Illustration shows Angle Steel, made with equal and unequal legs, ranging from ¾x¾ to 8x8 inches.

STEEL TEES



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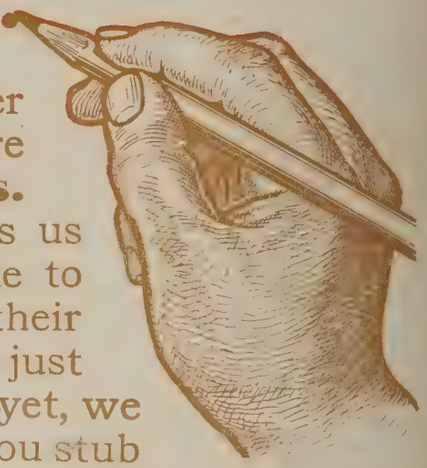


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E. C. Atkins & Co.
Silver Steel



MANY readers of the National Builder have made up their minds that they are ready to buy **Atkins Silver Steel Saws.** We know this because every mail brings us letters from high class mechanics who write to tell us how much they are pleased with their **Silver Steel Saws** or to say that they are just about to buy one. If you have not bought yet, we wish to say *now is the time.* Don't wait until you stub your toe against the Spring rush of business, but order your **Silver Steel Saws** *now* while there is time to make a careful selection.

ORDER THROUGH YOUR DEALER

He is entitled to your business and can serve you better than anyone else. Most likely he already sells them. Even if he does not, order *from* him just the same. He'll get them for you from his wholesale house. But try your dealer *first.* Then if he *won't* supply you, let us know. For your own sake you ought to use an **Atkins Silver Steel Saw** this Spring, that's sure, and now is the time to buy them.

SILVER STEEL—You ought to use a **Silver Steel Saw** because it will save you time and strength? Even if your boss *does* pay you for the time lost in filing the saw, don't you think you ought to use a saw that will run longest without re-filing. And if an **Atkins Silver Steel Saw** does not do this, take it back to your dealer and get your *money back.* That's simple. **Silver Steel** will hold its edge longest because we have discovered a formula for making steel which is far ahead of any other. If it isn't —remember—*money back.*

THE GRINDING—Atkins Silver Steel Saws are not simply ground with a thin back, they are taper ground—thickest on the tooth edge, two gauges thinner on the back at the butt—four to five gauges thinner on the back at the point and *gradually taper* toward the thinnest point. This gives them clearance—permits them to run free and easy. This is why they will cut faster than any other saws. If they don't—remember that guarantee—*money back.*

PERFECTION HANDLE—While we make some saws with the old style handle if you must have it, we recommend the Perfection Handle which removes all possible strain from the saw arm. Every ounce of power counts and less pressure is required in order to make the teeth cut fast. That's why **Atkins Silver Steel Saws** run easier than any other saw. If you don't find it so—remember that same guarantee of ours—*money back.*

HOW TO KNOW THEM—No saw is a genuine **Atkins Silver Steel Saw** unless the name **E. C. Atkins & Co.,** and the words **"Silver Steel"** are plainly marked upon the blade. Don't let anyone try to work off a cheaper saw on you as a genuine **Silver Steel Saw.** Make him show you our name on the blade. Then you'll know.

OUR FREE OFFER—We are still anxious to receive the names of high-class mechanics who are interested in fine tools and if you will send us your name and address, together with ten cents to pay postage, we'll send you a package worth while—a nail apron, an interesting booklet "Saw Sense," on saws, a monthly time book and information on saws that ought to interest every carpenter. Address

E. C. Atkins & Company, Inc.
Indianapolis, Ind.

PRINTED AND CIRCULATED THAN ANY BUILDING PAPER IN AMERICA.

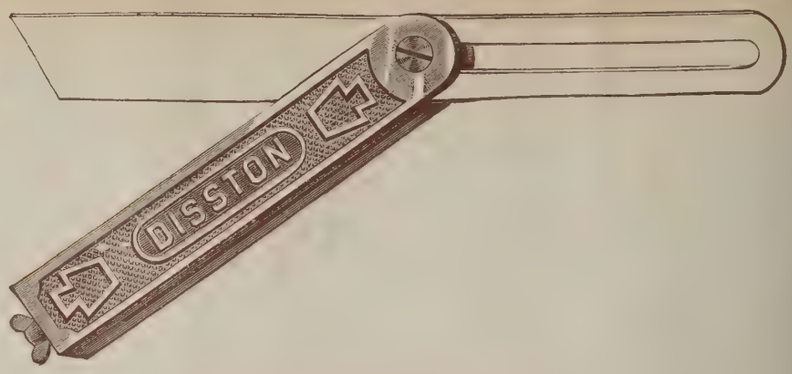
THE NATIONAL BUILDER



PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

MARCH, 1911

DISSTON
Bevel No. 3



Every Disston bevel is thoroughly inspected before it leaves our factory.

It must come up to the Disston standard before it leaves the shop.

Bevel No. 3 is a most efficient and most easily adjusted tool.

Made of Disston Crucible Steel.

Iron stock, flush screw and parallel edges.

Turn of thumbscrew operates unique mechanism for tightening the blade.

Nicely finished, fine appearing tool.

HENRY DISSTON & SONS
INCORPORATED

Keystone Saw, Tool, Steel and File Works

Philadelphia, Pa.

BRANCHES: Chicago Boston Cincinnati New Orleans Memphis San Francisco Seattle Portland Spokane Toronto Vancouver

AUGER BIT ESSENTIALS





The Fifth Reason why the well-known

RUSSELL JENNINGS BITS

are unsurpassed is the accurate

DOUBLE TWIST

which provides two smooth passages for the removal of chips.

¶ Repeated tests have proved conclusively that the double twist is the best for auger bits in the same way that it is the acceptable form of screw conveyors.

¶ Although it is sometimes claimed that the cheaper form, the bit with the solid center, clears easier, the claim is not substantiated by trial. Ask the carpenter—he knows.

RUSSELL JENNINGS MFG. CO.
CHESTER, CONN., U. S. A.

21-28

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.



Bishopric Wall Board Easily Applied

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut at the factory into 4x4 ft. sheets, which are easily and quickly nailed to studding, ready for immediate application of wall paper, paint, burlap, or other decoration.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary, and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

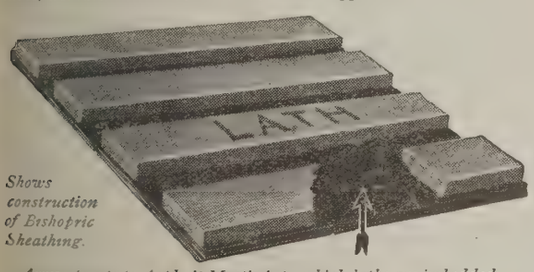
Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space.

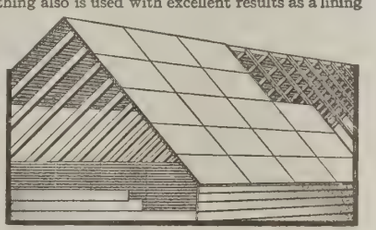
In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required. In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

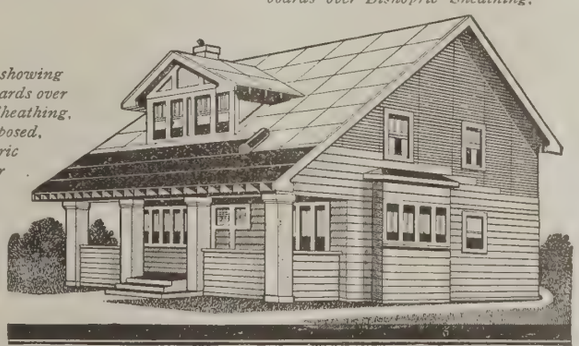
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

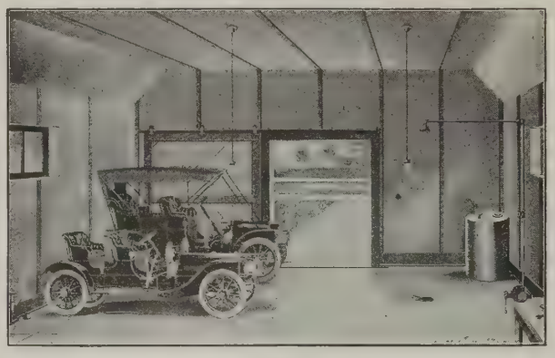
The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UTILITY WALL BOARD

A Fibrous Water-Proof Board Made in Convenient Widths and Lengths

To be Used Instead of Lath and Plaster in New Building or Repair Work



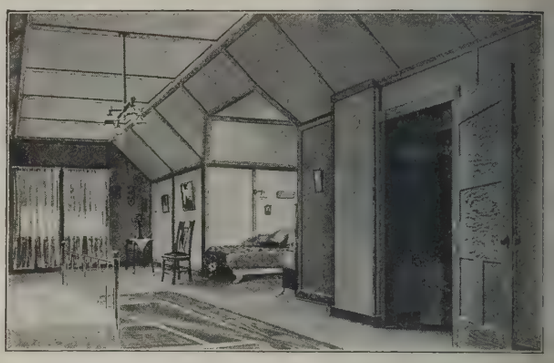
Make your Garage Warm by Lining with UTILITY Wall Board

Mr. Contractor

This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern building material.



This shows how an Attic looks after being finished with UTILITY Wall Board.

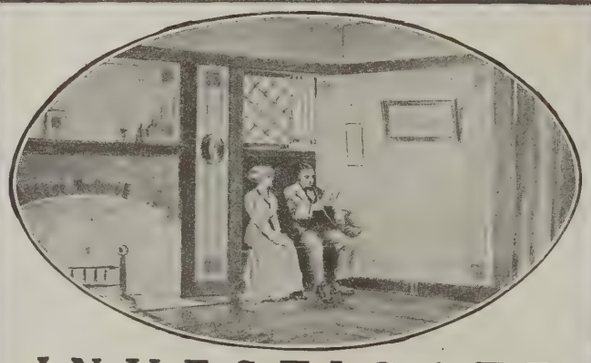
Utility Wall Board is better than lath and plaster. It saves the user a lot of money besides giving him a handsome, durable job. Utility Wall Board can be painted and decorated with the finest results. Utility Wall Board is being used in both small and large buildings. Everyone likes it.



Write Now for FREE Sample and Prices

Utility Wall Board can be applied by the carpenter—nailed right to the studs—easy and clean to handle—cuts with a saw—fits any space and can be put on in winter or summer—no waiting for plaster to dry—no cracked walls—no dirt—no ruined decorations—warm in winter and cool in summer

THE HEPPES COMPANY, 4502 Fillmore Street, Chicago, Ill.



INVESTIGATE Compo-Board

Best for Walls and Ceilings.

Better then lath and plaster. More economical and durable. Can be put on in any weather and will stay up and look well as long as the building lasts.

Compo-board is made of strips of thoroughly dried lumber well glued. These strips are then covered with a specially prepared moisture proof paper, which is cemented under intense heat and pressure.

This makes a wall lining that will last indefinitely. Cannot crack or crumble off. Cannot chip off or mar by banging furniture into it. It is moisture and cold proof and fire resisting. Warm in winter and cool in hot weather.

Beside being a wall lining, Compo-Board has many other uses around the house and in the yard, in the office and factory. For remodelling the house or finishing off an extra room in the attic or basement, it is ideal. Summer cottages can be made as warm as the city home. Use it for partitions or back plastering.

Compo-Board can be had in strips four feet wide and one to 18 feet long, in any length in even feet.

SEND FOR SAMPLE AND BOOKLET

Fully describes Como-Board and its many uses and advantages, and the sample will show you what it is.

NORTHWESTERN COMPO-BOARD CO.
5776 Lyndale Ave. No. MINNEAPOLIS, MINN.

(The border of this advertisement is a cross section view of Compo-Board.)

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



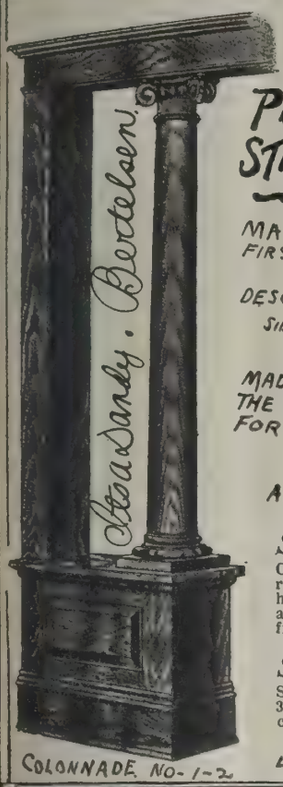
The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

$8.50 FOR THIS COLONNADE



A VERY LOW PRICE FOR THIS STRICKING NEW COLONNADE

MATERIALS AND WORKMANSHIP FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUDED
MADE FOR 5¾-INCH JAMBS
MADE IN OAK OR YELLOW PINE, IN THE WHITE, HAND SMOOTHED, READY FOR FINISHING.

PRICES
ANY HEIGHT NOT OVER 9 FEET.

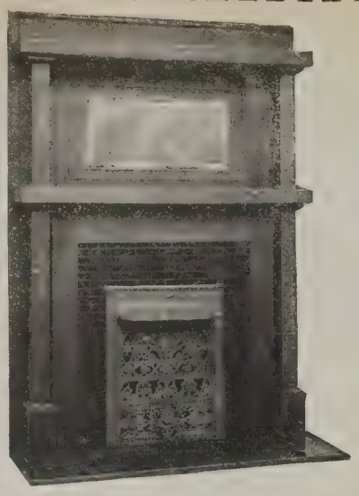
Style No. 1-2 EACH **$8.50**
Columns are 6 inches in diameter, tapering to receive 5-inch compo. cap, pedestals are 20 inches high over all and the width is 24 inches over all, and when set in to receive casings extension from jamb is 18 inches. Top shelf is 10 in. wide.

Style No. 2-2 EACH **$9.00**
Same measurements as above, only pedestals are 30 inches wide over all and when set in to receive casings extension from jamb is 24 inches.

SEND YOUR ORDER NOW, DONT LET IT GET AWAY FROM YOU.

COLONNADE NO. 1-2

BERTELSEN ADJUSTABLE GRILLE CO. 619 S. CLINTON ST. CHICAGO.



$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

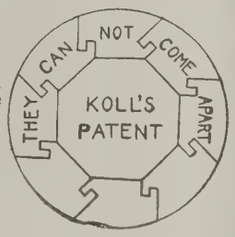
CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

60,000 COLUMNS

at an average of $5.00 each or 6,000 at $50.00 each gives you an idea of the annual capacity of our plant.



We own the largest factory building in the world devoted exclusively to the manufacture of high grade COLUMNS and PORCH WORK.

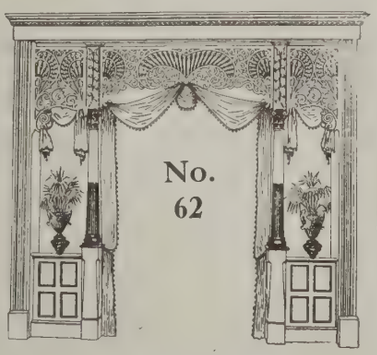
A new and very complete catalogue of COLUMNS will be sent on request. Ask for T-40.

Hartmann-Sanders Company
Sole manufacturers of
KOLL'S PATENT LOCK JOINT COLUMNS
Elston and Webster Avenues, CHICAGO
Eastern Office: 1123 Broadway, New York City
The best columns for porches, pergolas or interior use.

CHICAGO GRILLE WORKS

1892 1911

Interior Columns Colonnades Consoles



Established NINETEEN Years

Special Prices to the Trade

Let us estimate on your work before you purchase elsewhere.

An opening like the above will add $100.00 to the value of your property. Let us quote you a price.

Catalogue FREE on request.

838 WELLS STREET, CHICAGO, ILL.



Make Your Selections From Our New Catalog

It's Free



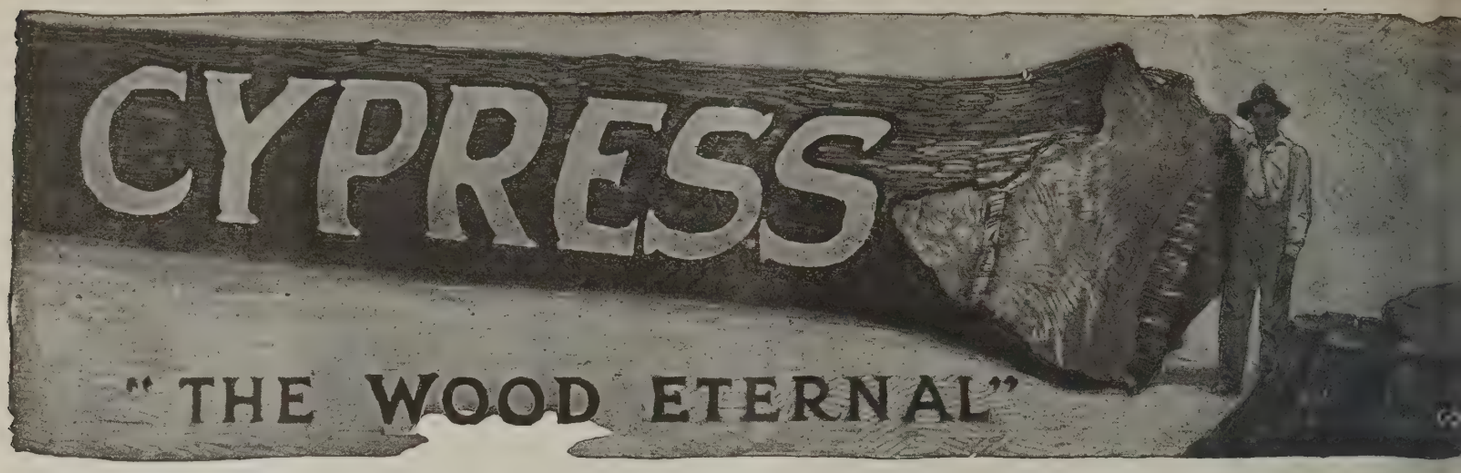
It contains a complete line of **high grade** sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, roofing and building papers, wall boards, hardware and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

REMEMBER—IT'S FREE

THE HUBER BUILDERS MATERIAL CO.
39-43 Vine Street, :: Cincinnati, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS IT WILL HELP.

"PUT A STOP TO DEPRECIATION—BUILD WITH CYPRESS *AT FIRST*



THE WOOD THAT *LASTS* SHALL BE *FIRST* with *wise* CONTRACTORS

CYPRESS WILL NOT ROT

CYPRESS DEFIES DECAY

By honest and intelligent advice on **woods** we are not only saving losses to people who are going to **build anyhow**—but we are also

CAUSING MORE PEOPLE TO BUILD

This is going to be of more and more benefit to **you** month by month. It is **up to you** to intelligently take advantage of this by **learning for yourself** that **CYPRESS** is not only the ONE BEST OUT-DOOR WOOD for the owner—but also the ONE BEST WOOD FOR **YOU**. Cypress **"makes good."** That helps your reputation. Cypress is easy to work—that's **good for your tools.**

CYPRESS "THE WOOD ETERNAL"

We are giving away complete working plans and specifications for THIS BUNGALOW. Many thousands of people ALL OVER THE U. S. are writing for them. THEY WILL HAVE TO GET **YOU** TO DO THE WORK.

THEY WILL INSIST on CYPRESS.

It will be MONEY IN YOUR POCKET TO HELP THEM GET JUST WHAT THEY WANT.

CYPRESS

is the "comer" in YOUR territory.

LISTEN FOR IT.



Plans by Lowe & Bollenbacher, Architects, Chicago.

CYPRESS AVERTS REPAIR BILLS

CYPRESS LASTS PRACTICALLY FOREVER

Why not FIND OUT what CYPRESS can do for YOU, NOW

WRITE US—ASK YOUR OWN QUESTIONS—about your own needs, bi or little. You can rely on detailed and reliable **CYPRESS** information if yo address our "BUILDERS' HELPS DEPT." We will recommend **CYPRESS ONLY FOR USES WHERE IT IS THE BEST WOOD TO USE**

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

We are *producing* CYPRESS—*and talking it—but not retailing it.* BUY IT NEAR HOME. *ASK your lumber man if he sells CYPRESS; if he does not, ask him WHY. Then WRITE US. We will tell you where you CAN get CYPRESS*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

RED GUM

AND

SAP GUM

A good many of the illustrations selected by the writer of this series of **RED GUM** and **SAP GUM** advertisements, which have appeared in the National Builder during the past year, have been of buildings located in New York City. This selection has been purposely made, as it has been deemed the best possible acknowledgment of the value of this wood that it should be so thoroughly appreciated so far away from the section where it is produced, and in New York, where it is the general practice to use the very best of materials in the modern buildings which are being erected.



Trimmed in Gum—"A [illegible] Finest Hardwood"
The Beaconsfield, 116th Street and Riverside Drive, New York
Schwartz & Gross, Architects

RED GUM for interior trim, natural or in any standard finish—and **SAP GUM** for the **"best wood ever"** for **white enamel,** are absolutely satisfactory woods when **properly** seasoned and **properly** handled in the trim mill. If their intrinsic value and beauty are taken into consideration, their cost is almost absurdly low.

"Clinch Your Reputation for Leadership by Recommending (and Using) GUM"

*Builders desiring to see samples of **Red and Sap Gum,** both rough and finished, or who wish market prices of selected **Red and Sap Gum,** are invited to correspond with any of the following firms:*

CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., St. Louis, Missouri
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
CARRIER LUMBER & MFG. COMPANY . . . . . Sardis, Mississippi
BAKER LUMBER CO. . . . . Turrell, Arkansas
ANDERSON-TULLY CO. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

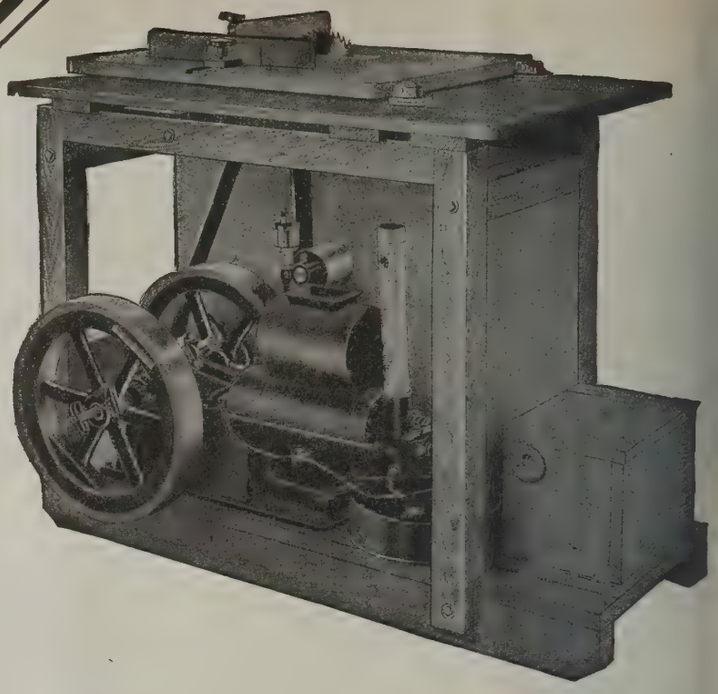
$165.00

FOR THIS

PORTABLE SAW RIG

WITH THE FOLLOWING ATTACHMENTS INCLUDED

READY TO RUN WHEN OUTFIT REACHES YOU

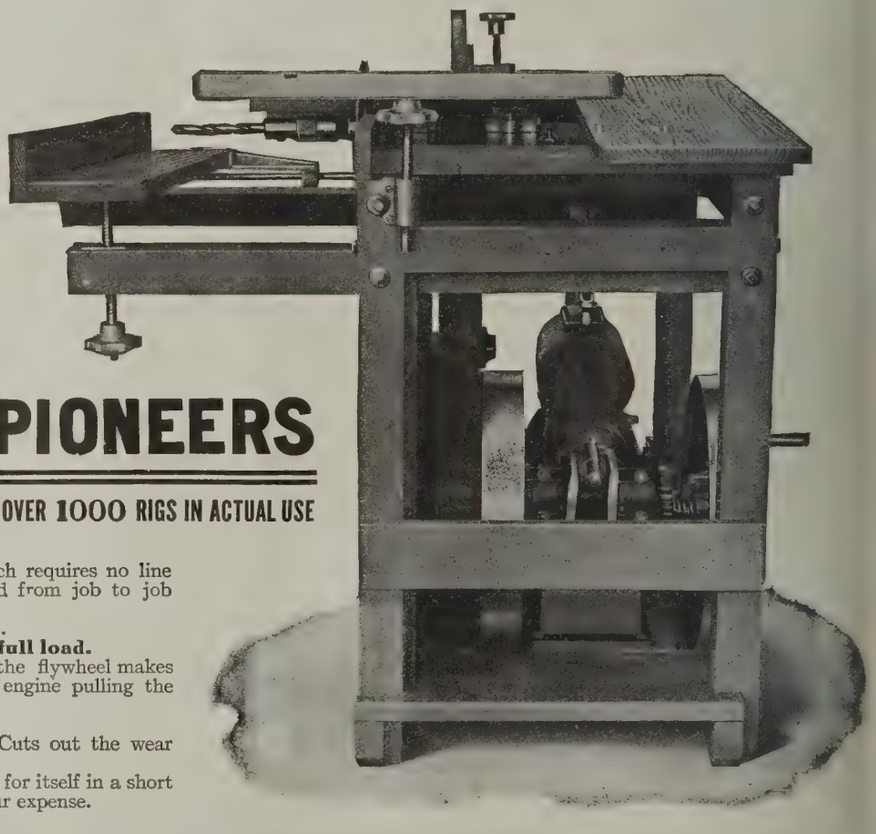


One 8″ Rip Saw
One 8″ Cross Cut Saw
One 10″ Cross Cut Saw
One ½″ Dado Head
One 2¼″ Jointer Head (four knives) and Adjustable Iron Block
One Emery Wheel
One Extra Spark Plug
One Oil Can and Wrench
One Belt Tightener attached to Engine.

Buy Only What You Need of the Extra Attachments as Follows:

Boring Attachment complete with sliding table, bolts, chuck and two boring bits.
Sanding Disk.
Special Moulding Knives.
Different sized Dado Heads, etc.

All these extra attachments will be charged to you at cost on your order for a complete outfit.



WE ARE THE PIONEERS

IN THE MANUFACTURE OF PORTABLE SAW RIGS. OVER 1000 RIGS IN ACTUAL USE

A complete and economical operating mill, which requires no line shafts or large amount of floor space. Can be moved from job to job and will do the work of five men.

A power plant guaranteed to make you no trouble.

Designed and built to run **continuously** under **full load.**

Always ready to do sawing, and one crank of the flywheel makes it run. The three horse power water hopper cooled engine pulling the 8″ saws with ease.

Will rip 2″ and cross cut 3″ lumber.

Cuts hours to minutes. Cuts cost to pennies. Cuts out the wear and tear on muscles.

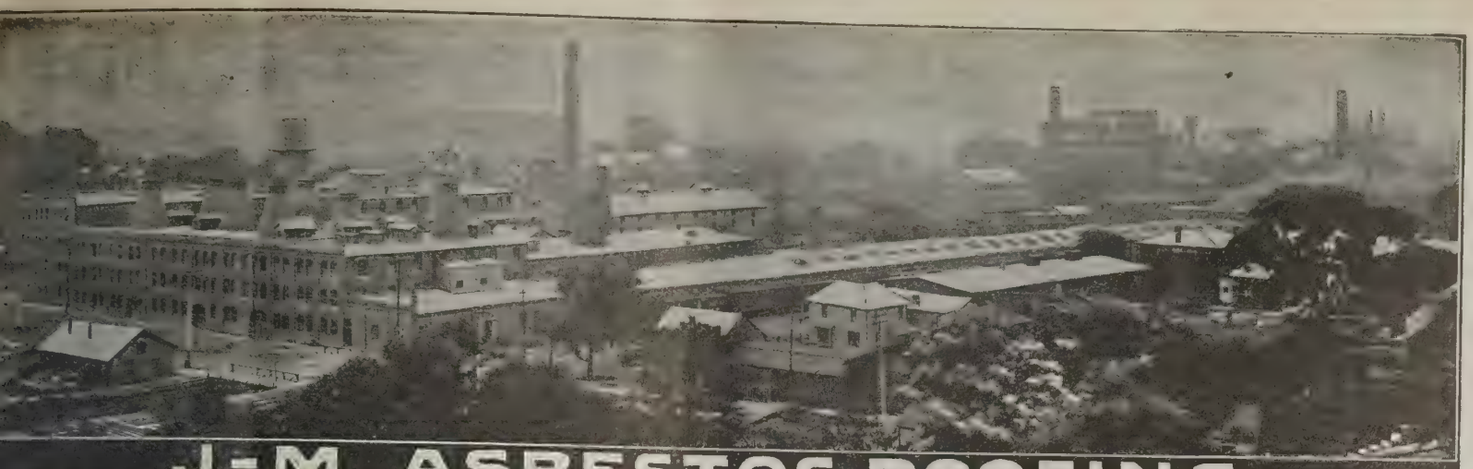
This Rig put on your job or in your shop will pay for itself in a short time and we absolutely guarantee same or return at our expense.

WRITE FOR DESCRIPTIVE FOLDER

C. H. & E. Manufacturing Co., Inc.

319 MINERAL STREET, -:- MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



J-M ASBESTOS ROOFING ON THESE BUILDINGS OVER TWENTY YEARS

Illustration shows the plant of the Robinson Clay Products Co., Akron, Ohio, which was covered with J-M Asbestos Roofing over twenty years ago. Although this roofing has had to withstand the deadly gases used in manufacturing clay products in addition to the elements to which all roofings are subjected, it is in perfect condition today.

J-M Asbestos Roofing is not in the least affected by gases, chemical fumes, fire, salt air, heat or cold. It is practically indestructible because made of sheets of indestructible Asbestos—a rock quarried like slate or granite—firmly cemented together with Trinidad Lake Asphalt, the mineral which has withstood the severe duties of street paving for more than thirty years.

J-M Asbestos Roofing is the cheapest-per-year roofing on the market, because it outwears several ordinary roofings and never has to be painted.

Write nearest branch for Sample and our handsomely illustrated Catalogue No. 303.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, Etc.

Baltimore, Boston, Buffalo, Chicago, Cleveland, Dallas, Detroit, Kansas City, London, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburg, San Francisco, Seattle, St. Louis

For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
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1247



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

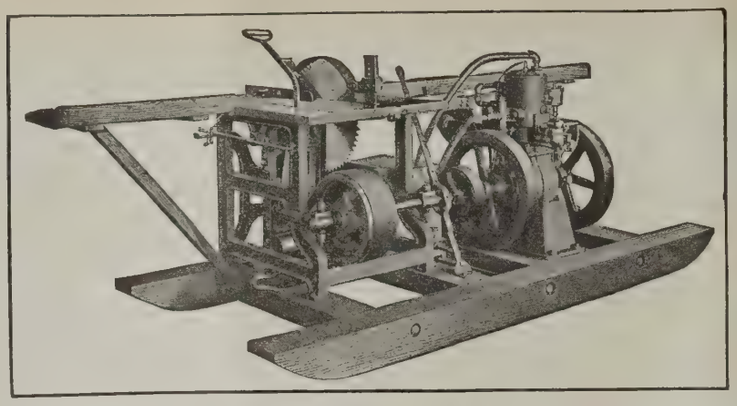
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THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

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IT SURELY WILL

interest YOU to know about a machine
with which you can fill your contracts

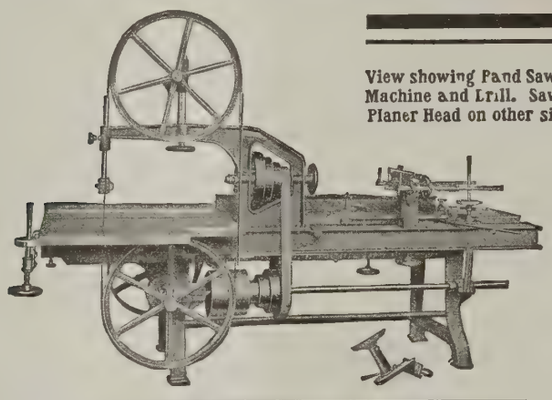
CHEAPER, QUICKER and WITH LESS HELP

than ever before. Let us tell you all about the

OSHKOSH PORTABLE SAW RIG

It saves its cost on one contract.
A postcard will bring you full information

Oshkosh Logging Tool Company, 414 S. Main St., Oshkosh, Wis.



View showing Band Saw, Lathe, Boring Machine and Drill. Saw Mandrel and Planer Head on other side.

The "Buffalo" Crain Combination Woodworker

Has **Lathe** 40″ between centers; **Band Saw** taking 12″ under the guide; **Saw Mandrel** taking saws up to 12″ diameter; **Planer Head,** 5″ or 10″ **drill, boring machine, sizer, shaper, tenoner.** Three men can work at it at one time and perform a **Dozen Different Operations.** It is the latest invention and without comparison the simplest, strongest and most efficient machine made at the price. Low power cost; only 4 H. P. required at full load. No extra attachments needed. The facilities for adjusting every working part to suit the work in hand are unequalled.

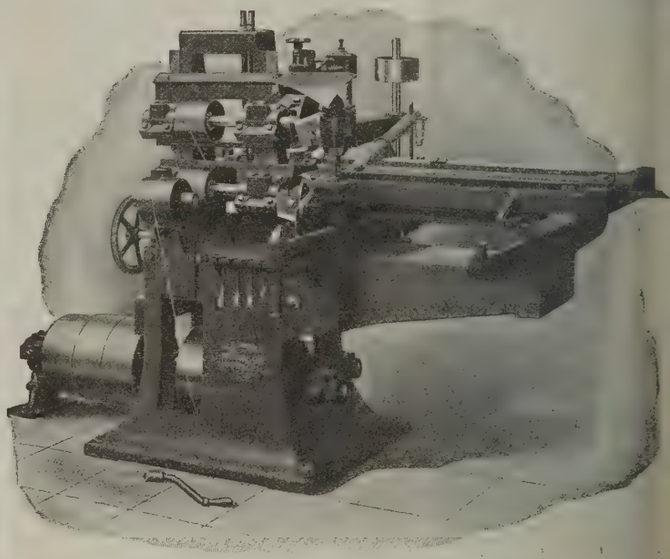
Send for Complete Description and Prices. **Booklet 1785.**

Buffalo Forge Company
Buffalo, N.Y.

When in the market for a **TENONING MACHINE** Bear in mind that

"Smith of Smithville"

Are the Original Manufacturers and Build the Best



(No. 225-Ce Single-end Tenoner)

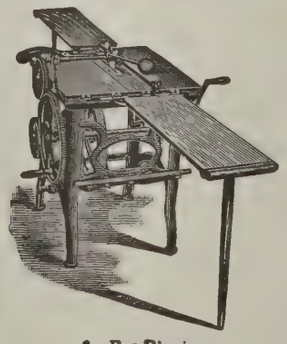
Smith's original Single-end Tenoning Machines were patented in 1852, since which time many improvements have been made, the above engraving representing the latest and best type. The design is unique, with a rack for holding all wrenches. The carriage is fitted with roller bearings so as to move easily and true across the ways. Made with double or single heads, with or without copes and with or without saws.
Also manufacturers of Double-end Tenoners, made in twenty-two different sizes and styles, to meet all conditions and classes of work.

Special Sectional Catalog on Application.

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NEW YORK CHICAGO ATLANTA SHREVEPORT

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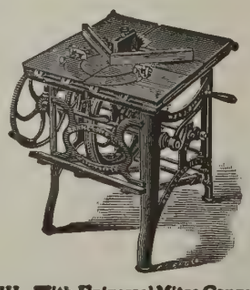
I. For Ripping.

Our new foot and hand power Circular Saw No. 4, the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing etc

Solid Iron Table Planed Perfectly True.

COUNTERSHAFT IF DESIRED.

Send for Our New Catalogue



III. With Universal Mitre Gauge.

Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, etc.



II. For Cross Cutting.

W. F. & JOHN BARNES CO.
436 Ruby Street, ROCKFORD, ILL.

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THE GRIMM WOODWORKER IS A WONDER WORKER

A Practical, Portable Planing Mill that Will Save You Time, Labor and Money

The Grimm Woodworker

Will Save You Time. No waiting for the planing mill to deliver your work.

The Grimm Woodworker

Saves you Labor. Does the work of five men.



"THE LITTLE WONDER WORKER"

The Grimm Woodworker

Saves you Money. Puts the profits of the planing mill in your pocket and its saving of time and labor means money to you.

The Grimm Woodworker

Will do all the mill work needed in the construction of any building.

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Gentlemen—The Combination Woodworker which you sold me a short time ago, I am very much pleased with. It is the best wood-working machine of its kind I ever saw. If I knew I could not get another machine like it, I would not sell it for triple its value. Wishing you all success, I remain, yours truly,

(Signed) GEORGE WEGMAN.

Nine Machines in One

Rip Saw Cross Cut Saw
Dado Head Jointer Sander
Moulding Knives
Emery Wheels Jig Saw
Boring Attachment

Send for Booklet and Trial Offer

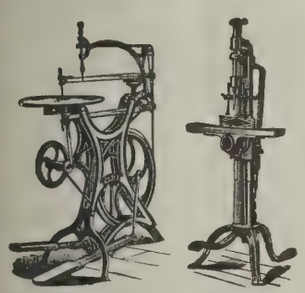
GRIMM MFG. CO., 42 Erie Street, Buffalo, N. Y.

FOOT, HAND AND POWER

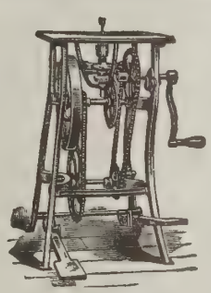
WOOD-WORKING MACHINERY

FOR CARPENTERS, BUILDERS, CABINET-MAKERS AND OTHER WOOD-WORKERS

Built for Hard Work, Accurate Work and Long Service

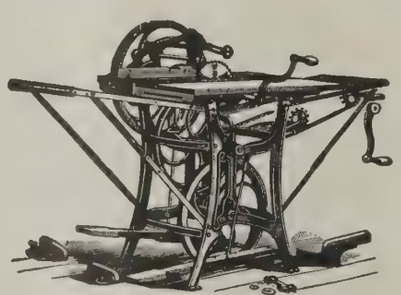


"Victor" Scroll Saw — "Diamond" Mortiser



"Rex" Moulder

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



"Union" Combination Self-Feed-Rip and Cross-Cut Saw

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory, may be returned at our expense.



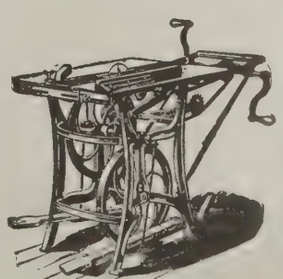
No. 8 "Union" Power Saw

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

Send for Catalog "A"

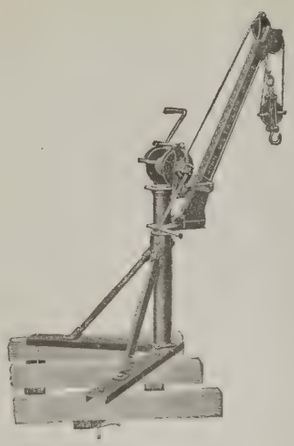
The Seneca Falls Manufacturing Co.

629 Water Street, Seneca Falls, N. Y., U. S. A.



No. 6 "Union" Combination Saw

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TAYLOR PORTABLE STEEL DERRICK



For Builders, Roofers, Plasterers, Stone Masons, and with special equipment for unloading railroad gondola cars.

Constructed entirely of malleable and steel, roller bearing, circle swing, Hoists clear side wall and lands on eighteen-inch trucks. Adjustable capacity and speed.

One man operates both cranks and can hoist 1500 pounds

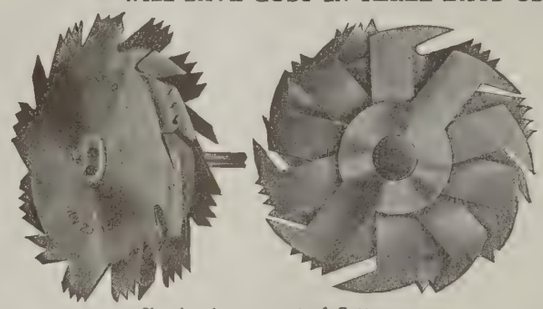
Price $40.00

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1034 W. Lake Street, - CHICAGO, ILL.

HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

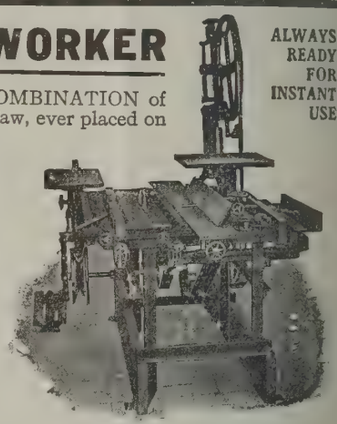
Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N. Y.**

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE



The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws.

Write for Catalog and Prices.

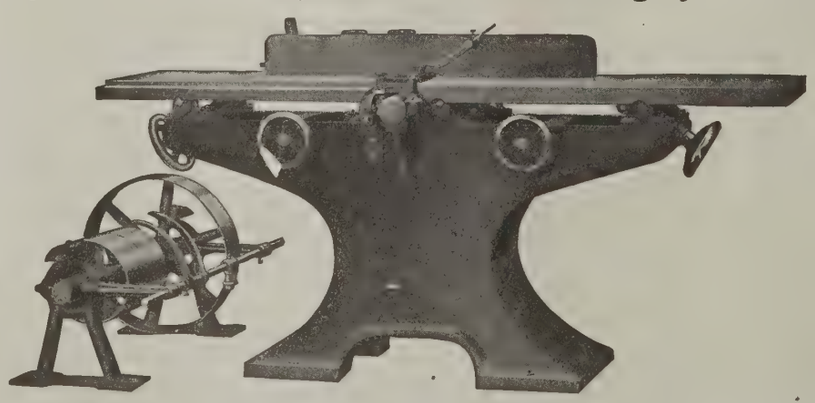
PARKS' BALL BEARING MACHINE COMPANY

KNOWLTON AND FERGUS STREETS **CINCINNATI, O.** Canadian Apts., Bournival & Co. St. Barnabe North, P. Q.

PROTECT YOUR FINGERS

by using a CRESCENT Jointer with Safety Head

The knives in CRESCENT Safety Heads are made of high speed steel which will hold an edge longer and turn out better finished and more work than can be done on a common jointer with ordinary knives. You may crowd the machine to the limit and the quality of work will be just the same as though you hadn't crowded it a bit.



The price of these splendid machines is very reasonable considering the very high quality of the machines and the enormous amount of accurate work they are capable of turning out.

Send for catalog giving complete description. It tells about our elegant line of Band Saws, Saw Tables, Jointers, Borers, Shapers, Planers, Planer and Matchers, Pole Rounders, Disk Grinders, Variety Woodworkers.

THE CRESCENT MACHINE COMPANY 10 MAIN STREET LEETONIA, OHIO, U. S. A.



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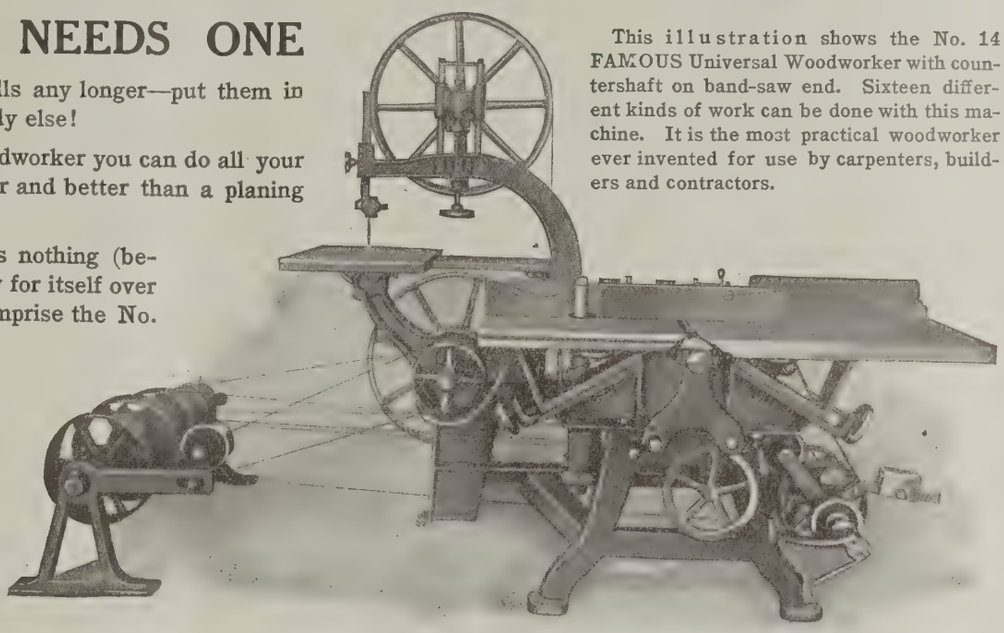
The Famous Universal Woodworker is worth more to your business than sixteen ordinary wood-working machines

EVERY CARPENTER NEEDS ONE

Don't pay out your profits to planing mills any longer—put them in our own pocket. Stop working for somebody else!

With a No. 14 FAMOUS Universal Woodworker you can do all your millwork yourself—and do it quicker, cheaper and better than a planing mill can.

The first expense is small, the upkeep is nothing (because we guarantee it for life) and it will pay for itself over and over again. The following machines comprise the No. 14 FAMOUS Universal Woodworker:



This illustration shows the No. 14 FAMOUS Universal Woodworker with countershaft on band-saw end. Sixteen different kinds of work can be done with this machine. It is the most practical woodworker ever invented for use by carpenters, builders and contractors.

Sixteen Woodworking Machines in One

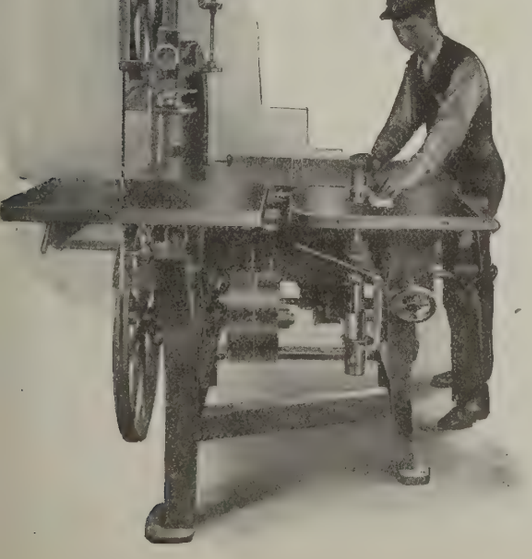
1—27 inch Band Saw.
2—12 inch Jointer.
3—Saw Table with raising or lowering arbor.
4—Single Spindle Shaper.
5—Boring Attachment, arranged on special boring spindle.
6—Pony Planer.
7—Tongue and Pole Rounder.
8—Hollow Chisel Mortiser.
9—Single End Tenoner.
10—Drum Sander.
11—Disc Sander.
12—Knife Grinder.
13—Emery Grinder.
14—Band Resaw.
15—Spoke Tenoner, Rim Borer and Wheel
16—Adjustable Felloe Rounder. [Equalizer.

A Complete Machine Shop

If you contemplate installing a machine shop, buy a No. 14 FAMOUS and instal sixteen different machines **on one base.** If you have machinery **now,** and are thinking of buying more, sell what you have and buy a No. 14 FAMOUS. You'll get more satisfaction and be money to the good.

When you buy separate machines you waste time, floor space and money. You require more labor, you must have a separate belting, pulleys and shafting—or motors—for each machine, and must set aside a large sum for depreciation. With a No. 14 FAMOUS you buy just ONE machine, and just enough power transmission equipment for that one. Under our broad guarantee there will be no depreciation expense and no fear of breakdowns. There is nothing complicated and no time lost in adjusting the attachments for the different operations.

You owe it to your business to write RIGHT NOW for full particulars of the machine, and of our proposition which allows you to try before you buy. Don't hesitate, but ask today.



This shows our No. 14 being operated as a Single Spindle Shaper.

Send for Catalogue and Details of our Free Trial Offer.

The Sidney Tool Company

Sidney, Ohio

Canadian Agents—

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The A. R. Williams Mchy. Co.
Front Street

MONTREAL
The A. R. Williams Mchy. Co.
320-328 St. James St.

WINNIPEG
The A. R. Williams Mchy. Co.
260 Princess St.

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The A. R. Williams Mchy. Co.
57-61 Alexander St.



Using the No. 14 FAMOUS as a Hollow Chisel Mortiser. Nothing could be more efficient or simple than this.

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THE NATIONAL BUILDER

FRED. T. HODGSON, Editor

Wm. C. A. Stevenson, Louis Muller } Associate Editors.

Porter-Hodgson Co., Publishers, 358-364 Dearborn St., Chicago

FRED. A. HODGSON, President. FRED. D. PORTER, Secretary and Treasurer. GEO. A. FARGHER, V. Pres. and Adv. Mgr.

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RELIABLE ADVERTISERS

THE NATIONAL BUILDER seeks the advertising of reliable houses only, and asks that prompt notice be given by any reader who has cause for complaint against an advertiser, that the matter may be investigated, and the advertisement discontinued should the advertiser be proved untrustworthy.

Volume 52 CHICAGO, MARCH, 1911 Number 3

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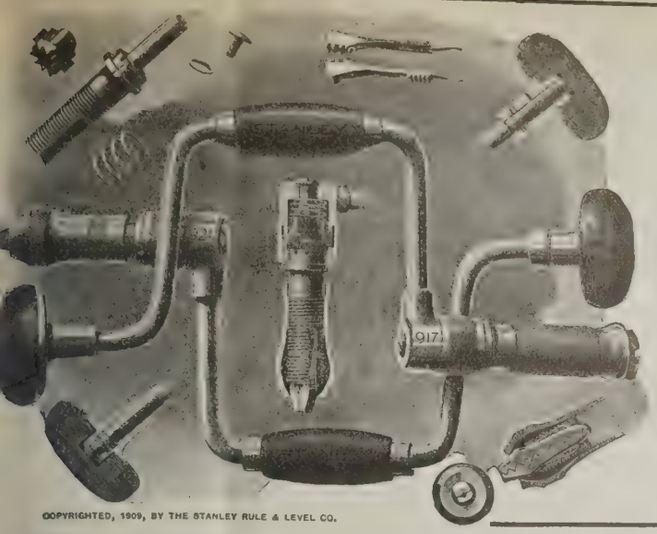
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Stanley Tools

STANLEY CONCEALED RATCHET BIT BRACES

are of the highest quality as regards workmanship, material and finish, and embody improvements and refinements in mechanical construction not previously contained in any Bit Brace. In this form of ratchet there are no projections to hurt the hand, and the working mechanism being encased, it is always free from dirt, grit and moisture, and retains oil for a long time. These Braces are fully warranted, carrying with them the guarantee of a Company who have been manufacturing high-grade Carpenters' and Mechanics' Tools for over fifty years.

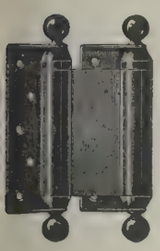
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STANDARD THE WORLD OVER.

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

Bommer Spring Hinges are Quality Goods



But cost no more than the inferior kinds

The Springs Never Go Lame

This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge



Reputations are made by consistently giving your customer the best spring hinges and avoiding imitations or substitutes

Bommer Spring Hinges are sold by all Hardware Dealers

HAVE YOU POWER BORING MACHINES?



Quadruple Bit Price $5.00
Can not be used in a hand brace

IF SO, No Sash Pulley Can be Classed with the

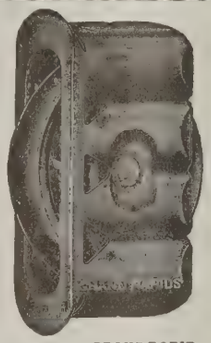
Grand Rapids No. 12

Mortised at one Punch with the

Quadruple Bit

or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money



Write For Free Samples

Grand Rapids Hardware Co., 118 Pearl St. GRAND RAPID MICH.



Hand Power Elevators and Dumb Waiters for all purposes

Cut shows the Improved Sedgwick Hand-Power Invalid Elevator Outfit.

Catalogue upon request

Sedgwick Machine Works

130 Liberty St. New York



TRUS-CON JOIST HANGERS

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

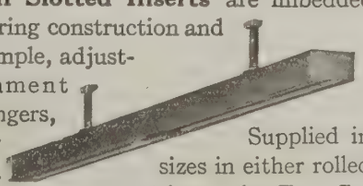
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

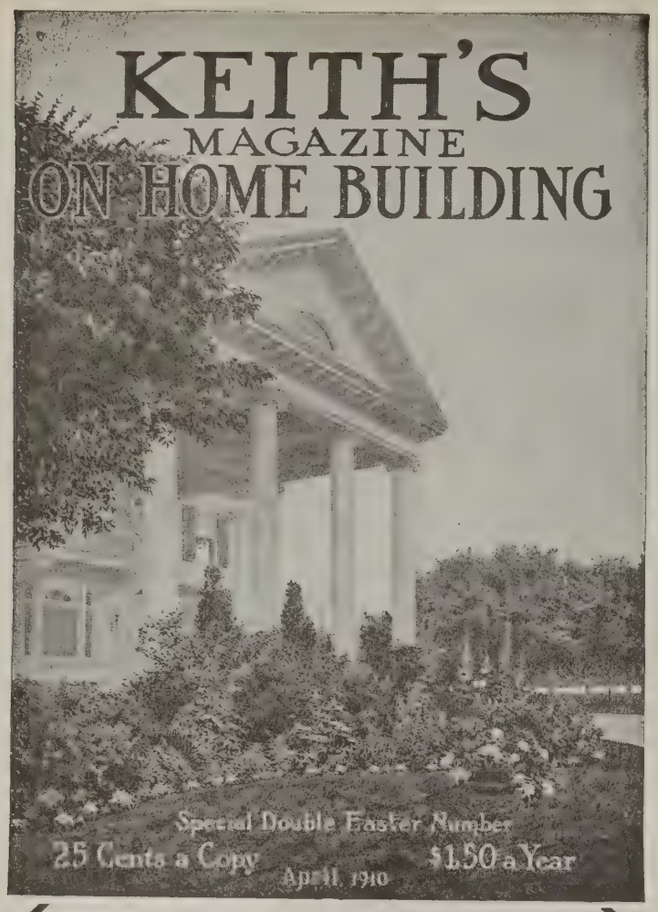
Trus-Con Slotted Inserts are imbedded in the concrete during construction and furnish a simple, adjustable attachment for shaft hangers, sprinkler systems, etc.



Supplied in various sizes in either rolled steel or cast iron; also Trus-Con Socket Inserts to receive threaded bolts.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

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The Recognized Authority

EACH issue of 72 to 80 pages is complete with instructive articles finely illustrated by half-tone cuts, artistic designs for moderate cost homes, contributed by leading architects. A year's numbers furnish a splendid variety of strictly new and high class work.

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A series of articles by architect H. Edw. Walker now running in Keith's Magazine, with drawings illustrating his monthly talks on "Construction Problems," will prove of unusual interest and practical value to every builder. You will be sure to want every number. Send in your subscription and book order NOW to start with our BIG APRIL NUMBER.

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Send $2 and I will mail you any one of these $1 books, enter you for a 1911 full year's subscription to KEITH'S monthly magazine and mail you *now* 3 numbers published in 1910. ($3.00 value for $2.00.)

Any 5 books and a year's subscription $5.

Fill Out This Coupon and Mail Today

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Dear Sir:

I accept your Special Offer and enclose $2 for a year's subscription to the well known KEITH'S MAGAZINE on Home Building, with 3 recent sample numbers extra and one of your $1 books. I have selected from your list, Vol. No._____, which please mail to me at once.

SIGNED _____

ADDRESS _____

A NEW MACHINE THAT WILL

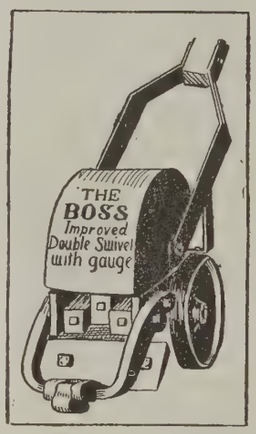
NOT ONLY DO THE WORK OF
10 FLOOR PLANERS AND SCRAPERS
BUT WILL DO IT MORE PERFECTLY
WE CLAIM AND HAVE PROVEN THAT
IT HAS NO EQUAL COMPETITOR ON
THE MARKET FOR PERFECT WORK. WE
ALSO MANUFACTURE THE ELECTRIC SCRUBBER
AND POLISHER.



FLOOR SANDING AND POLISHING MACHINE CO.
1706 CHESTNUT ST.
PHILADELPHIA, PA.

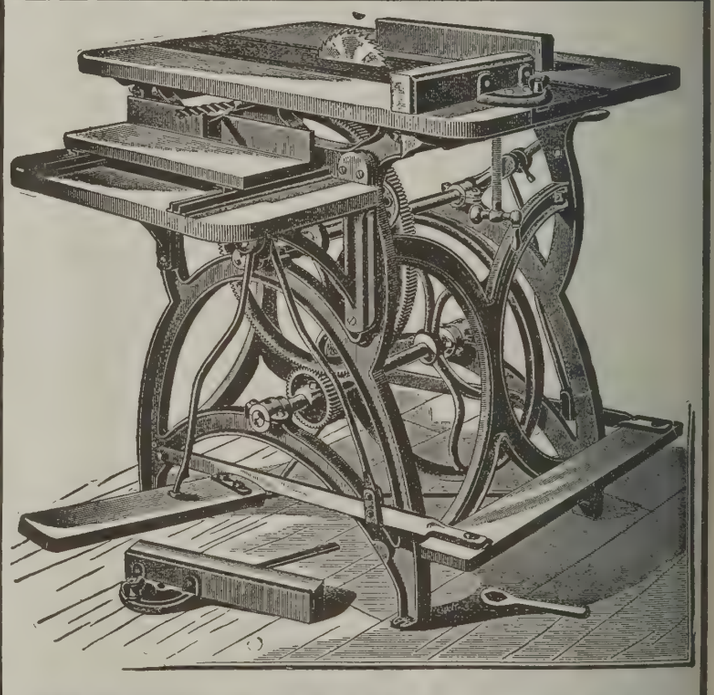
DRIVEN BY ELECTRICITY AUTOMATIC THROUGHOUT
ASK FOR BOOKLET

The Boss Improved Floor Scraper



Has double swivel allowing the knife to be set in any position. Gauge can be set for any thickness of shaving and keeps knife from making depressions in floor. Gives knife double support. The pear-shaped wheel which is in the gauge is attached to the gauge in front so that when the scraper is let down to take shaving, it lets the knife down gradually, and prevents the knife from making a deep cut. With this gauge and wheel attachment, the knife will leave no mark. Impossible to do poor work. Adjustment simple—positive. Gauge can be removed instantly. Sanding attachment. Prices very low. Write for descriptive circular.

GEORGE J. KEPPLINGER
DWIGHT, ILLINOIS
Adv. Dept. B.



MARSTON'S Hand and Foot Power CIRCULAR SAW

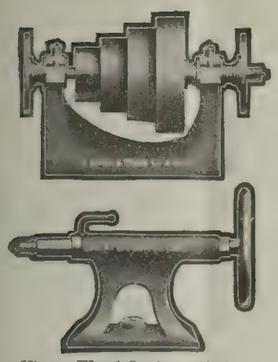
Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

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J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

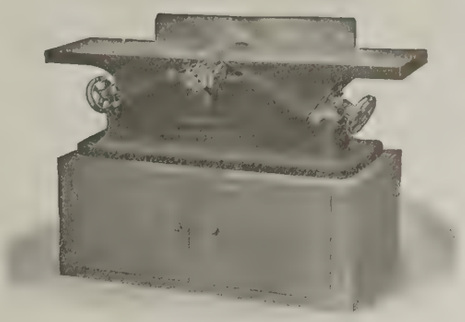
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THAT YOU WRITE ADVERTISERS.
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SMALL SHOP TOOLS



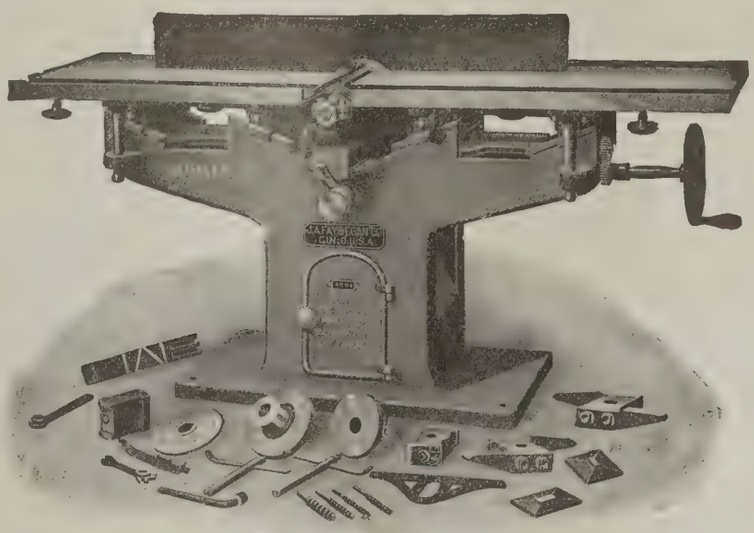
Victor Wood Lathes, all sizes

Take up little space
Easy to operate
Turn out the finest work
At prices which make them pay for themselves in a short time



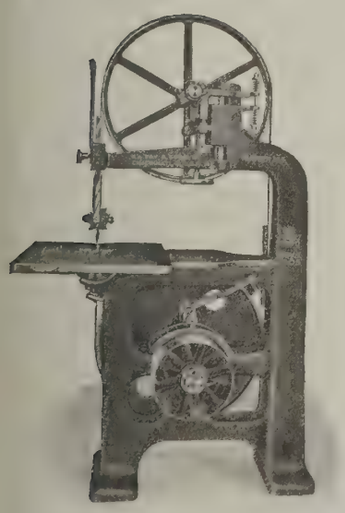
No. 254 Bench Hand Planer. The quantity and quality of work you can do on this machine will surprise you.

Start Right by putting in High-Class Tools. Cheap machines are dear in the end.



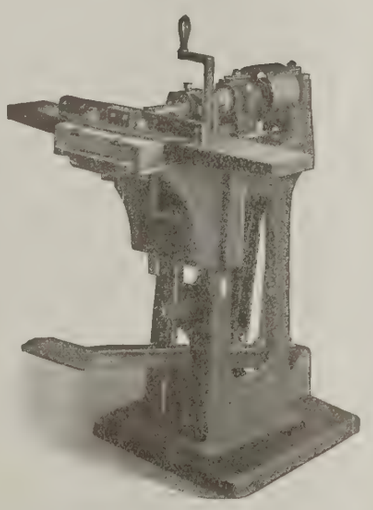
No. 62 Universal Wood Worker. A whole shop in itself. The variety of work you can do on this machine is practically unlimited.

Our Tools are Fully Guaranteed and will do your work for many years to come.



No. 155 Band Scroll Saw. Built onthe lines of our most expensive saws. The best small band saw you can buy at any price

Having your own shop puts the mill man's profit in your pocket; enables you to turn out just what you want when you want it, keeps your men busy in bad weather and off seasons, and increases your business by making it possible for you to take your contracts at a lower figure than your competitor who still depends on the planing mill.



No. 270 Rorizontal Hollow Chisel Mortiser. Working up to ¾ inch square and 6 inches deep, it will do as fine work as tne biggest and highest priced mortiser ever built.

WRITE TODAY

Large Illustrations, Full Details of Construction, Prices, Terms, etc., upon application.

J. A. FAY & EGAN CO., 327-347 W. Front St., CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

As Sure as 2 and 2 Is 4

The DAISY MFG. Co.
South Bend, Ind.
Gentlemen: Please send me the "Daisy" Floor Scraper Booklet free.
Name .....
City .....
State .....
Occupation .....

A Shearing Cut Gets Best Results in Floor Scraping

Why does a mechanic when scraping a floor by hand use the Shearing Cut? Because he obtains smoothest and quickest work so. When you whittle a piece of wood you use a Shearing Cut.

A Shearing Cut is ALWAYS made with the

"DAISY" FLOOR SCRAPER

With One Ten-Inch Blade Single Shearing Cut is Made
With Two Five-Inch Blades Double Shearing Cut is Made



The "Daisy"

CUTS EITHER WITH OR ACROSS THE GRAIN
CUTS RIGHT UP TO BASE BOARD AND INTO EVERY CORNER
IS EASIER ON THE OPERATOR AS IT REQUIRES ONLY A SLIGHT LIFT TO GET BEST WORK
WILL DO MORE WORK THAN ANY OTHER IN SAME LENGTH OF TIME
WILL DO PERFECT STRAIGHT EDGED WORK AND WILL PLEASE YOU
CLAMPS ARE INSTANTLY FASTENED
FILING DEVICE FILES BLADES TO RIGHT BEVEL
EDGE-TURNING DEVICE IS A WONDER

UNSOLICITED TESTIMONIALS

FRED L. WALTERS
CARPENTER AND BUILDER
Jobbing Given Prompt Attention
Estimates Furnished

Gillette, N. J., Oct. 11th, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
The flooring has arrived and we have scraped it with your machine and I find it does all you claim for it. Inclosed you will find check as per agreement.
Thanking you for your kindness in allowing me to try this machine and for extending the time for trial, I am, Yours respectfully,
FRED L. WALTERS.

KUTSCH BROTHERS
CARPENTERS AND CONTRACTORS
Jobbing and Repairing
Promptly Attended to
No. 2043 Washington Street

Dubuque, Iowa, Sept. 1st, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
Immediately after using the Scraper we have found it to be satisfactory and superior to any we have seen in use.
We herewith inclose draft in full for same.
Yours truly,
KUTSCH BROTHERS
Per J. P. K.

Belle Fourche, S. Dak., Aug. 4, 1910.
THE DAISY MFG. CO., South Bend, Ind.
Gentlemen:—
After giving the three Floor Scrapers a trial we have decided that the "Daisy" is the one we want. Inclosed find draft in full for same.
Very respectfully,
NELSON & GOLDING



Ten Days Free Trial Offer

We will ship a "DAISY" Outfit to any responsible contractor who intends purchasing a floor scraper for a ten days free trial. Test it with others, if you do not find it best return it. The trial will not cost you a penny.

DAISY MFG. CO., SOUTH BEND, IND.

"Nothing but the Highest Praise for THE TRIPLE "A" MACHINE"



This Letter is Self Explanatory

Flint, Mich., 11-23-1910.

Triple "A" Machine Co.,
Chicago, Ill.

Gentlemen:—
I take pleasure in writing you regarding the workmanship of your mechanics in scraping the floors of the Flint P. Smith Building, this city.
I have tried out three different floor scraping machines and am satisfied that the Triple "A" was the best. Owing to the work which your men and machines were able to do, I can have nothing but the highest praise for the Triple "A" Machine.
Yours truly,
W. E. WOOD.

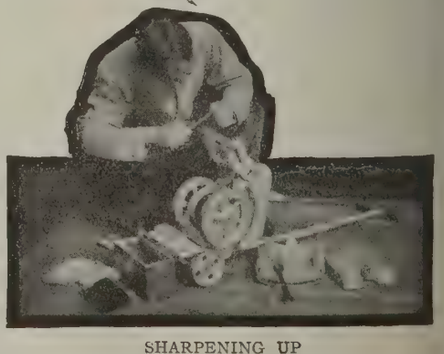
Surfacing Floors

(by contract)

pays when you have the proper equipment.

We can't do all the floor surfacing in the country, but we're willing to furnish the machines and give others a chance.

Any carpenter can successfully operate **The Triple "A" Spring Driven Floor Smoother**—It's easy—the motor spring furnishes power.



SHARPENING UP

Make it your business to see this machine in operation

Triple "A" Machine Co.

110 South Clark Street, CHICAGO

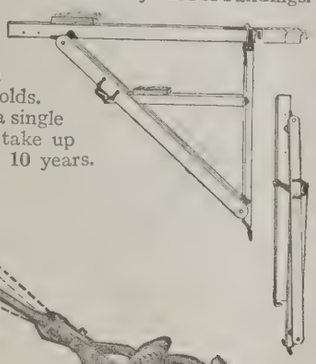
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Latest WEBER Work Savers

SAVE time and you make money. Crude tools delay work and turn out "botch" jobs. My devices are right up to the minute—mechanically correct—and you can't afford to be a day without them, Read every word of this ad; then send for complete catalog and prices. I've been a successful contractor for 25 years, and I absolutely **know** I can save you money at every turn of the road.

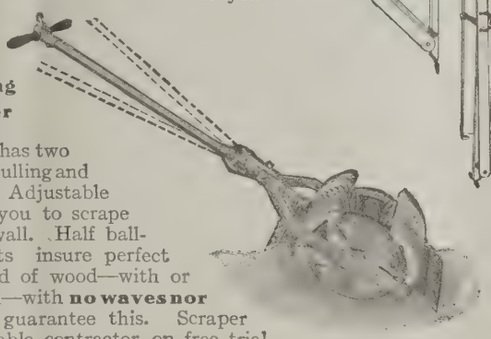
Double Scaffold Bracket

is the only one that can be adjusted for use on any kind of buildings. Will not swing sideways and has two scaffold boards which make it ideal for putting up cornices. Weighs only 22 lbs., but is much stronger than the old, heavy scaffolds. Can be folded without loosening a single bolt. When folded, 24 brackets take up space only 3 x 4 x 5 feet. In use 10 years.



WEBER

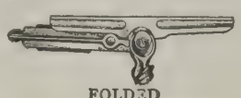
Double-Acting Floor Scraper



improved model, has two knives—one for pulling and one for pushing. Adjustable handle enables you to scrape right up to the wall. Half ball-and-socket joints insure perfect work on any kind of wood—with or against the grain—with **no waves nor chattering.** I guarantee this. Scraper ent to any reliable contractor on free trial.

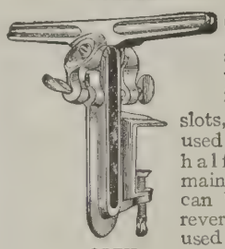
Folding Saw Vise

holds the saw with rigid unyielding grip and is as nearly noise-preventive as such a tool can be made. Can be thumb-screwed to any plank or bench in an instant. When folded, it takes up no more room than a common hammer. Saves many an aching arm from using dull saws and should be in every kit.

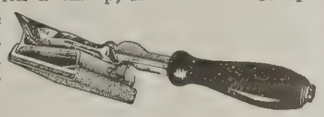


FOLDED

Cabinet Scraper and Sander



affords a firm grip and can be controlled with ease in the tightest corners. Knife is fastened with a clamp, not with holes or slots, and can be used till but a half inch remains. Scraper can be quickly reversed and used for sandpapering and polishing. Weight 22 oz. Handiest tool ever made for the purpose.



OPEN

Sharpening Device

for floor scrapers holds the file at the correct level for an even, true edge on Weber and other floor scraper knives. With this tool, anyone can do excellent work in short time without previous experience. Well worth investigation.

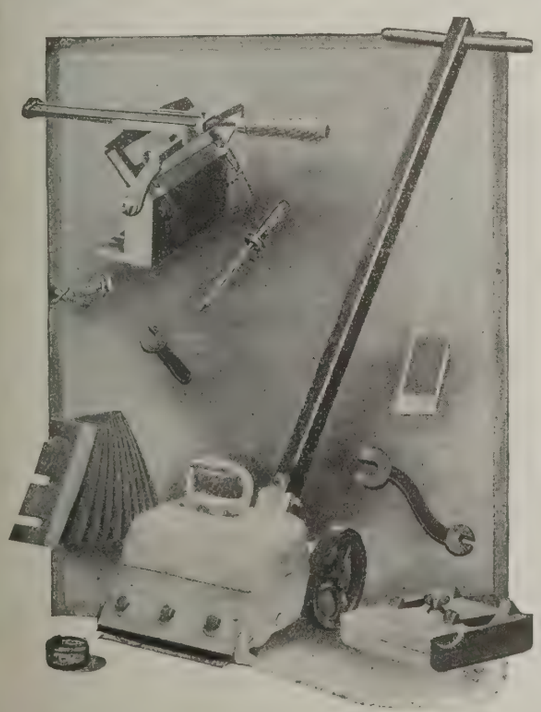


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JOHN F. WEBER, Pres. :: WEBER MFG. CO.

661 71st Avenue, WEST ALLIS, WIS.

TRY THIS OUTFIT YOURSELF



and learn, by actually working with it, just what it can do.

If you knew the time and money you could save by doing your floor finishing with the Acme Floor Scraping Outfit, you would not hesitate a day longer to send for the machines. If you have floor scraping to do, there is absolutely no reason why you should not accept my free trial offer. I do not ask for any money and don't expect any if you are not satisfied with the results of your trial. Send back the outfit. That's all I ask.

If you haven't my booklet which gives full detailed description of my floor scraping equipment, then let me send it to you, together with full particulars of my free trial offer. Write me for these now and I will send them by return mail.

JOSEPH MIOTKE, 249 Lake St., Milwaukee, Wis.

A FEW EXPRESSIONS FROM THE WEST

Lamar, Colo., Feb. 6, 1911.
Jos. Miotke,
Milwaukee, Wis.

Dear Sir—Enclosed find our check in full payment of the Acme floor scraping outfit which you sent us on trial a few weeks ago.

Beg to say that the scraper and attachments have given good satisfaction.

Yours very truly,
G. A. BROWN MFG. & LUMBER COMPANY.

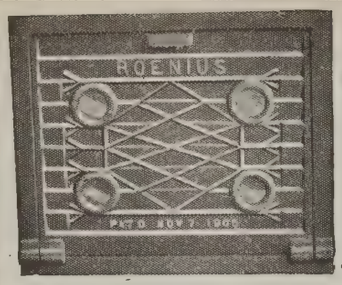
Oakes, N. D., Feb. 10, 1911.
Jos. Miotke,
Milwaukee, Wis.

Dear Sir—In reference to the Acme floor scraping outfit which you sent me on trial a few days ago, will say that the machine works perfectly satisfactory. It is not necessary to have new floors to demonstrate that machine on. I tried out the scraper under various conditions, both on old and new flooring, and the results are entirely satisfactory in every particular. I believe you have one of the most up-to-date machines and attachments there is on the market. I have sharpened one blade with your sharpener, and I do not think it has an equal and is worth considerable to anyone to sharpen and turn most any kind of a scraper blade.

I do not consider I spent as much time learning to use the Acme as I would learning an inexperienced man to file and turn a hand scraper. Your outfit certainly does the business and it will be the means of my saving many dollars on floor scraping work.

B. ORCUTT.

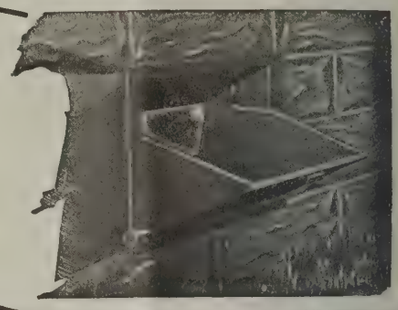
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WRITE FOR CIRCULAR N AND PRICES NOW

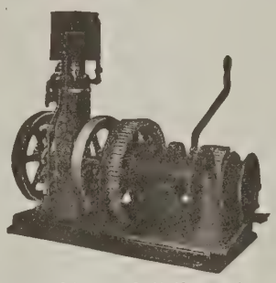
Roenius Wood and Coal CHUTES

Roenius Chutes have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed. Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked. Ask your dealer for the Roenius—or write us.



GRAND RAPIDS FOUNDRY CO.
MANUFACTURERS
Grand Rapids, Wisconsin

Material Hoists



For Double Platform Elevators

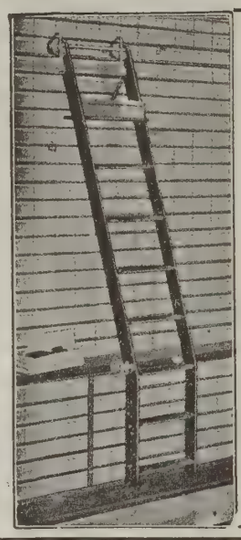
SIMPLE, STRONG, DURABLE

The most economical method for elevating building material. Two sizes, 4 and 6 horse power.

Contractors send for Bulletin No. 5 and get our proposition.

Also a full line of engines from 1 to 35 horse power.

Bates & Edmonds Motor Co.
1146 MILL ST., LANSING, MICH.



Mr. Carpenter and Builder

Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

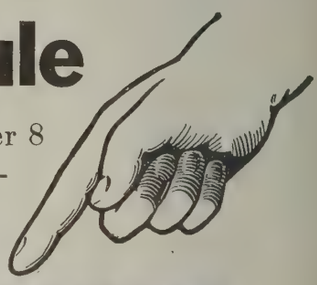
It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY
1442 N. Eighth St., ST. LOUIS, MO.

Nicholls' Rafter Framing Rule

FULLY EXPLAINED



If your roof raises 8 inches to the foot, look under 8 and you will find your figures for length of common rafter, hip or valley rafter per foot run, length of first jack rafter and the difference in the length of others spaced 16 and 2 ft. centers, also their cuts.



FOR EXAMPLE

If your roof raises 8 inches to the foot, or, as it is called, third pitch, under 8 on the first line are the figures 14.42; this is the length of common rafter per one foot run; if the building is 16 feet wide, half the width of building would be the run of common rafter; in this case it would be 8; multiply

14.42 by 8
8

115.36

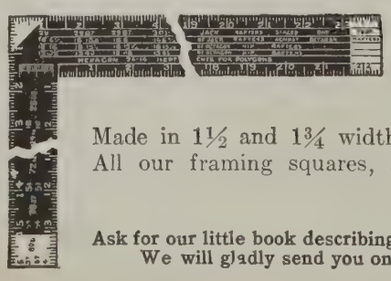
you have 115.36 inches, or 9 feet 7⅜ inches. To obtain the bottom and top cuts of common rafters, use the figures 12 on body and 8 on tongue; 12 side gives bottom cut; 8 side gives top cut; the same figures give bottom and top cuts for jack.

On the second line under 8 are the figures 18.78; multiply these figures by 8, which is the run of common rafter and gives lengths of hip or valley rafter.

18.78
8

This gives 150.24 or 12 feet 6¼ inches. This is the correct length of hip or valley rafter.

On the fifth line under 8 are the figures 10 and 12; by placing square on stock to be cut at these figures, 10 on body, 12 on tongue, and marking on 12 side, this gives side cut of jacks against hip or valley rafter.



Our No. 100A has the octagon roof framing rule on back of square as per small cut, giving all lengths and cuts of rafters for same. This square sells for **POLISHED STEEL $2.25 OXIDIZED COPPER $2.50 NICKEL PLATED $3.00**

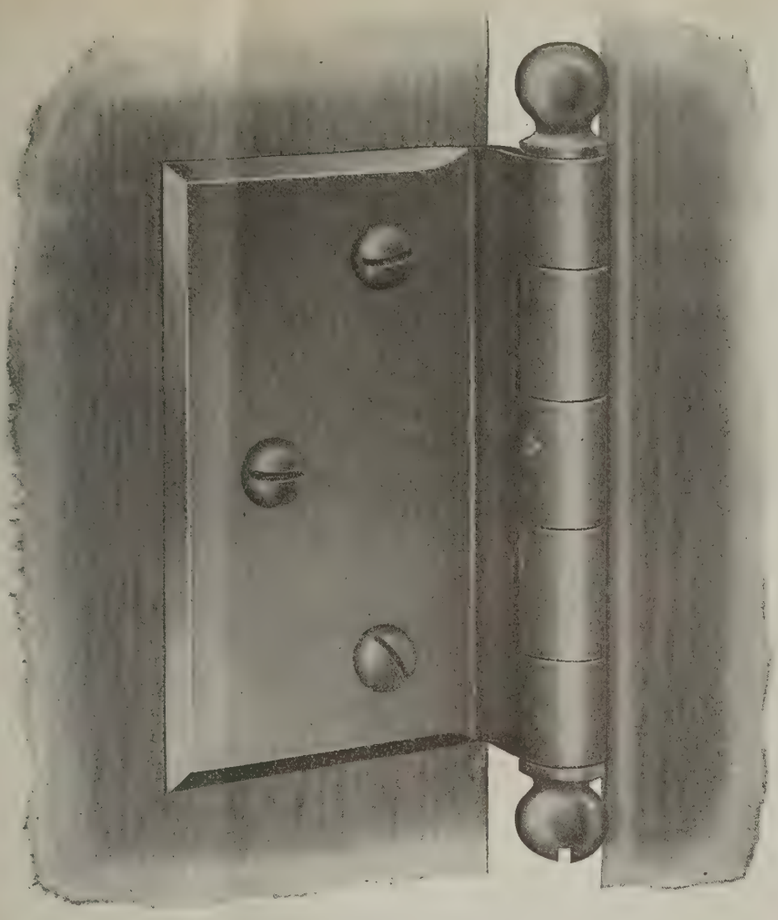
Made in 1½ and 1¾ width tongue. Ask your dealer for these, but if he will not supply you we will prepay express. All our framing squares, also Nos. 100-1-2 and 3 standard squares have **HARDENED CORNERS.**

White portion of cut shows part hardened

Ask for our little book describing our framing rule. We will gladly send you one upon request.

NICHOLLS MFG. CO., Ottumwa, Iowa

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No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

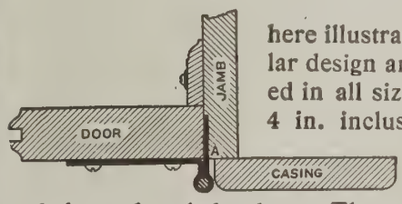
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

These are exclusive "NATIONAL" features.

Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.



It is Round—and It is a Wonder

The new Carborundum Carpenters' Bench Stone is just the right size for that rotary motion required in sharpening chisels, plane bits, etc. Made one side coarse grit for bringing the tool to an edge, the other fine grit for finishing. Like all Carborundum sharpening stones, it gives a better edge in less time—never fills or glazes and wears uniformly.

CARBORUNDUM ROUND COMBINATION BENCH STONE

No. 107..... $1.00
With quartered oak box holder 1.50
Carborundum Pocket Stone in leather case... .35

ASK YOUR HARDWARE DEALER OR SEND DIRECT

THE CARBORUNDUM COMPANY, Niagara Falls, New York

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Fighting The Trust!



The Smashing Anti-Trust Fight Now On!

Trust Prices Eclipsed at Last!

An absolutely *first-class* **high-grade** watch at a price within the reach of the people—the Burlington Special Anti-Trust Watch.

The World's Masterpiece of watch manufacture—the Burlington Special—now sold direct to the public at its *rock bottom, anti-trust* price (and besides without middlemen's profits.

We do not care what it costs—we will uphold our independent line and so we are making the most sweeping, baffling offer ever made on watches.

Some trusts are legal and some are not. **We do not say that the watch trust is illegal;** but we do say that the **methods** of the giant factories in making "contracts" with dealers **to uphold double prices** on watches is very **unfair**—unfair to **us** and **you.** Hence our **direct** offer on the Burlington at the **very same** price the **Wholesale** Jeweler must pay.

This is *your* opportunity—**NOW**—while this great Anti-trust offer lasts—get the best watch made anywhere at one-third the price of other high-grade watches. Furthermore, in order to fight the Trust most effectually, we even allow terms of

$2.50 a Month on our finest watch—easiest possible payments at the rock-bottom price, the identical price the **Wholesale** Jeweler must pay.

WATCH BOOK ON REQUEST.

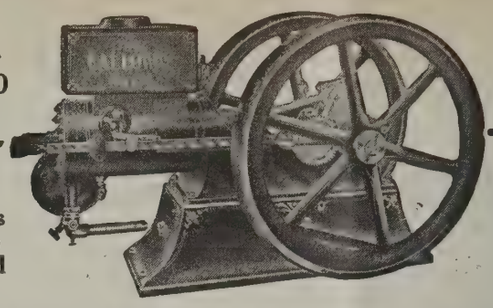
Now do not miss this opportunity. At least we want you to know about WATCHES and WATCH PRICES. Write today.

BE POSTED—Send a postal or letter and get the free book. It tells you how to judge a watch. You should get this great book if you ever expect to own a watch.

BURLINGTON WATCH CO.

Dept. 6973 **19th and Marshall Blvd., CHICAGO**

5 H. P. $119.50



1¾-28 H. P.

30 Days Free Trial

Built for Service

CONCRETE MEN ATTENTION

Galloway Engines are made in all sizes from 1¾ to 28 H. P. They run on gasoline, naphtha, kerosene or distillate. We are furnishing complete mixing rigs and our price means a big saving of money to you—$50 to $300, depending on the engine you buy. You have the privilege of trying the outfit 30 days. If it is in any way unsatisfactory we refund your money with interest and pay freight both ways.

The Galloway Gasoline Engine

SIMPLEST ENGINE BUILT

Only four things to do:

Turn on the switch, turn on the oil, turn on the gasoline, give the flywheel a start and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs.

The Galloway has been classed as a standard, high grade engine for fifteen years. Over 4,000 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember, the bore and stroke count, and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake test.

On the larger sizes, if it is not entirely convenient for you to pay all cash, we will take your note for the balance at the regular rate of interest for six months.

The price given is for the five-horse power only, but we make these engines in seven sizes.

Ask for free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure. Write today.

The William Galloway Company, 1695 Galloway **WATERLOO, IOWA**

THE WINTHROP

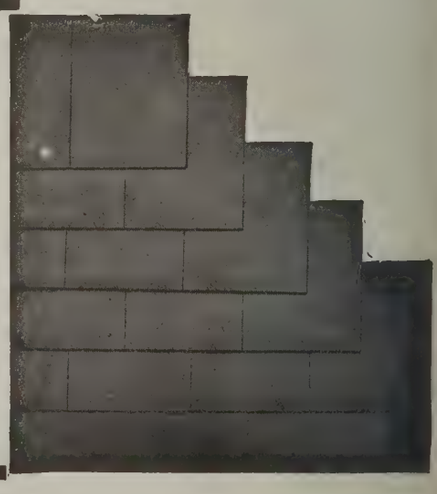
SOLID TAPERED ASPHALT SHINGLES

Are of a Cool, Gray Slate Color

And have the durability of asphalt—the fine appearance of slate and the light weight and low cost of wood shingles. They are fire-resisting—weather proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

Special Inducements to Those Who Apply First Roof in Each Town. Catalogue on Request

WINTHROP ASPHALT SHINGLE CO., 1100 THE TEMPLE **CHICAGO, ILL.**



Crestings and Finials



CRESTING No. 107. FINIAL No. 97

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GALESBURG, ILL.

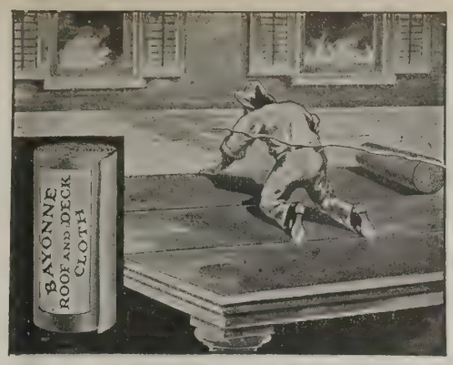
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SEND US YOUR PLANS FOR AN ESTIMATE ON THE SHEET METAL.

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For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

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202 and 204 Market Street, ST. LOUIS

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All Widths—All Weights—Any Quality

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Our co-operative department gives complete instruction for laying
BAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.

All "asphalt roofing" is not Trinidad Lake Asphalt Roofing—there's a great big difference. Look out for that when you buy your roofing.

Ordinary so-called asphalt roofings are made of artificial products masquerading as real asphalt. They are nothing more than the residue from petroleum oil or native bitumens made into a black pitch, which is easily affected by changes in weather.

Genasco

the Trinidad-Lake-Asphalt Roofing

is made of genuine *natural* asphalt—perfectly stable and uniform in quality.

Trinidad Lake Asphalt is endowed by Nature with *natural* oils; and they stay in it. This gives Genasco its wonderful resistance to rain, snow, sun, wind, heat, and cold—and keeps it lastingly waterproof.

The artificial asphalts have oils *mixed* with them, but they haven't the quality of the oils in the natural product; and they soon evaporate and leave the roofing "dead"—and it cracks, breaks and leaks, although at the first it may look like Genasco, the real Trinidad-Lake-Asphalt roofing.

Natural asphalt in roofing is the greatest weater-resister known. To make sure of roofing that will permanently protect, ask your dealer for Genasco, the Trinidad-Lake-Asphalt Roofing, with either mineral or smooth surface. Fully guaranteed.

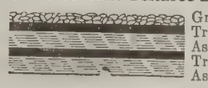
The Kant-leak Kleet waterproofs the seams of Genasco Roofing without cement, does away with nail-leaks, and gives the roof an attractive finish. Ask your dealer for Genasco with Kant-leak Kleets packed in the roll.

Write for samples and the Good Roof Guide Book.

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THE BARBER ASPHALT PAVING COMPANY
Largest producers of asphalt, and largest manufacturers of ready roofing in the world
PHILADELPHIA
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Cross-section Genasco Stone-surface Roofing



Gravel
Trinidad Lake Asphalt
Asphalt saturated Wool Felt
Trinidad Lake Asphalt
Asphalt saturated Wool Felt

The Carey Roof Standard

CAREY'S FLEXIBLE CEMENT ROOFING

To Prove to You

the high, standardized construction and composition of Carey's Roofing, we want to send you

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and give you practical information regarding Carey's Roofing based on 25 years' actual time-proved tests. Carey's Roofing is equally adapted to flat or steep surfaces, wood-sheathing, tile or concrete. Whether your contract is large or small, we want to show you the advantage of using a standardized roofing material.

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"FAMOUS FOR DURABILITY"

Artistic and Attractive in Appearance — Durable and Inexpensive

Practical and Easily Applied

with Superior Fire-Retardative and Storm-Resisting Qualities to meet Extreme Weather Conditions — Sparks, Hail, Sleet, Sliding Ice, Rain, Snow, or the Extremes of Cold and Heat do not affect the Superior Upper Coating of **"Burmite,"** which is made with Two Separate and Distinct Surfaces, i. e.,

BIRD-SAND and *"Twolayr"* SLATE-CHIPS (Patent Pending)



Roofed and Sided with "BURMITE"

For ROOFING and SIDING of Buildings—*be they NEW or OLD*

Ready-To-Lay

Burmite

(Registered U. S. Patent Office)

FLEXIBLE-CEMENT-BURLAP INSERTED MATERIAL

Will be Found *The* BEST *By* TEST — GUARANTEED FOR 10 YEARS Without Coating

Used in any Climate; can be applied in cold weather; equally well adapted to uneven, flat or steep surfaces; can be laid over old Shingles or Tin. Lasts longer than Shingles—costs less. Sold on its merits and lasting qualities. The First Cost—The Only Cost.

To make yourself acquainted with this up-to-date Material for Roofing and Siding Residences, Business and Factory Buildings, Summer Homes, Bungalows, Barns, Garages, Churches, Plants, Warehouses, Depots, etc., of CONCRETE, BRICK, STONE, FRAME or other Construction — *be they NEW or OLD,* Write Today for our Samples and Booklet,

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Illustrated with Buildings, Beautifully Printed in Colors, showing effect of Burmite Material applied as a Roofing and Siding. Mailed free of all charges and obligation.

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Mail to my address, as above, Sample and Booklet. This places me under no obligation.

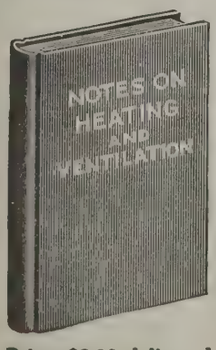
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N B

Notes on Heating and Ventilation



Price, $2.00 delivered

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Second Edition; Bound in Cloth, 6¾x4¾ in.; 200 pp.

This book is a resume of lectures delivered to classes in heating and ventilation at the University of Michigan. It is written primarily for the steamfitter and designer of heating systems It presupposes a knowledge of the construction and operation of the simpler forms of heating systems. Reduced to as brief a form as possible, so that readers can readily find notes or data desired.

Contents—Theory of heat and measurement of temperature. Heat losses from buildings; rules for determining heat losses in different constructions. Different forms of heating systems; their advantages, disadvantages and relative economy. The design of a direct steam heating system. The design of an indirect heating system. Steam boilers and steam piping. Carrying pipes underground, etc.

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Luxurious Enamel Bath Tub of guaranteed quality. Will wear forever.



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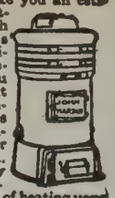
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HEATING PLANTS. Let us make you an estimate on a heating plant. With instructions from our engineering department, you can install it yourself. Simple and safe as a stove. No expense after once installed. The only healthful economic method of heating your home. Plans free. Tools loaned. Boiler only **$65.00 and up**



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Full Line of Plumbing Supplies



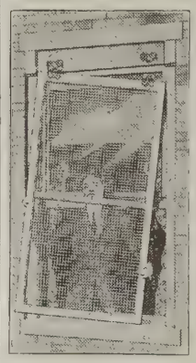
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Complete bath room outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

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Try a pair to hang one of your own window screens.

After that you'll always use and recommend them.

Ask on your letter-head and we'll send a sample set free if you mention your hardware dealer.

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Let us send you this Home Heating Book, with other booklets and prices first—Now's the time to investigate—Think it over. We will save you first cost and lasting economy and reduce your fuel bills ½ to ⅔. Find out about the experience of thousands of satisfied owners of Hollands—Double Grate Surface—Patented Corrugated Air-admitting Double Firepot, burning fuel from sides and top, nature's way, for greatest even heat. Consumes gas, soot and clinkers with least smoke. No explosions. Book tells all improved tested points, convenience and satisfaction of the Holland. Unlike others. Less joints. No bolts. Simpler and easier and cleaner to run. Ideal damper arrangement. Consumes less fuel. Gives longest service from construction and double materials used where strains are greatest. Save money with

Holland Gas and Soot Consuming Furnace

FREE



Write for it Today

Years of experience in the heating business has taught us that the strain in any furnace is from the fire line up and that is why the combustion chamber of the Holland Furnace is over an inch thick at the top where our patented radiator is placed. Radiator is cast in one piece and altogether from the base to the top, our furnace has but five joints.

Burns any fuel—soft coal—slack screens—hard coal, lignite, or wood with least waste. Smoke travels twice as far, no heat wasted. Equal heat all through the house in all pipes. Special Double Guarantee. Book has many other points to tell you.

Save ½ to ⅔ on Fuel

Our fuel-saving claims for the Holland have been proven by thousands of satisfied owners. You be the judge. Just send name on postal for our Big Catalog—Free with other Home Heating Booklets and prices. Who's your dealer?

Holland Furnace Co.,
Dept. 14
Holland, Mich.



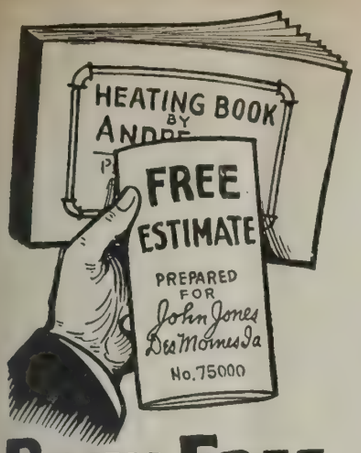
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You can buy our furnace direct from our factory AT THE FACTORY PRICE, and test it 60 days in winter weather. If not pleased, return it at our expense for freight both ways, and pay us nothing.

This offer, and lots of good furnace information, will be found in our free 48-page booklet. Ask us for one. A postal card will do.

Hess, 907 Tacoma Building, Chicago

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BOTH FREE

CONTRACTORS

BEFORE you set a price on that next house get Andrews' Big Book on Heating and Free Estimate covering the price, complete, of an Andrews Plant, shipped you direct, "knock down," ready to erect.

BIG MONEY FOR YOU

THIS SYSTEM is the easiest for you to handle, as we do all the work of planning, cutting and fitting—yes, and take the risk of the plant's success. We know the Andrews Systems are the best that can be produced in every way. Your carpenter's helper can easily set up the plant, following our complete and simple directions. It will pay you to investigate our proposition which enables you to make the profit that would otherwise go to the heating contractor. Send us a rough sketch for an estimate on your next job. We will quote you a net price or quote price to your customer, allowing you a liberal commission. Let us help you make some money.

How to Get an Andrews System

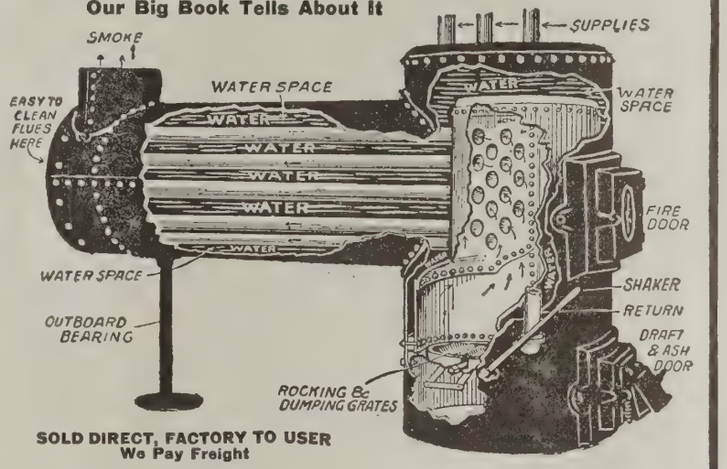
First send us a rough sketch of floor plans (or architect's plans) of the house to be heated, giving size of rooms, windows, height of ceiling, construction, etc., and get our Free Estimate of cost complete. We will tell you all about the plant, what it includes and send with the estimate our big Book fully describing everything. Our engineers then design your plant to meet your individual requirements. Pipes are cut to fit and threaded. All fittings, etc., are marked and boxed, and the entire plant is shipped you, freight paid, ready to erect. Such simple and complete instructions are given that a carpenter's helper can easily set the plant up.

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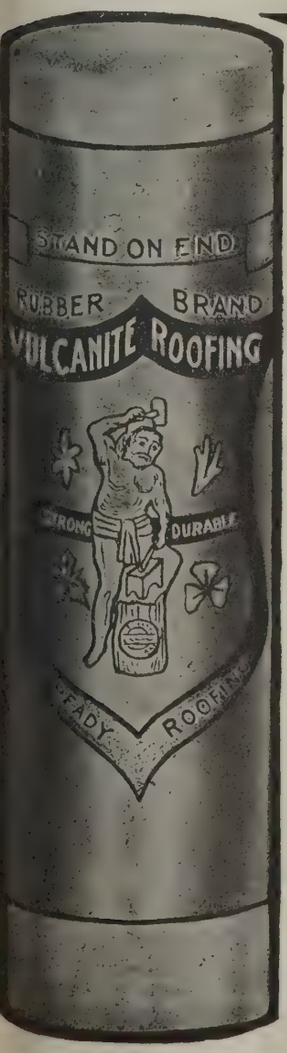
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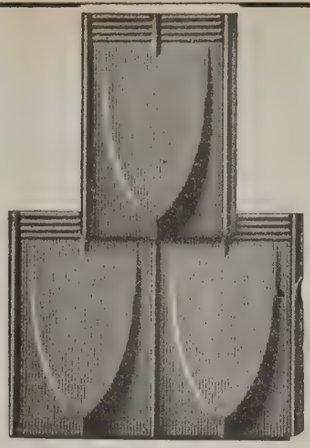
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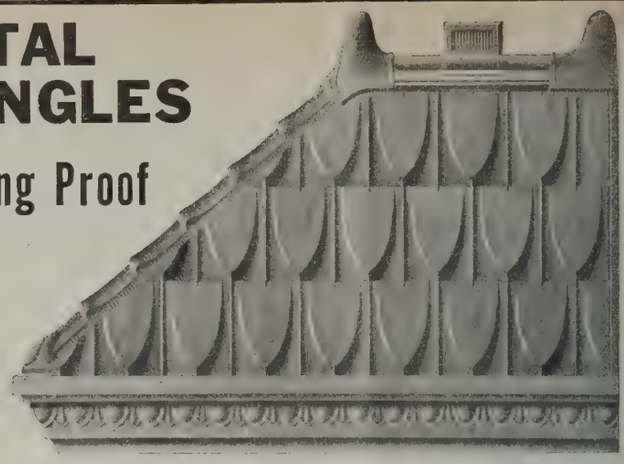
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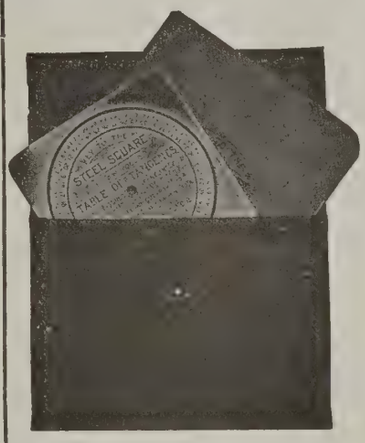
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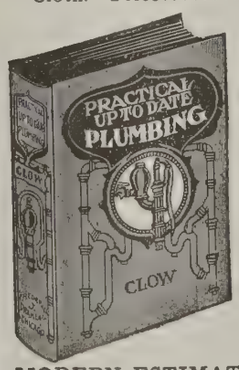
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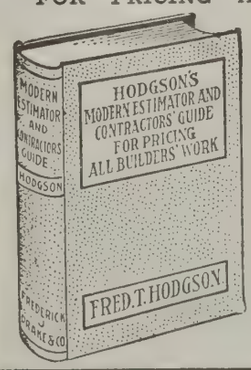
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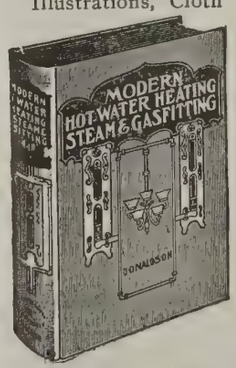
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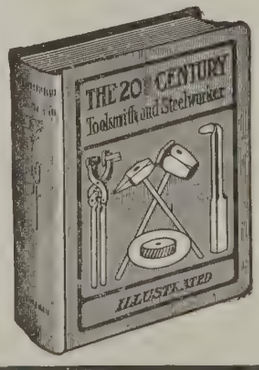
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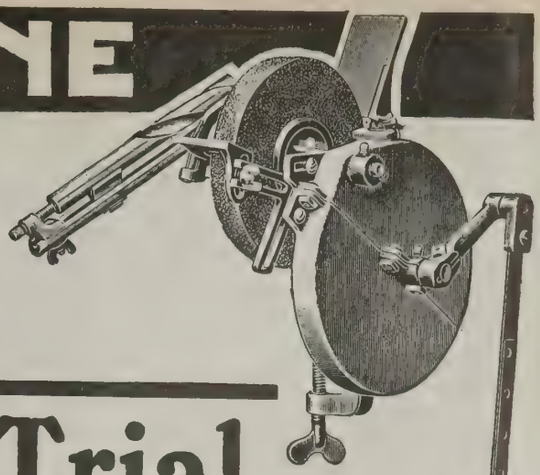
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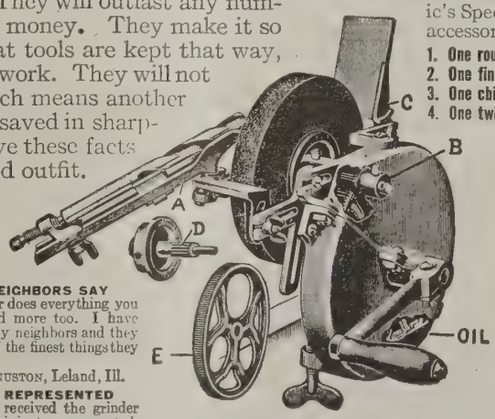


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This outfit supplies every grinding, buffing and polishing need. The chisel and twist drill attachments make it easy for inexperienced persons to sharpen drills and chisels correctly.



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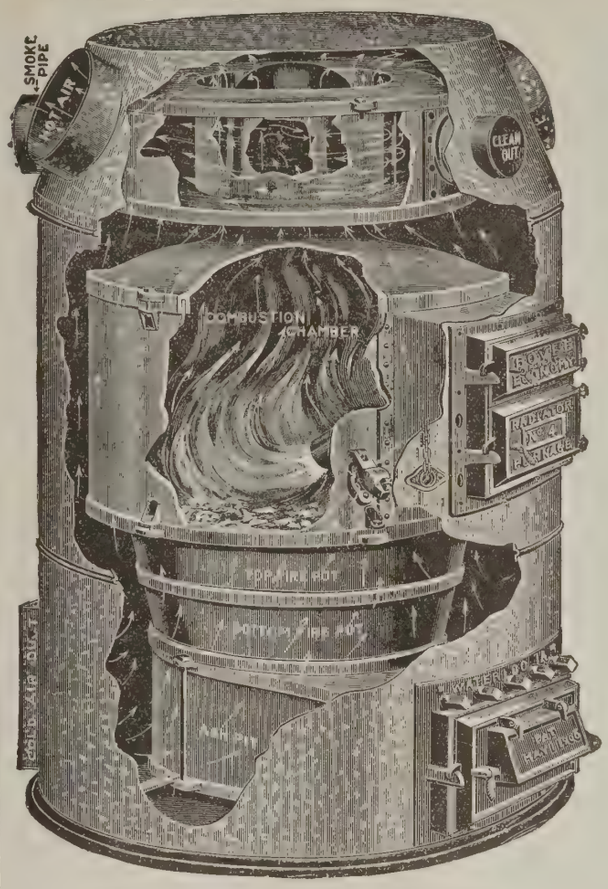
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Three-Run Heating Plant for Residences

Including Pipe Registers and All Fittings

40-Inch Furnace

20-inch firepot, 28-inch combustion chamber. Heats 10,000 feet. Price..... **$65**

These Furnaces will carry from 5 to 8 pipes, which can be added at small cost when desired.

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One large run directly over Furnace and two cold-air plates, including pipe-registers and fittings.

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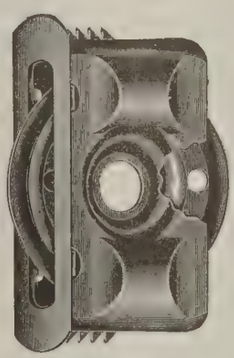
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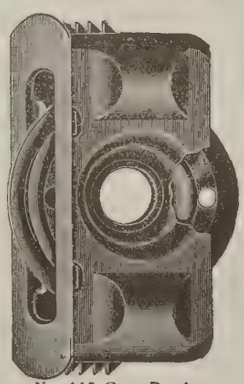


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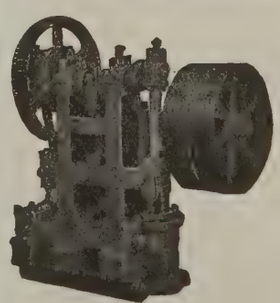
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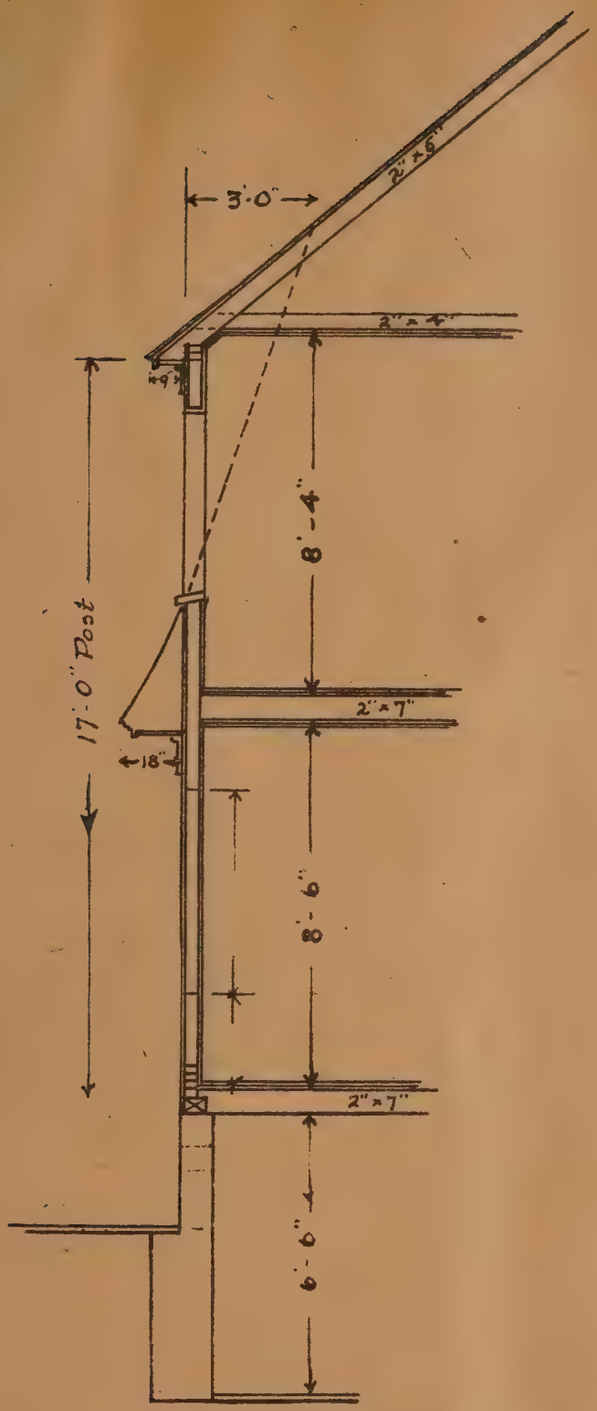
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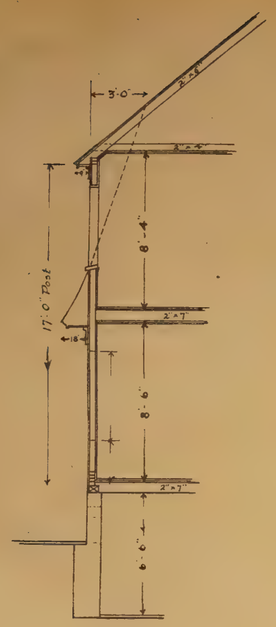


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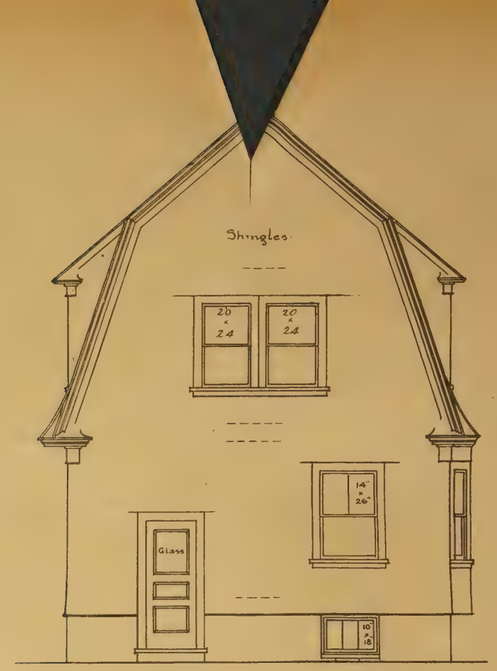
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FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION

SUPPLEMENT TO

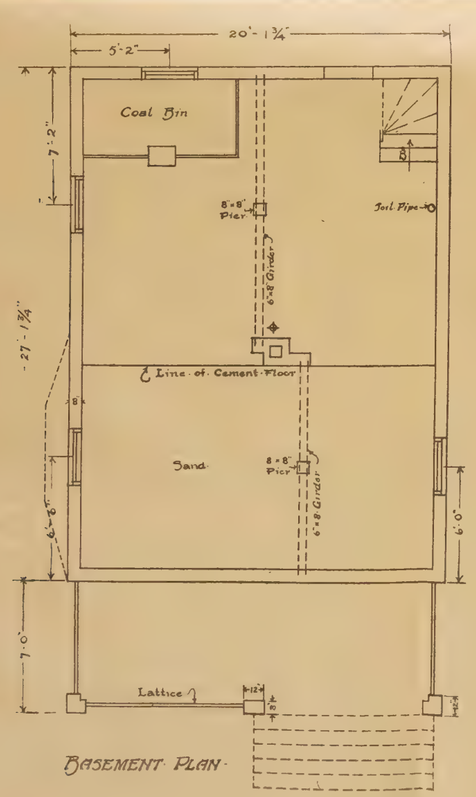
THE NATIONAL BUILDER

MARCH, 1911

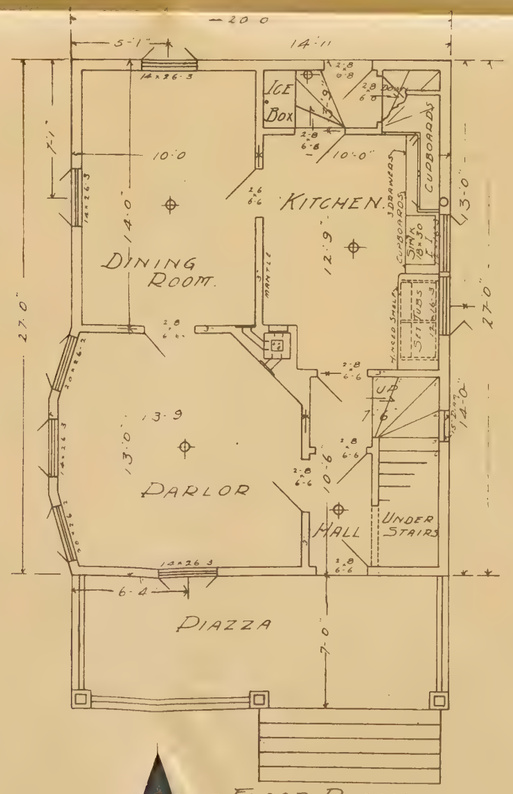
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SCALE FOR FLOOR PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 4 FEET.

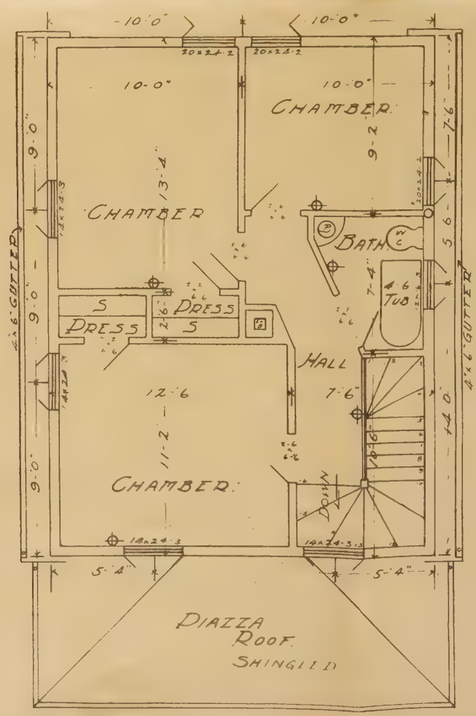
FOR ESTIMATE, SEE PAGE 20



BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

THE NATIONAL BUILDER

Vol. 52 CHICAGO, MARCH, 1911 No. 3



THE COLONIAL SHINGLED HOUSE

NATIONAL BUILDER DESIGN No. 339

G. L. Warfield, Architect

For Floor Plans, Elevations and Details, See Supplement of This Number. Estimated Cost, Architect's Fees Not Included. $2,170.00

THE SUPPLEMENT PLAN

ON the supplement this month is shown an inexpensive house favoring in design the quaint Dutch Colonial style, emphasized by the gambrel roof at front and rear gables. Other attractive features of the exterior design are the porch across the entire front with its balusters, the large oriel window of the dining room, and the well-balanced arrangement of the windows throughout. The plan is direct and economical of space; the entrance hall is at the side, and is entered directly from the kitchen, avoiding passing through rooms to answer callers. At the left, opening from the hall, is the well lighted parlor, and back of this the dining room. The kitchen has set tubs, is well supplied with cupboards and has a special place for ice-box. On the second floor are three chambers of good size, each with two windows, and carefully planned wall space for beds. The bath room has the usual three fixtures. The house is shingled, and is one of the best in design and plan of any inexpensive home that has been published in this journal.

ESTIMATE of COLONIAL SHINGLED HOUSE

By I. P. HICKS

EXCAVATING AND MASONRY.

94 yards excavating, 35c	$ 32.90
576 cu. ft. stone wall, 18c	103.68
180 cu. ft. cement block wall, 25c	45.00
37 lineal feet 8x8 flue, 80c	29.60
Cement cap	2.00
32 yards cement cellar floor, 40c	12.80
Total excavating and masonry	$225.98

LUMBER BILL.

	Feet.
2 4x6x22 ft. sills	88
4 4x6x14 ft. sills	112
1 6x8x14 ft. girder	56
1 6x8x12 ft. girder	48

Copyright, 1911, by the Porter-Hodgson Co.

8	2x4x14 ft. coal bin	72
19	2x8x22 ft. floor joist	551
25	2x8x20 ft. floor joist	675
96	2x4x18 ft. outside studding	1,152
12	2x4x12 ft. gable studding	96
100	2x4x16 ft. partitions and plates	1,100
40	2x4x14 ft. rafters	360
14	2x6x10 ft. porch joists	140
14	2x4x12 ft. porch ceiling	126
14	2x4x16 ft. porch rafters	154
22	2x4x20 ft. ceiling joists	286
10	1x4x12 ft. bridging, No. 1 com	40
20	1x6x12 ft. braces, No. 1 com	240
10	2x2x16 ft. furring, No 1 com	55
	Total feet framing lumber	5,351
5,351	ft. framing lumber, at $27	$144.47
3,100	ft. sheathing outside walls and rough floors, $27	83.70
940	ft. main roof sheathing, $27	25.38
36	M red cedar or cypress shingles for outside walls, $4.75	171.00
138	lineal ft. 1x10x12 to 16 ft. cypress finish, $50	5.75
100	lineal ft. 1x6x12 to 16 ft. cypress finish, $50	2.50
250	lineal ft. 1x4x12 to 16 ft. cypress finish, $50	4.15
80	lineal ft. 1x8x14 ft. cypress finish, $50	2.75
80	lineal ft. 1⅛x12x14 ft. pine finish, $50	5.00
175	sq. ft. 1x4x14 ft. pine flooring for porch, $50	8.75
175	ft. ⅝x4 in.x14 ft. porch ceiling, $30	5.25
1,460	ft. 2¼ face clear Y. P. flg., $45	65.70
5	rolls R. R. building paper, 75c	3.75
100	sq. ft. 1x12x12 ft. C. pine finish shelves, etc., $50	5.00
	Total lumber bill	$533.15

MILL WORK.

2	O. S. door frames, 2 ft. 8 in. x 6 ft. 6 in., $2.25	$ 4.50
6	pair jambs, 2 ft. 8 in. x 6 ft. 6 in., cypress, 70c	4.20
7	pair jambs, 2 ft. 6 in. x 6 ft. 6 in., cypress, 70c	4.90
1	front door, 2 ft. 8 in. x 6 ft. 8 in., cypress	10.00
1	rear door, 2 ft. 8 in. x 6 ft. 8 in., cypress	8.00
6	doors, 2 ft. 8 in. x 6 ft. 6 in., cypress, $2.70	16.20
7	doors, 2 ft. 6 in. x 6 ft. 6 in., cypress, $2.70	18.90
1	twin window frame, 12x16, 3 light	4.50
4	window frames, 14x26, 3 light, $2.25	9.00
2	window frames, 20x26, 2 light, $2.25	4.50
1	circle frame, 15 in. diameter	3.50
4	window frames, 14x24, 3 light, $2.00	8.00
1	twin window frame, 20x24, 2 light	4.50
1	window frame, 12x16, 3 light	2.00
4	cellar window frames, 10x18, 3 light, $1.75	7.00
2	windows, 12x16, 3 light, $1.75	3.50
4	windows, 14x26, 3 light, $2.00	8.00
2	windows, 20x26, 2 light, $1.75	3.50
1	circle sash, 15 in. diameter	2.50
4	windows, 14x24, 3 light, $1.80	7.20
2	windows, 20x24, 2 light, $1.80	3.60
1	window, 12x16, 3 light	1.75
4	cellar sash, 10x18, 3 light, $1.25	5.00
56	plinth blocks, cypress, 8c	4.48
56	door casings, 6 ft., cypress, 2¼c ft	7.50
30	window casings, 5 ft., cypress, 2¼c ft	3.37
44	head casings, 4 ft., cypress, 2¼c ft	3.96
176	ft. cap mold, cypress, 2¼c ft	3.96
176	ft. fillet mold, cypress, 1c ft	1.76
240	ft. door stops, 14 ft., cypress, 1½c ft	3.60
210	window stops, 14 ft., cypress, 1c ft	2.10
64	ft. window stool, cypress, 2c ft	1.28
64	ft. window apron, cypress, 2c ft	1.28
400	ft. inside base, cypress, 4c ft	16.00
400	ft. floor molding, cypress, 1c ft	4.00
250	ft. picture molding, cypress, 1½c ft	3.75
196	ft. 3½ in. crown molding, cypress	3.92
80	ft. 3¼ in. crown molding, cypress	1.20
300	ft. 2 in. bed molding, cypress	1.50
130	ft. ⅞ in. cove molding, cypress	.65
100	ft. ⅞ quarter round, cypress	.50
10	ft. porch rail bottom, cypress	.60
10	ft. porch rail top, cypress	.60
14	ft. porch rail top, cypress	.84
14	ft. porch rail bottom, cypress	.84
80	balusters, 1⅛x1⅛x2 ft., cypress, 4c	3.20
500	ft. porch lattice, cypress	3.00
	Stairs, yellow pine or cypress	45.00
	Cellar steps	8.00
	Total mill work	$271.64

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

CARPENTER LABOR.

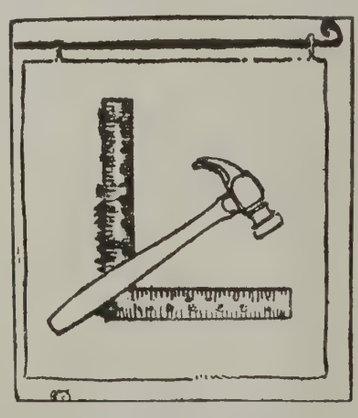
5,351	ft. framing lumber at $10	$ 53.51
4,000	ft. sheathing, $10	40.00
36	M shingles, $2.00	72.00
196	lineal ft. cornice, 15c	29.40
80	lineal ft. door cornice, 10c	8.00
1,460	ft. flooring, $20	29.20
	Smoothing floors	20.00
175	ft. porch floor, $1.50	2.62
175	ft. porch ceiling, $1.50	2.62
	Finishing 4 cellar window frames, $1.25	5.00
	Cellar stairs	10.00
	Main stairs	23.00
2	outside doors, $4.00	8.00
13	inside doors, $3.00	39.00
16	windows, $2.00	32.00
400	ft. inside base, 5c	20.00
250	ft. picture molding, 1¼c	3.62
	Incidentals, 10%	39.79
	Total carpenter labor	$437.76

RECAPITULATION.

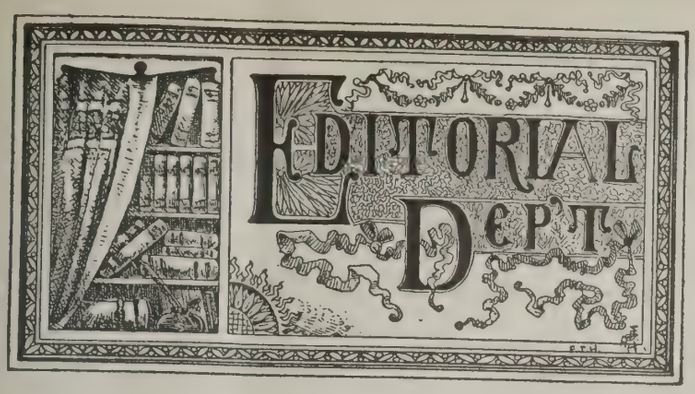
Excavating and masonry	$ 225.98
Lumber bill	533.15
Mill work	271.64
Carpenter labor	437.76
Hardware and nails	48.00
Tin work	20.00
Plastering, 490 yards, 27c	132.00
Plumbing	250.00
Electric wiring	38.00
Painting	110.00
Incidentals, 5 per cent	103.32
Total estimate	$2,169.85

CARPENTER'S CURIOUS SIGN

A St. Louis carpenter, with a name fitting his occupation, has worked out a clever sign as sketched here. Under it appear the words: "L. Hammer, West End Carpenter and Builder."



The cornice is waving, Peggy, dear,
The gables all are ringing;
Why let me pine?—for, oh, you know
I'm sawdust when I'm singing!
—Nixon Waterman, in Saturday Evening Post.



Did you read all the advertisements that appeared in the February number of THE NATIONAL BUILDER?

* * *

If you did not read them, you do not know what you have missed! See and read all the advertisements in this issue, you will be the wiser and better for it—and it may be money in your pocket.

* * *

At this writing the fate of the reciprocity treaty, between Canada and the United States, hangs in the balance. If the treaty is accepted by the people of the two nations, it is reasonable to suppose that some grades of building materials will be somewhat reduced in price, though so far as we can discover, the reduction will be very little. The free admission of food stuffs, into the United States from our northern neighbor, will, no doubt, have a tendency to establish a lower cost of living, and this will be a boon for which we will have reason to be thankful.

* * *

THE NATIONAL BUILDER does not indulge in politics. It does not know one party from the other, or recognize in its columns, any party lines or party conduct, but like all impartial onlookers of passing events, it does feel—from its own point of view, that it knows a good thing when it sees it, and while the tariff treaty contains some things that certainly might be better for the country at large, as a whole, it will, if passed serve a good purpose and cause a lowering in the cost of living, though the lowering will not be of large dimension. It may also have the effect of causing—if passed—a slight reduction in the price of pine and hemlock, though we doubt it, as the price of rough lumber is now, in Canada, nearly the same as in this country. However, there are many places in the United States, near the boundary line, that will profit by the move, because of their proximity to the sources of supply, and there are many places in Canada that will be benefited in the same way because of their nearness to American lumber markets. Taking it altogether, the adoption of the proposed treaty, while not altogether an unmixed blessing, will tend very much to the benefit of both countries and will do away with many of those annoying and often objectionable features that disgrace the present methods of the customs officials of both nations.

* * *

Why build a monument to the memory of the late Stanford White? He was not a martyr to his profession by any means. Had he died in the pursuit of some real, or imagined advantage to his profession, or because of State or National opposition to his professional views, he might have some claim for a lasting memorial in stone or bronze, but under the circumstances, it were wiser to leave to his works—of which there are many—the duty of perpetuating his artistic qualities. So long as these works last, so long will the memory and fame of Stanford White remain, and like Wren, "His works will be the most fitting memorials of his greatness."

* * *

The practical workman, who has but little knowledge of mathematics, is often up against difficult problems when called upon to design structures requiring some knowledge of stresses and strains, and is occasionally thrown into considerable difficulties, for innate genius and rule of thumb are not always reliable guides in such matters. The less a man knows, the more he will guess at proper constructions, and it follows that some very wild guesses are formulated, and sometimes materialized in brick and stone and iron. Of two actual designs for the guide framing of a gasholder, both prepared by presumably "practical men," one would have weighed 128 tons, and the other 712 tons, a big difference.

In our editorial experience, we have often been called in to offer solutions of problems that sometimes bordered on the comic, both from the simplicity of the solution, and because of the manner in which the problem was laid before us. In many of these problems the solution did not depend on mathematical attainments, but rather on a simple knowledge of the "fitness of things," and a slight acquaintance with the first four rules of arithmetic; something the ordinary workman generally understands; or should, and if he does not, he should set himself to work to master, which he can do if he applies himself to the task earnestly, an hour or two each night for a month.

* * *

The practical man, while all right, is apt to be too conservative in his notions. He lacks imagination; what has been good enough for him, and for his father before him he thinks, should be good enough for you. He lacks that vision which is "the art of seeing things invisible," and from the fact of his energies having been so much concerned with hard facts as to stunt his development on the speculative and poetical side of life, he is often narrow-minded. It is such as he who, when called upon to ventilate a quiet little country church, amid a peaceful surrounding of trees and cornfields, blasts its beauty by surmounting the roof with hideous torpedo-shaped monstrosities of sheet iron, or perches on its ridge, a barn-like louvre, which, while effective as a ventilator, destroys the beauty of the rural building. The practical man, however, has an important place in the world's economy, and we could better do without the artist than without the man who knows how to do things—and does them. A good education is a priceless asset for any person to possess, but it does not follow that because a man does not have a college education, he cannot become a first class workman or an excellent architect and designer. Some of the cleverest designers we have known, never traveled on the paths of learning beyond the threshold of a public school; while a few of the most incompetent and stupid artists—so called—we ever met, were college bred. This, however, does not argue against the benefits of a thorough education. Man should, and does, continue to learn and improve so long as his life and intellect stand by him.

* * *

Unfortunately, in these days there is a tendency to display too much learning in the writings given out for public instruction than is necessary. Whole pages are covered with mystic symbols and discouraging formulæ, and the ordinary working man becomes dismayed by the formidable array, and leaves them undisturbed in their mysteries. The absurdity of attempting to carry mathematical statements to such a pitch of refinement, arises from two considerations. First, we do not know all the necessary factors with anything like accuracy, and a wrong assumption in any one factor vitiates the whole calculation. It is like trying to make mince-pies when we are not quite sure whether a certain white powder is sugar or carbonate of soda. The result is doubtful—it may come out right or it may not. Secondly—too much reliance is placed on the value of constants which have been copied year after year from one text book to another, and in the first instance may have been based on very inadequate experiments. For example, the formulæ for the strength of wooden columns were until recently, copied from text book to text book, with perhaps, some variation in the mode of statement, but all based on experiments made in 1840 on seven pieces of wood cut from one plank, the largest pieces used in the experiments being about two inches square and five feet long. If a few sticks from another plank had been used, how would the constant have turned out?

* * *

One of the besetting weaknesses of the theoretical man is his assumption of a superlative exactness in matters which do not admit of a nicety or mathematical definition. A wire-edged precision binds all his thoughts and notions, however trivial. He is like the witness who stated that the prisoner at the bar said, "My dear Thomas—or words to that effect." In our younger days, one well known text book on constructional ironwork worked out many calculations for riveted joints to the fourth place of decimals of an inch. Rankine, an old and valued mathematical high-priest, in dealing with certain hydraulic questions, gives a table of heights in feet due to certain velocities, and is careful to say that they are calculated for latitude 54¾. Visits to engineering and municipal works are very excellent things in some ways, but as a means of acquiring a full knowledge of, say, the Brooklyn Bridge or the Hudson River tunnels, a few hours spent in inspecting these works would not be half so effective as a perusal of the special issues of the engineering papers, with their multitude of illustrations and exact figures.

A SAMPLE SPECIFICATION

By S. CHARLES, C. E.

GENERAL CONDITIONS.

The entire work to be executed under the direction and to the entire satisfaction of the architect, or his representative, and in conformity with his instructions and such scale and detail drawings as may be furnished from time to time during the progress of the work.

The contractor shall give his personal superintendence to the work, or shall have some competent person on the work, at all times, to act for him, and shall furnish all materials, labor, scaffolding, etc., necessary to complete the work, according to the true intent and meaning of the drawings and these specifications, of which intent and meaning the architect, or his representative, shall be interpreter, and his decision, in any and all cases, shall be final and binding on the contractor.

The location of the building will be indicated by the architect, and should be examined by the contractor before bidding.

The contractor must lay his own work out correctly and will be held responsible for all measurements. Where no figures or memoranda are given, the drawings shall be accurately followed, according to this scale, but figures or memoranda are to be preferred to the scale, in case of difference. In any and all cases of discrepancy in figures or drawings, the matter shall be immediately submitted to the architect, or his representative. for decision, and without such decision, said discrepancy shall not be adjusted by the contractor, save only at his own risk; and in the settlement of any complication arising from such adjustment the contractor shall bear all extra expenses involved.

The contractor must, wherever it is necessary, furnish the services of a competent and approved engineer, to lay out the work and establish levels, using the datum lines as laid down on the drawings.

It is intended that the drawings and specifications include everything requisite and necessary to the proper and entire finishing of the building, notwithstanding every item necessarily involved by the work, is not particularly mentioned, and all the work when finished, to be delivered up in a perfect and undamaged state.

The drawings and these specifications shall be considered as co-operative, and the work or material called for by the one and not mentioned in the other, is to be done or furnished in as faithful and as thorough a manner as though fully treated of by both.

The contractor must furnish the architect with a list of the sub-contractor's with whom he proposes to contract, before commencing the work, and will not be permitted to contract with any parties for the performance of any proportion of this work without the consent of the architect, and no sub-contractor will be recognized in any other capacity than that of an average employe of the general contractor.

The architect, or his representative, may require the contractor to dismiss such workman as they deem incompetent or careless, and he is to have at all times, access to the work, which is to be entirely under his control.

The contractor will be held responsible for all damage to the building, whether from fire or other causes, during the prosecution of the work and until the work is accepted. He shall be held responsible for all damage that may occur to persons, animals or vehicles, for want of proper lighting, boarding, watching, or enclosing, or any accident arising from defective scaffolding, or any negligence on the part of himself or his employes.

Except it be otherwise specified, all materials are to be of the best quality of their respective kinds, and all labor to be done in the most thorough, prompt and workmanlike manner, to the full satisfaction of the architect, or his representative.

All drawings and memoranda relating to the work are the property of the architect and are to be carefully used, and returned at the completion or cessation, from any cause, of the work.

The contractor shall render all assistance to the other mechanics in every way in which his special work can be of service and such assistance shall be given promptly and thoroughly and without additional charge. The work shall be carried on systematically and shall be so managed by the contractor, at all times, as to secure rapid progress and avoid annoyance and inconvenience. The contractor and his employes must work with harmony with other contractors on the grounds.

The contractor must remove all rubbish at the completion of the building.

Building permits are to be obtained, and paid for, by the contractor; also the necessary water during the course of construction.

EXCAVATION AND GRADING.

The contractor shall clear the site of the building of all dirt or rubbish, and excavate to the proper depths for all footings as shown on the drawings. All trenches to be the exact width of footings, and any trenches too deep must be refilled with concrete. The tops of all footings to be at least 3 feet 6 inches from the finished grade.

As soon as the footings, pipe lines, etc., are in place, inspected and approved by the architect, all trenches are to be refilled, and any earth not required shall be removed from the premises unless otherwise ordered. All backfilling shall be thoroughly tamped every 8 inches.

The cellar floor shall be excavated to a depth of 6 inches below the finished wood floor, also all areas.

CONCRETE WORK.

All walls to have concrete footings of dimensions noted on drawings, mixed to the proportions of one part Portland cement of approved brand, to 2½ parts clean sharp sand, and five parts of broken stone, in cubes not larger than 2 inches, thoroughly incorporated with a sufficient quantity of water and laid in the trenches in two different layers, gently ram all concrete until the water rises to the surface, care being taken to avoid premature setting of the cement.

Reinforced footing shall be as specified above, and size of steel bars as noted on the drawings.

The whole of the floor surface of the basement except as noted, to be properly lined and rammed and covered with 4 inches of concrete composed of one part of Portland cement, three parts sand and six parts broken stone as described above, and to be covered with mosaic, or cement finish, as may be required. Areas, boiler room, and other places call for to be finished with ¾-inch cement capping composed of one part Portland cement and three parts sand.

Where wood floors are required for basement they are to be constructed as follows:

First, level and ram the earth, then cover the same with 2 inches asphalt concrete composed of pitch, asphalt sand and fine ashes, rolled down to 1¼ inches, then place in sleepers—Georgia pine or spruce, 2x4 inches, beveled to the true level on same and then fill in between same with a course of asphalt concrete, as called for above.

STONE WORK.

All stone must be sound, strong and of a homogeneous character, and where exposed to view must be free from stains or discolorations.

All exterior walls of basements, as indicated on plans, from concrete footings up to height of first water table, to be of Potomac blue stone or such other stone as may be approved of by the architect.

All walls to be laid in Portland cement, mortar, one part cement three parts sand, to all sides above and below ground. All work below the surface of the ground and back of exterior walls to be of rubble masonry, well scabbled, solidly bedded, laid on natural bed with close joint. Joints below ground to be weathered to throw off water. Interstices to be filled solid with stone chips bedded in mortar. Bond stones to be placed at frequent intervals and corners. Jambs and angles to have extra size stone, thoroughly interlocked. Walls to be built perfectly plumb and straight and to true lines and leveled up with large size stones, to receive the floor joists.

The mason must build all channels and leave apertures where required by the steam fitter and plumber throughout the job, and insert as the work progresses all bolts, anchors, plates, lugs, back sills, lintels, wood, bricks, etc., necessary for the various trades, and all cramps, dogs, etc., deemed necessary by the architect.

(To be continued.)

Ordinary floor varnishes or linseed oil will produce darkening. Mineral oils are less likely to darken wood than linseed oil, but are not to be considered in dwelling houses or public halls in floors, because of their tendency to soil the dresses of ladies.

THE LIFE OF A SHINGLED ROOF

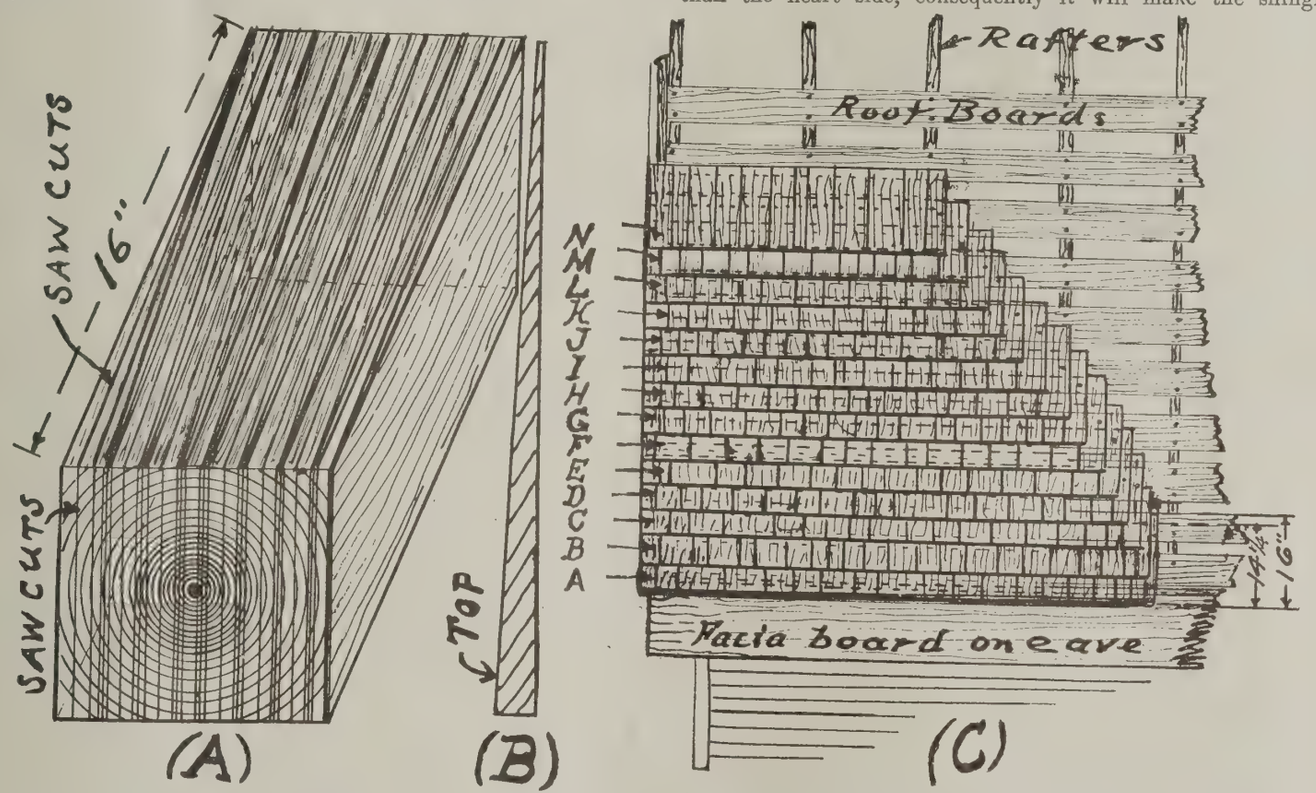
By S. A. C.

THE question is asked many times, "How long will a shingled roof last"? The answer depends very materially upon the grade of shingles used and the workmanship employed in laying them.

A first-class shingled roof should last at least twenty years; in fact, the writer has known of roofs that have stood for thirty years without requiring very much repairing, however, the shingles were first-class when put on and were properly laid.

Many suppose that all there is to shingling is to lay one course on top of the other, showing 4 to 5 inches to the weather, as the case may be, so that the joints will not come directly over each other.

This is a very erroneous idea, in fact there is considerable skill required to do a good job of shingling. The great trouble seems to be that carpenters do not take sufficient time to do a good job, or the contractors do not allow the time.



STANDARD SHINGLES.

Standard singles are 4 inches wide, 16 inches long, and about ½ inch thick at the butt, tapering to about $\frac{1}{16}$ inch at the thin end; a shingle 8 inches wide would have two shingles in it. Shingles are put up in bundles 20 inches wide, 25 courses thick at each end of the bundle with the thin ends lapped and bound together, 250 shingles in each bundle, 4 bundles to the M (thousand).

FIRST-CLASS SHINGLES.

First-class shingles should be sawn from good sound clear body timber (cedar or cypress), sawn parallel with the grain of the wood. Referring to the illustration, (A) shows a shingle block ready to saw into shingles; it will be observed by the lines indicating the saw cuts that the block is reversed every couple of shingles, so as to cut the butts from opposite ends, in order to keep the shingle cutting with the grain of the timber.

(B) shows the edge of a shingle that has not been cut parallel with the grain of the timber; this makes a very poor shingle, as it will split obliquely across the shingle with the way the grain runs; if this shingle is used at all care should be taken to lay it with the side up as indicated, top. In the writer's opinion kiln drying does not improve the lasting qualities of shingles; he would prefer them air dried.

A WORD ABOUT LAYING.

(C) shows a portion of a roof, with fourteen courses of shingles lettered A, B, C, D, E, etc. The double course, A, is laid first with joints broken at least 1 inch; course B is then laid, showing in this case 4¾ inches to the weather, which gives three laps to each 16 inch shingle, and 1¾ inches to spare. The joints in course B should not be placed so that they will come over the joints in the under course in A; then proceed with courses C, D, E, etc., taking care to not only break the joints in the course directly under, but also that the joints in course D will not come over joints in course B, joints in course E over joints in course C, etc., etc., for the reason that should joints in courses B and D be directly over each other and a shingle in course C should split in line with them, you would have a leak. Nails should not be driven so hard that the head will sink into the shingle, as shingles are subject to more or less shrinkage and swelling with the weather; if the nails are not driven too tight they allow for a little play and are not so liable to cause splits.

Another thing the shingler should watch is to lay the shingle with the heart side down; the bark sides will shrink more than the heart side, consequently it will make the shingle lay closer to the roof, but if the heart side were up it would be more likely to curl and split. Shingles over 8 inches wide should be split in two before being nailed on. More than two nails should never be put into a shingle, as very wide shingles are liable to split where the nails are driven from the shrinkage and swelling. For shingles 3 inches wide and under one nail is plenty; the nails should be driven so that they will cover about one inch, with the next course above.

If the shingler would use a little more judgment and care, shingle roofs would rise to the rank they deserve. In most cases when leaks occur the shingle roof is blamed for it, while really it is the don't care system of laying them that is to blame.

He scoffed at lawyers, called them rogues,
Said all were steeped in sin;
But, being caught at breaking laws,
He called six lawyers in.

He said the doctors all were quacks,
Who practiced cunning tricks;
But when a fever struck him down,
He sent for five or six.

He scorned the preachers, called them fools;
But on a certain day
He thought his time had come, and called
Three preachers in to pray.—Judge.

AN INGENIOUS PUZZLE CONSTRUCTED IN WOOD

By W. J. HORNER

THIS puzzle consists of a box, shown in Figs. 1 and 2, and four blocks of wood to fit inside it, shown in Figs. 3 and 4. These blocks are numbered, as seen in Fig. 4, and the person who understands the puzzle asks someone to place one of the blocks in the box and put the cover on, without telling which is in there. The box may then be laid on the table, either side uppermost, and the person who knows the trick tells at a glance, without touching the box, which of the blocks is inside. As it is obviously impossible to see anything of the block, much less the number written on its face, it looks to the uninitiated like thought-reading, and the way it is done seems an utter mystery, and undiscoverable after the most careful examination of the box and blocks.

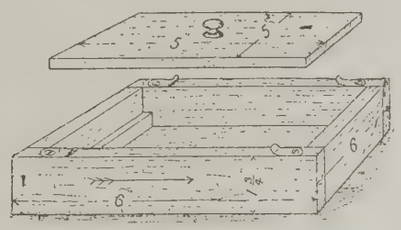


FIG. 1.—General View of Box and Cover.

The explanation is as follows: The blocks are loaded with lead or other metal in the interior and towards one edge, as seen in the cross-section, Fig. 2, where a block is inside the box, and by the dotted rectangles in each of the blocks in Fig. 4 This lead is completely enclosed, and not visible, or its weight noticeable, from exterior examination of the blocks. The box has an ornamental knob at top and bottom, as seen in Fig. 2. The box consequently cannot balance, but when resting on the

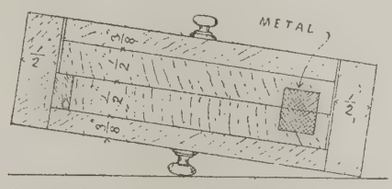


FIG. 2.—Section Through Box with Block Inside.

knob must tilt, as in Fig. 2. The side on which the block inside is loaded, of course, decides which way the box will tilt. It tilts a different way for each of the blocks, because, as seen in Fig. 4, the loading of each is in a different direction. A strip fitted in one end of the box, seen in Figs. 1 and 2, and a corresponding amount removed from each of the blocks, insures their always being placed in the box in one position only. The arrow shown on the exterior of the box in Fig. 1 is sufficient guide to tell the number from the direction of the tilt, and it is quite meaningless to a person not understanding the puzzle. The arrow may be taken as No. 1 side, and the other numbers proceed in

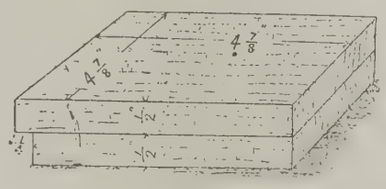


FIG. 3.—Perspective View of Block.

the direction of the arrow, 2 being at the adjoining side to the right as the box appears in the sketch, 3 on the far side, and 4 to the left, next to the arrow again. This reads equally well, no matter which way up the box stands. Numbers on the sides of the box would arouse suspicion, and probably lead to the solution of the puzzle.

Suitable dimensions for the parts are figured on the illustrations. Yellow pine or other very light wood should be used, so that the metal shall decidedly overbalance the wood. With a heavy wood, a relatively large amount of metal would be necessary to make the direction of tilt unmistakable. The construction of the box can be seen in Figs. 1 and 2, and hardly needs any explanation. It is nailed together with the bottom piece between the four enclosing sides. The four buttons for securing the cover may be of metal or wood. Those illustrated are simply bits of sheet tin, cut out with shears, and turned up a little at one end. A screw-hole is made in each end with a punch. If preferred, the cover could be hinged, and fastened on the opposite side to the hinges with a hook and eye. The cover then would have to be the full exterior side of the box, and for uniformity the bottom should be the same. The interior depth of the box would then correspond with the thickness of the blocks, instead of including the cover as well.

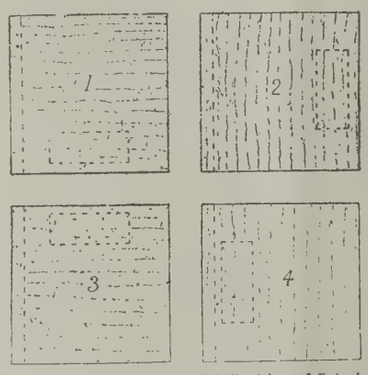


FIG. 4.—The Four Blocks with Position of Interior Metal Indicated by Dotted Rectangles.

The blocks are made of two pieces, for convenience in inserting the metal. These pieces may be nailed together, one being ¼ in. shorter than the other, as seen in Fig. 3, to fit the strip inserted in the box. Without this there would be several different directions in which the block might be turned, so making the working of the puzzle impossible. Before the halves of the blocks are nailed together, recesses for the metal are cut as seen in Figs. 2 and 4. Soft-solder might be melted and poured into each half separately without burning the wood seriously. If lead is used, it should be cast in blocks first; or sheet or scrap lead might be cut and fitted to fill the recess. Suitable scrap iron might be used, the recesses in the wood being cut to fit it. The metal should be as close to the edge of the blocks as possible. The blocks should measure about ⅛ in. less than the inside of the box, so that there shall be no possibility of their fitting too tightly and causing trouble in putting them in or taking them out. The knobs on the bottom and cover of the box need not necessarily be like those illustrated. Round-headed screws might be used instead, or small square blocks might be made and nailed on, with their tops beveled in each direction from the center.—The English Mechanic.

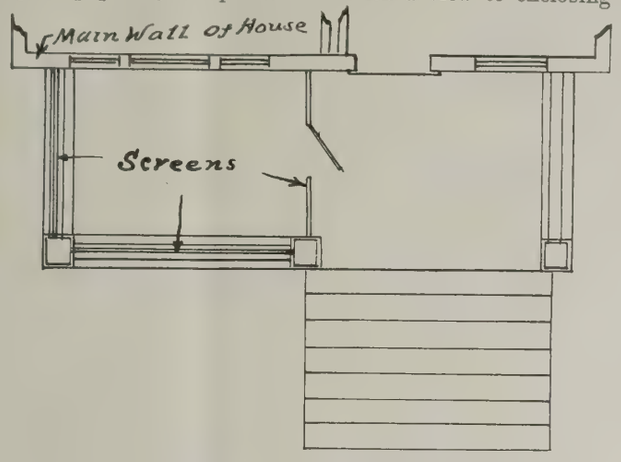
INLAYING

EVERY one has noticed that in ordinary inlaying there is a very ugly glue joint, equal in its width to that of the saw used, which runs round the whole of the inlaid pattern. This, of course, looks bad, and further, it involves the use of a very fine saw to reduce the width as much as possible. This, again, involves the use of comparatively thin wood. To avoid this, tilt up the saw table a little on one side—say the right. With it in this position cut out the right side of a letter—say a capital I. Obviously the uppermost of the two pieces of wood on which we are operating would have its I slightly broader than the bottom one. Then finish the letter, being always careful to make the cut "sun about," as the phrase is; i. e., in the same direction as the hands of a clock move. We now have an I cut out of the top piece slightly broader and longer than that cut out of the lower one. If we have proportioned the amount of "tilt" of the table with due regard to the thickness of the saw and of the wood used, the upper I will just fit neatly and tightly into the space left in the lower piece. Apply plenty of glue and gently tap the letter or monogram into its place, and we have a glue joint which will be barely visible. The amount of slope required in the table is very slight, and one soon finds out the happy medium.

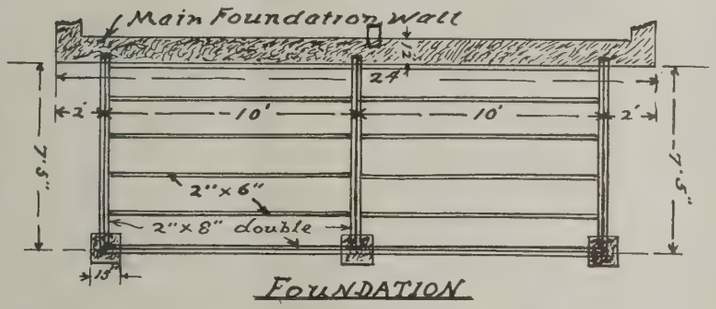
BUILDING THE HOME PORCH

By WM. C. A. STEVENSON

WITH the approach of another spring home owners will begin to plan their homes to enjoy outdoor life as much as possible. The idea of sleeping out of doors is becoming quite popular; the porch built with a view to enclosing with

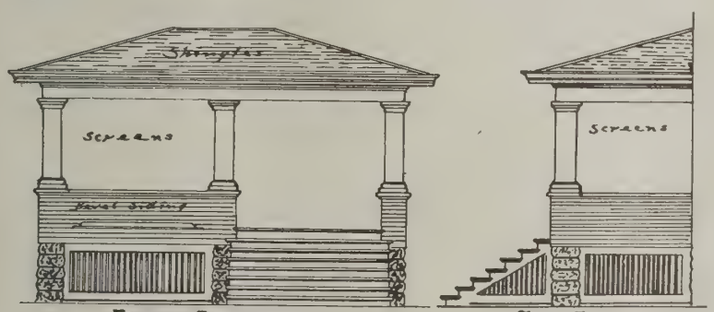


FIRST FLOOR



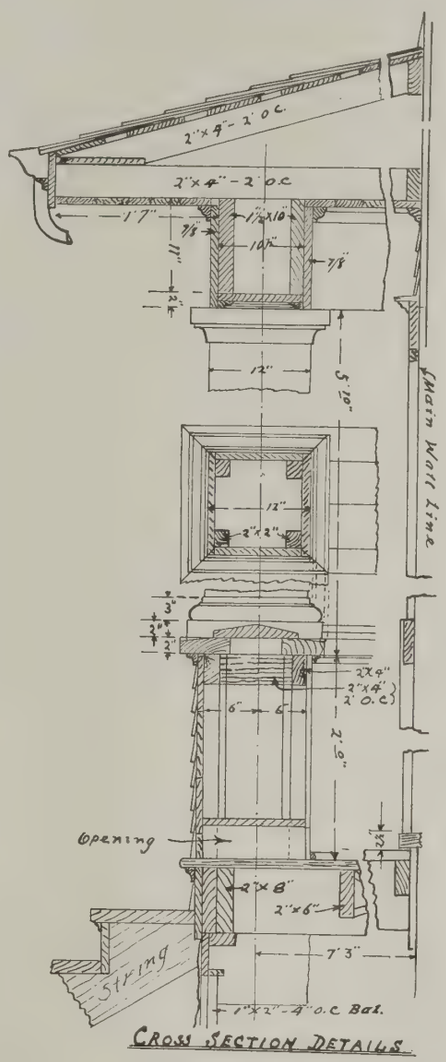
FOUNDATION

screens in summer and glass in winter affords a very desirable adjunct to the home.



FRONT ELEVATION END ELEVATION

The porch illustrated herewith, showing the foundation and porch plans, the front and end elevation, and cross sectional



CROSS SECTION DETAILS

details, is one the writer is about to build for a customer and offers a good example.

As the drawings are self-explanatory it will not be necessary to dwell on the construction details for this porch. The cost would range from $130 to $200, depending upon local conditions.

SPRING BUILDING AT A LOSS

E. P. HOERR

NOW that spring season is on, with building contracts ready to be let, we will learn of contracts being signed at about a cost basis. The successful bidder started out with the determination of getting the first job, and to do so it was necessary to cut the job. But on what kind of a basis? We venture a guess that most first spring jobs are secured on a basis of cost or at least so near to it as to give the contractor little or nothing for the troubles and chances taken to complete the work. And he could have secured more.

Let us say that this is all foolish. The "cut throat" way of getting work is just as harmful to Mr. Successful Bidder as to the various Mr. Loosers. It seems to set the basis for future contracts, since the unsuccessful bidders feel that the basis set on the first job by the successful one is the basis on which he will figure the other jobs.

Of course, we must not overlook the fact that one contractor's cost may not be the cost of the next contractor. Different men work differently. One Contractors men may work together better, thus making a lower pay roll. His buying plan may be different. The subcontractors' men may work better with his men; this saving time and hastening construction of the building; for nothing gives greater profit to a contractor than a job quickly constructed.

Its part of the game, of course, to be able to construct cheaper than your competitor, but then too, why not get a little more for your knowledge and abiliy. Instead of adding the regular percentage as your profit, be brave enough to add a few points more, for even one per cent more on a $5,000 job means $50. Suppose you do lose a job. Has not your competitor a right to some work? If you were to get two jobs in succession, it follows that the third contract "goes for a song." They begin to get hungry. Then you begin to suffer on the jobs that follow, for a pace has been set and you must hump if you want to keep in the race for future jobs.

In this article (THE NATIONAL BUILDER), is prompted to give advice to its great army of contractor readers. There is no desire to start a crusade for higher cost of buildings, yet its only too well known that the construction business is not a big money making proposition. The competition is keen.

It might not be amiss to add that your cost can in many cases be reduced by taking advantage of the advertising columns of this paper.

CHANGES OF STYLE

By WARFIELD WEBB

THERE is ample reason why the builder should keep in touch with the changes that are being made in the styles of both interior and exterior finish in house construction. This demands more than merely noting the varying improvements; it demands the ability to conform to the requirements that are demanded of a man who is capable of doing the actual work of constructing them, and this in a way that will bring credit to himself and his industry. There is art in doing the most commonplace things well, and driving a nail with accuracy is just as much an essential to a good workman as in designing a house. If the little detail is not looked after with care there will be no possible reason to hope that the larger undertaking will be any more worthy of commendation.

With the building conditions undergoing so many changes as they have in the past few years, it behooves a wide awake builder to keep abreast of these changes, and to be prepared at a moment's notice to do any work of an improved nature that may be demanded of him. It is true that there are still in vogue a certain number of standard sizes in doors, frames, sash, blinds and kindred specials, but there are likewise a larger number of particular designs, calling for more intricate labor and a far greater knowledge of careful workmanship. Unless the carpenter is equipped with the required knowledge to do this newer work well he is placed at a great disadvantage. If he endeavors to do this work without the proper knowledge then the result will be only a failure, or a job that is sure to be just cause for complaint.

The particular workman will devote a certain amount of his spare time, and every man has some time that he may call his own, to a practical improvement in this way. He best knows his own defects, and if he is ambitious to progress he will utilize this spare time in making it profitable for the future. Faulty construction is so common that there is ample reason to see on every hand inferior work. Have you ever noted the defects in a structure that were the result of careless or sometimes ignorant workmanship? They are on every hand, and they could have been avoided had the builder or contractor been at all conscientious in his work.

Hanging a door, or blinds, may seem a simple thing, and so it is to the man who looks at it from the proper viewpoint. Placing siding on a structure, framing a roof, erecting studding are all simple forms of carpentry work to the man who has studied out the details of his plan and the little nicities in advance of his labor. We can easy enough see our errors when we have made them and they have been pointed out to us. It is almost as easy to see them before they are made when we are particular about the work we do.

The poor workman is always looking for a job. He soon becomes known as such, and he is shunned by the particular contractor with good reason. If you are in this class make a careful study of the defects in your work and make it a rule never to make the same error the second time. It is so easy to do our work in a manner that will merit us a bad name. Care demands study, it demands hard work, and it calls for the serious thought that will cause us to study the plans that lie before us fully before we undertake a simple operation.

With the acquirement of accurate knowledge we must needs have good tools to work with, otherwise it will be far more difficult to do so and attain the desired end. Then there is the error of trusting to your eye to measure up where a plum should be used. If you place a window frame in position, erect floor joists, hang a door, there is need for accuracy. How will you do these things right when you trust to your eye, and not to the more certain accuracy of the plum?

See that each slight detail is correct before proceeding with another. This is the only sure method to avoid errors. When you are absolutely certain that you are right then proceed to make further headway. If you are going to guess, then there will be the natural consequence of guess work, which is, nine out of ten times, wrong. The builder who guesses is the man who is always on the lookout for a job. There is also the advantage of a man who has the proper idea of progress in mind of making headway in other respects. The jobbing carpenter in this age is not the man who is in demand, but there are times when it is very handy to be able to turn your labor to good account by doing something, in a creditable way, that is not, strictly speaking, just to your line of special work. It sometimes happens that there is a dearth of such men as are capable of only doing a few things well, or that the amount of special work is not large. Such times do come and if a man is able to devote his time to other pursuits, it will be a very profitable way to make a few dollars in odd times.

In any event do not undertake any work that you are not sure of being able to accomplish with due credit to yourself. A poor piece of work will be the worst possible asset for you in time of need when there is a demand for able men. The one mistake you have made may be the means of costing you an opening that will merit for you a much greater reward than what could be realized from a contract undertaking that netted you only disfavor with your employers.

THE HAND SAW

THE hand saw is the constant companion of the carpenter. There are a few other tools he carries incessantly, the hatchet and the square, but aside from these and even with these, the hand saw is probably the most useful tool in his kit, and most often abused.

Some carpenters are one saw carpenters. That is, they are men who have one favorite hand saw that they use for everything, for heavy framing, for cutting weather boarding, for cutting inside finish. Again, there are others who have a different saw for every kind of work.

It is these men, these latter, who generally get the best results and take the best care of their saws. In the hand saw as in a mill saw it should be adapted to a peculiar class of work. A good framing saw will cut weather boarding, but it will not do as nice a job as a finer toothed saw. Neither will the fine toothed saw used for cabinet work and finish make as good headway cutting heavy framing.

Some men vary their saws according to the work they have to do by different degrees of coarseness in their teeth, and also in their length.

There are some men, tall and lankey, with long arms, who want a framing saw at least two inches longer than the average saw, so as to get the benefit of the full stroke, and often these very men when they get to cutting mitre joints or weather boarding want to use a saw from two to four inches shorter than the average, with very fine teeth.

We may take it that the main division or variation for the class of work should be by the teeth and the thickness of the blades. For framing use saws with coarse teeth and comparatively heavy blade. For weather boarding fine teeth with a thinner blade, and for some interior finish one may use even a finer tooth blade than for the weather boarding, with a blade reinforced with a stiff back.

The disposition now seems to be to use saws with a few more teeth to the inch than formerly. There was a time when the favorite framing saw had from five to seven teeth to the inch whereas today it runs from seven to nine. Formerly the weather boarding saw had from seven to nine teeth to the inch whereas today they run from nine to twelve.

It is not always this way, because people have different ideas. As stated above some people use practically the same saw for everything about a house and others have a wide variety. A different saw for every kind of work and generally they keep it filed and in shape especially for that work.

This is the way to get the best results. Make your work into a series of divisions, at least three of them, and have saws for each division of work. Then keep them fitted up especially for doing that work. It will take a little more time and a little more attention and call for a few more tools in the end, but there will be enough gain in both quantity and quality of work to pay for it.

In short, the hand saw, which is the best side companion of the carpenter, generally gets too much abuse and not enough appreciation and care. It is filed in a hurry, often carelessly and poorly, is used roughly by some, is kinked, and is left out and allowed to rust and gets more rough treatment considering its qualities than any other tool.

The best way to create a live interest and insure better attention for your saws is to start in by buying the best kind of saws you can find, selecting them carefully for the use you have. Then having a saw that you are proud of in the beginning you will likely take better care of it as you go along.

BUNGALOW IN ORIENTAL STYLE



This bungalow, designed and built by H. S. Wright, Everett, Washington, for E. A. Roberts, presents something out of the ordinary particularly as to roof effect. In spite of the many curves and steep pitches there has been worked into this bungalow a considerable amount of room on the second floor; a fact which is not apparent from the cut.

Built upon spacious grounds, with broad verandas on two sides, it attracts immediate and favorable attention. There is a full excavated basement under this house, which adds that much more room to the whole.

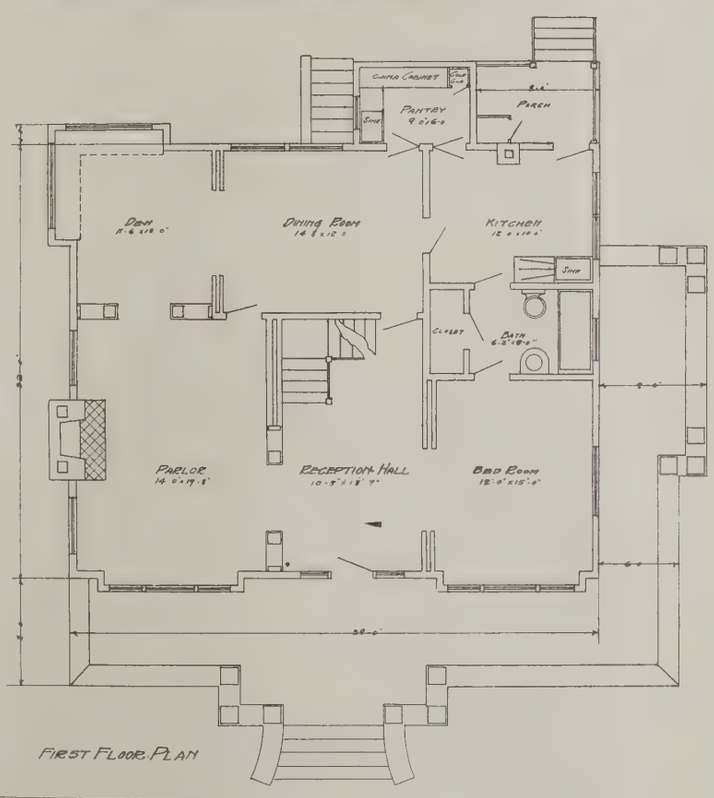
The first floor plan is carefully worked out and is, obviously, an extremely convenient home.

Upon entering there is a spacious reception hall, with the stairs to the second floor leading up from the back.

All parts of the house are accessable from this reception hall; the living room to the left, a bed room to the right and the dining room to the rear. The pantry is reached directly from either the kitchen or the dining room.

This bungalow was designed primarily that the first floor should furnish all the necessities of a home, the second floor being merely reserve space; hence the bathroom is located on the first floor and is accessable from either the kitchen or bedroom. There is also a second bath room on the second floor. This bed room is shut off from the reception room by sliding doors, so that it may be used as a library, if desired, in which case the second story bed rooms are at once available.

Access to the basement is had by one stairway leading from the reception hall under the second story stairs and by another stairway leading from the rear of the house, out of doros.



FIRST FLOOR PLAN

Prior to the last election Chief Justice Potter of Wyoming made a tour of the state in company with other Republican candidates. In a small town he was called upon by the chairman to address the people at the end of a lengthy program furnished by the not too gifted orators of the evening.

"Ladies and gentlemen," he began, upon arising, "the speakers who have preceded me have so thoroughly covered the ground that I hardly know what to talk about."

As he paused a stentorian voice in the audience suggested:

"Talk about a minute."—Lippincott's.

Not long ago there was held in a New England town an exhibition under the auspices of an "ancestral loan society," and among the proud exhibitors was a spinster, who showed several fine portraits of her great-grandfather, an officer in our revolutionay war. A friend was remarking to the spinster that she seemed proud indeed of her valiant ancestor. "A brave man!" exclaimed the friend.

"Brave!" repeated the descendant of the great man. "I should say he was brave! Why, he took part in over fifteen engagements, and there was hardly one in which he didn't lose an arm or a leg or something!"—Lippincott's.

TESTS ON AMERICAN AND ENGLISH OAKS

By J. W OVEREND, A. R. SAN. I

IT DOES not usually come within the practice of the everyday builder to know precisely the strengths of the timbers which he may be using, this being left to the various universities or technical colleges to experiment on same, and the results of the various stresses a beam will stand is handed down to the different engineers and contractors, through the various trades papers or by other channels. For timbers the most important is the transverse stress, or the resistance a beam offers to breaking when loaded anywhere in its length. A very important point in testing is that the degree of moisture in the material should be carefully considered. For testing this, a very simple method is as follows: Bore holes with the brace and bit right through the timber under consideration, weigh in the first state and then drying in an oven, afterwards weighing again, the percentage of difference being taken as the degree of moisture present in the timbers.

The formula used and recognised for beams center loaded is as follows:

$$BW = \frac{bd^2c}{s} \text{ where}$$

BW = Breaking weight in terms taken for the constant, and load concentrated at center.
b = breadth of piece in inches.
d = Depth of piece in inches.
c = Constant found by experiment by placing a piece of wood 1 inch square over a span of 1 foot.
s = Span in feet.

—TRANSVERSE TESTS.—

DATE	TEST NUMBER	DESCRIPTION	DIMENSIONS			BREAKING WEIGHT AT CENTRE IN TONS.	MODULUS OF RUPTURE FOR BEAM 1" WIDE 1" DEEP 1'-0" SPAN = FOR DRY WELL SEASONED OAK 560.	MODULUS OF DEFLECTION FOR BEAM 1" WIDE 1" DEEP 1'-0" SPAN = FOR DRY WELL SEASONED OAK 3360.
			WIDTH	DEPTH	SPAN.			
11-9-09.	11265	ENGLISH OAK BEAM	9"	4"	8'-0"	3.54	440 LBS	2323 LBS
11-9-09.	11267	ENGLISH OAK BEAM	4"	9"	7'-0"	8.22	398 LBS	2239 LBS.
11-9-09.	11266	AMERICAN OAK BEAM.	4"	9"	8'-0"	7.85	434 LBS	20645 LBS.

TABLE NO. 1.

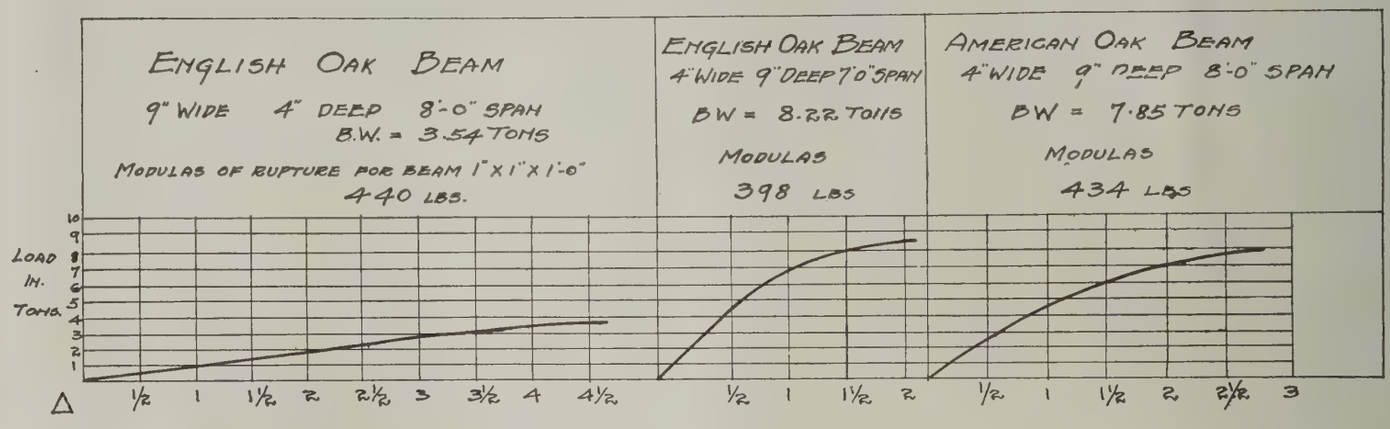
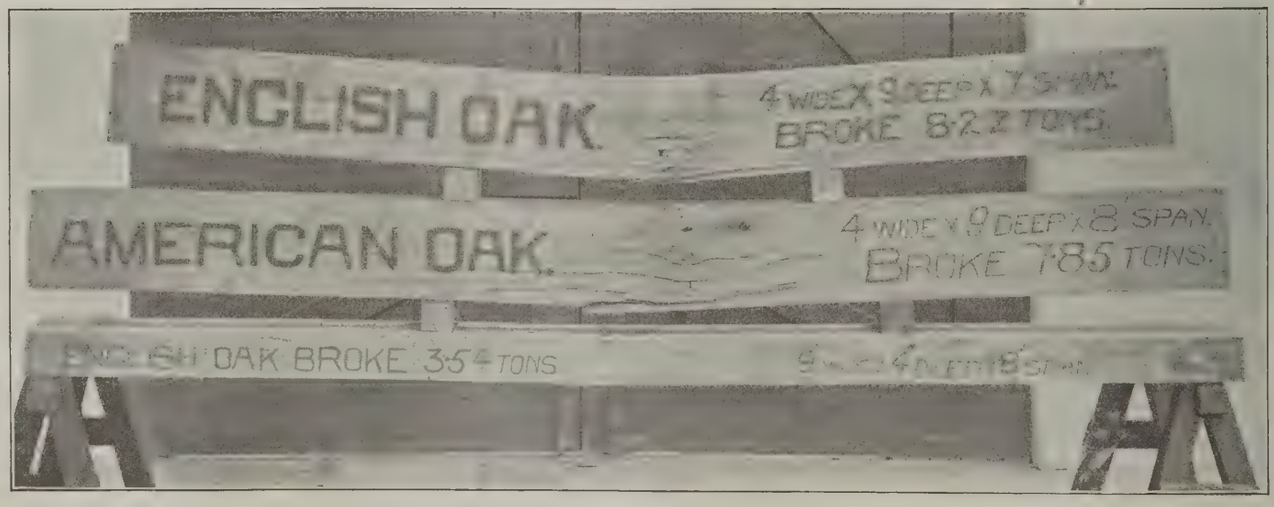


TABLE NO. 2.

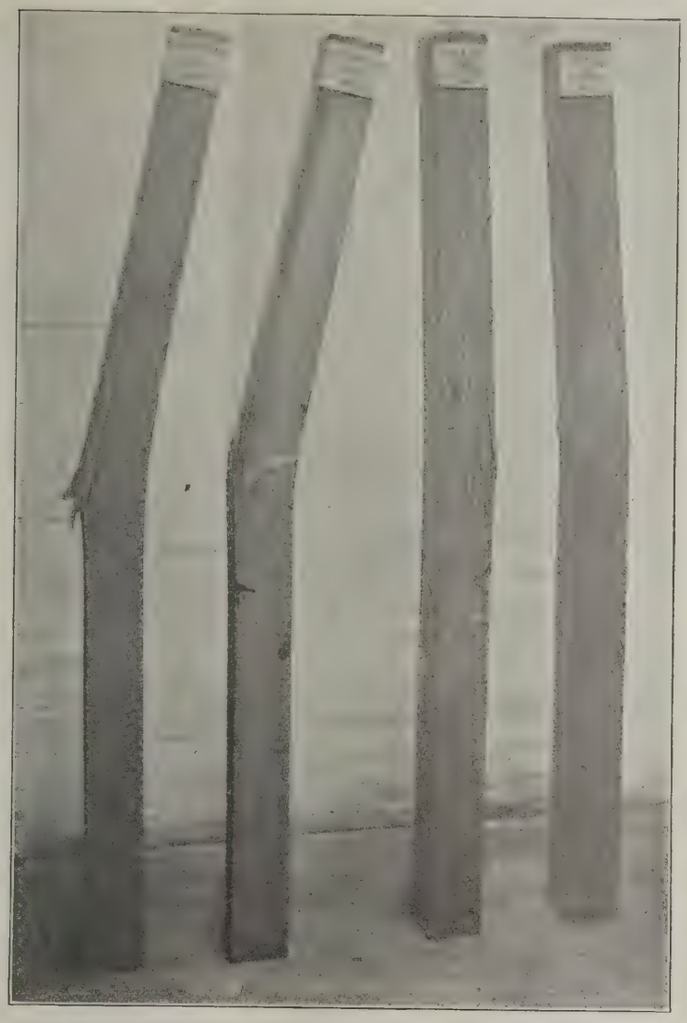


PHOTOGRAPH NO. 1.

*L is often used in place of s, but s is far better as it signifies the clear span and not the length of beam.

The following particulars of tests on 3 Oak Beams, 1 Baltimore and 2 English are reproduced by the special permission of Professor G. F. Charnock, Technical College, Bradford, Yorkshire, England, in connection with the Incorporated British Inste. of Certified Carpenters, visit to Brandford in 1909, the institute being an institute comprised of Carpenters and Joiners in England

Table No. 1 gives all the sizes and also the actual breaking weights in tons center loaded. Photograph No. 1 shows the breaking result. The following shows the results worked out by the rule



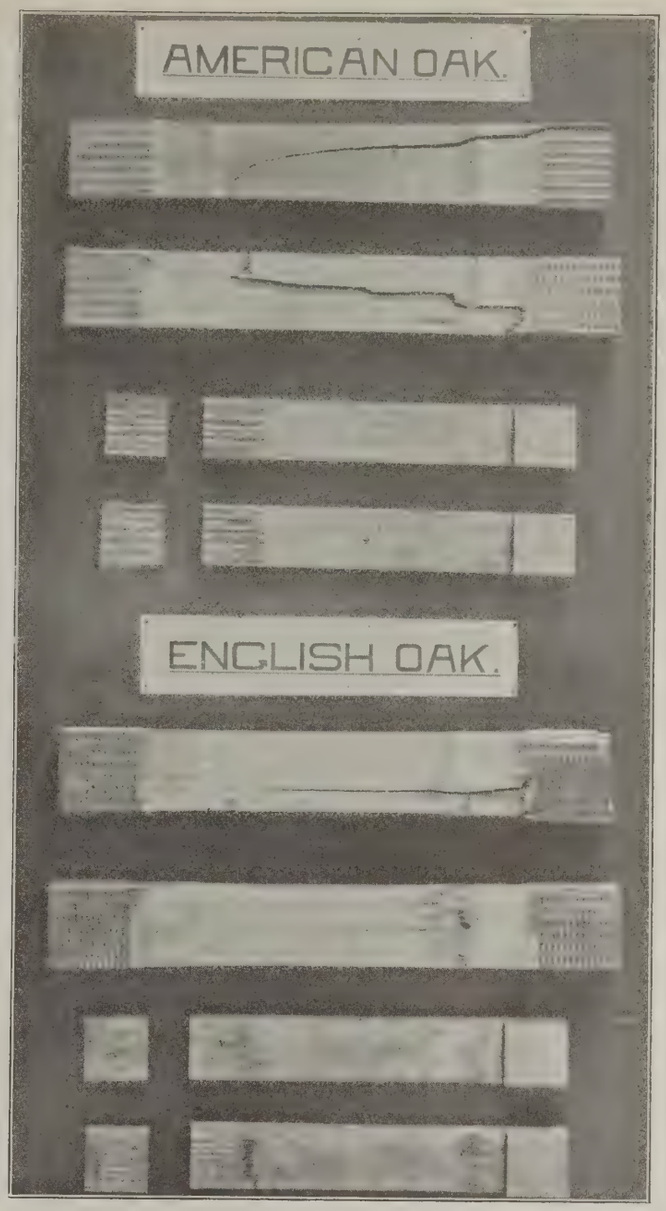
PHOTOGRAPH NO. 2.

$$BW = \frac{bd^2c}{s}$$

No. 1. $BW = \frac{bd^2c}{s} = \frac{4x81x5}{7} = 11.571$ tons. 8.22 By experiment.

No. 2. $BW = \frac{bd^2c}{s} = \frac{4x81x5}{8} = 10.125$ tons. 7.85 By experiment.

No. 3. $BW = \frac{bd^2c}{s} = \frac{9x16x5}{8} = 4.5$ tons. 3.54 By experiment.



PHOTOGRAPH NO. 6.

planatory. Δ = Deflection in inches and applied load in tons. Table No. 3 and Photo No. 2 shows some crushing tests of struts in oak, the sizes of pieces and length in feet being all given in the table.

Table 3 crushing tests of struts, description, etc.

Table No. 4 and Photo No. 3 shows the results of a series

—CRUSHING TESTS OF STRUTS.—

DATE	TEST NUMBER	DESCRIPTION	DIMENSIONS			CRUSHING LOAD.	
			SIDES IN INCHES	AREA IN SQ. INCHES	LENGTH IN FEET	TOTAL TONS.	TONS PER SQ. INCH.
10-9-09.	11259	ENGLISH OAK	4.5X4.5	20.25	6	23 18	1.14
10-9-09.	11260	ENGLISH OAK	4.5 X4 5	20 25	6	26 55	1.31
10-9-09.	11261	AMERICAN OAK.	4.5 X4.375	19 68	6	29.20	1.48
10-9-09.	11262.	AMERICAN OAK	4.375X4.25	18 59	6	27 93	1 50

TABLE NO. 3.

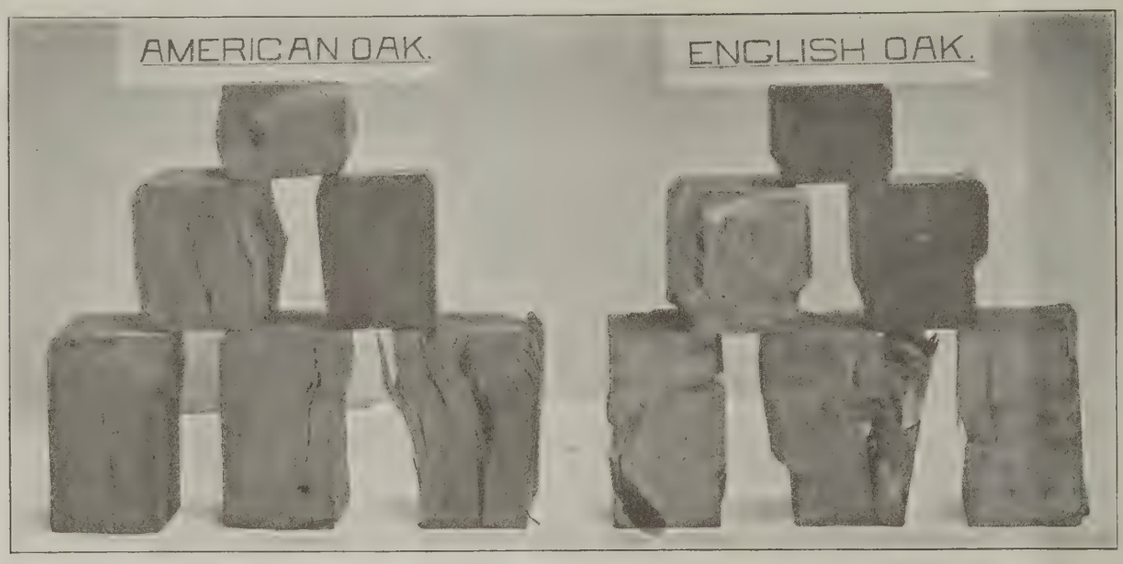
It should be noticed that the actual practical results are considerably below the results given by calculation and the values given in text books. This was due to the fact that the timbers in all 3 cases contained an abnormal amount of moisture which would of course have been removed by more complete seasoning. Photo No. 1 shows the views of beams after experiment and the nature of the strain. Table No 2 shows the deflection curves which is self ex-

of compressional tests. To arrive at approximate result it will be noticed that a series of pieces was tested and then the average was taken. Notice should be taken of the moisture contained in the pieces which affected the results.

Table No. 5 and Photo No. 6 illustrates the results of detrusion or shearing tests. Again in this case the average should be taken.

Table No. 6 and Photo No. 6 illustrate the results of a series taken for tensile tests. The average again should be taken of the results attained.

So many factors enter into the testing of timbers that in order to arrive at some approximate results a series must be taken and averages taken. Single experiments are almost useless.



PHOTOGRAPH NO. 3.

Compression Tests.

Description	Dimensions			Crushing Load			Moisture Contained	Remarks
	Sides In Inches	Area In Sq. Ins.	Length In Inches	Total Tons	Tons Per Sq. In.	Average		
English Oak.	4x3.875	15.50	8	23.35	1.50		50%	As the per cent
" "	4x3.875	15.50	8	29.82	1.92		50%	of moisture con-
" "	4x3.875	15.50	8	31.59	2.09		50%	tained increases
" "	4x3.875	15.50	6	25.59	1.64	1.82	50%	the resistance
" "	4x3.875	15.50	6	30.74	1.98		50%	of the wood to
" "	4x3.875	15.50	4	31.15	2.01		50%	fracture de-
" "	4x3.875	15.50	4	25.60	1.65		50%	creases. Thus if
American Oak	4x4	16	8	24.36	1.52		30%	the English
" "	4x4	16	8	23.64	1.47		30%	Oak had contain-
" "	4x4	16	8	25.62	1.60		30%	ed only 30% of
" "	4x4	16	6	26.03	1.62	1.55	30%	Moisture the
" "	4x4	16	6	24.53	1.53		30%	average crushing
" "	4x4	16	4	25.36	1.58		30%	load would have
" "	4x4	16	4	24.83	1.55		30%	been still greater

TABLE NO. 4.

—Detrusion or Shearing Tests—

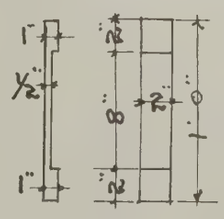
Description	Sketch of Specimen	Dimensions		Ultimate Shearing Stress		
		Parts In Shear In Ins.	Area In Shear Sq. In.	Total Tons	Tons Per Sq. In.	Pounds Per Sq. In.
English Oak		2 x 2	4	1.89	.472	1057
" "		2 x 2	4	1.97.	.492	1102
" "		2 x 2	4	1.56	.390	873
American Oak.		2 x 2	4	1.60	.400	896
" "		2 x 2	4	1.77	.442	990
" "		2 x 2	4	1.63.	.407	911

TABLE NO. 5.

TENSILE TESTS.

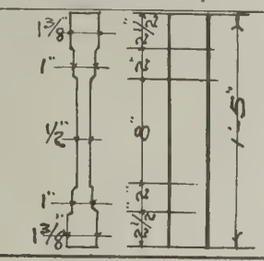
DESCRIPTION	SKETCH OF SPECIMEN	DIMENSIONS		ULTIMATE TENSILE STRESS.	
		SIDES IN INCHES	AREA IN SQ. INS.	TOTAL TONS.	TONS PER SQ. IN.
ENGLISH OAK.		2.50 x .50	1.25	4.46	3.56
" "		2.50 x .50	1.25	5.10	4.08
" "		2.48 x .50	1.24	4.81	3.87
AMERICAN OAK		2.48 x .50	1.24	3.81	3.07
" "		2.47 x .50	1.23	3.87	3.14
" "		2.46 x .50	1.23	4.58	3.72.

TABLE NO. 6.



SHINGLED HOUSE FOR CHARLES HOFFMANN, RIVER EDGE, N. J.
WILDER & WHITE, ARCHITECTS, NEW YORK CITY.

COST ON A SQUARE FOOT BASIS

E. P. HOERR

EVERY now and then we hear of a Contractor and Builder who estimates buildings on a cubic foot basis, basing it on the cost per cubic foot of a job he had previously built.

We are rather inclined to doubt the wisdom of estimating in this manner, for there are bound to be so many points at variance in the different buildings. These differences are, of course, considered, but is it not rather too much "guess work" to add or deduct here or there for these differences?

Let us suppose for instance, that a contractor kept close cost on a house just built by him; say it was a frame building 26 feet wide by 32 feet deep with gable style. The studs and joists were of yellow pine, likewise the sheathing and under floors. The foundation was of concrete, the cellar floor being also concreted. There were two porches front and rear, of concrete and wood. The interior finish was of plain red oak throughout, with plenty of cabinets, bookcases and mantels. The top floors were also of oak corresponding to the finish of the rooms. The cost of this house was say 15c per cubic foot.

Now he has placed in his hands a set of plans where the house is 36 feet front by 30 feet deep, with peak roof. The specifications called for northern lumber to be used in its construction. The foundation to be entirely of stone and the cellar floor to be concrete. Only one porch is to be built in the front entirely of wood. The interior finish to consist of birch, oak and yellow pine. There are to be cabinets, bookcases, etc., but entirely different in size and style from those on the other job. Naturally there were many smaller differences.

We surely know that the same square foot basis would not hold good on the two houses, but is it possible to even use it as a basis, and take up differences by adding or deducting? Would it not be better to figure anew? Seems like a too uncertain way of doing so an important a thing.

Its true, of course, that estimating at its best is in a sense a guess. But let a man take up the various sections at a time, one by one considering each part singly; then put them all together as a whole, and he will come much nearer to the right cost, than if he took it up as a whole in the first place.

ADVICE TO ASPIRING CONTRACTORS

By CHAS. ANDERSON

IN taking up the subject of bookkeeping, it is not the writer's intention to attempt to give a system such as might be used by an experienced bookkeeper, but rather a simple system such as one would keep for himself, which has been found quite suitable and to answer the purpose for a contractor doing quite an extensive business.

The chief object in keeping a set of books is to be able to tell at short notice what your financial standing is; a system that will answer this question is all that is required. The system shown here, if correctly kept, will answer the purpose fully.

The main thing is to be able to tell what you owe and who owes you and the amounts. By balancing up this and taking an inventory of your stock and property, you can soon tell whether you are running at a profit or a loss.

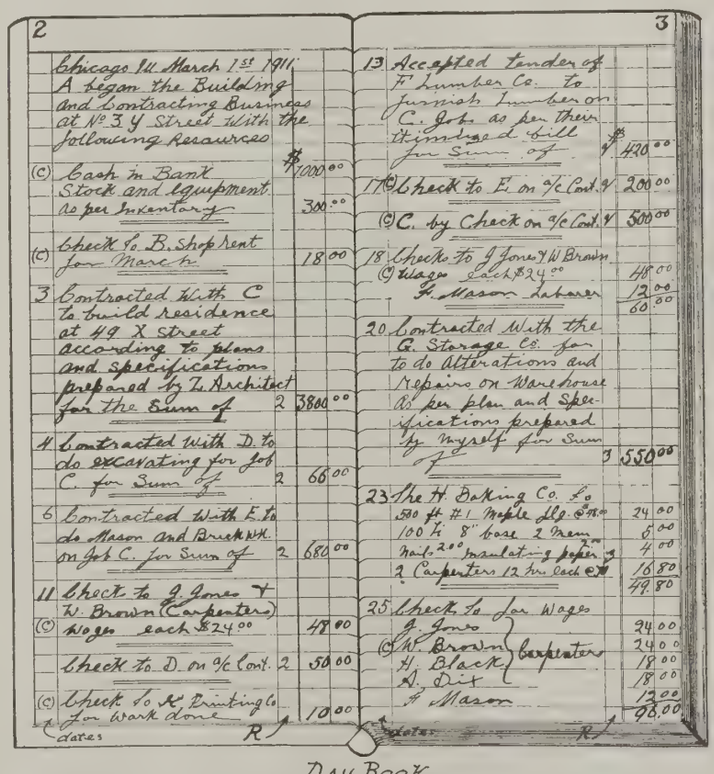
For those who desire, it would be a good plan to take a course of bookkeeping with some reputable correspondence school, of which there are a number in the field.

BOOKS REQUIRED.

Different systems require different books. The simple system the writer proposes to show here requires a day book, cash book, estimate book, stock book and cost book. At present only the first three will be dealt with.

In order to simplify as much as possible, I have shown sample pages of these three books showing the entries from one posted into the others. In the day book the transactions of each day should be entered as they occur, making each explicit. Where there is no written contract, specify in the day book what the agreement was.

Letters have here been used instead of names. It is also assumed that the contractor pays all his bills by bank check, as every business man should, for this very materially simplifies the system.



DAY BOOK

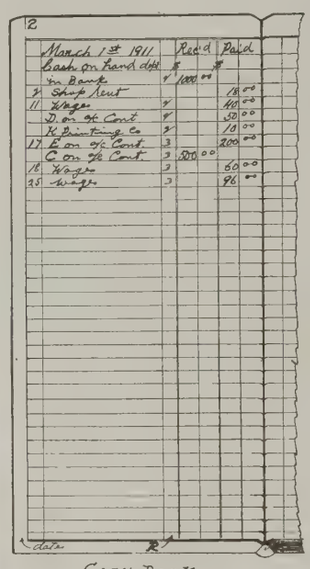
When every transaction is entered into the day book daily, if it is not found convenient to post it into the other books each day it can be done, say, once each week.

Only the cash transactions are entered into the cash book; that is, cash received and paid out. The letter (c) in the date column indicates that the entries have been carried to the cash book; the figures in the column R in the day book indicate on what page in the day book the entry will be found should it become necessary to refer to it.

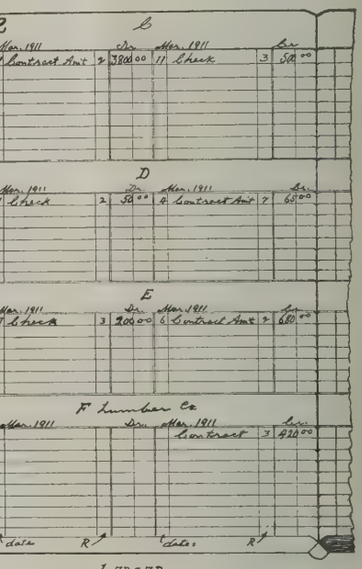
In the ledger is kept each individual account, so that any account can be turned to quickly and will show what the standing is.

The first account in the ledger is seen to be that of C. The amount of the contract price is placed on the Dr. side of the ledger, as this is the amount C. will owe when the contract is complete; all payments C. makes to A. are placed on the Cr. side.

Accounts D., E. and F. Lumber Co. are contracts A. has made for money to be paid out by him, so they are placed on the Cr. side of the ledger, as all of these have these amounts to their credit when they have fulfilled their contracts, any payments that A. makes on these he enters on the Dr. side of the account. The figures in column R indicates on what page these entries will be found in the day book, and column R in the day book on what page in the ledger; this makes it easy to refer from one book to the other when necessary.



CASH BOOK



LEDGER

The entries in the day book of the G. Storage Co. and the K. Baking Co. show on page 3 in the ledger, as indicated by figures in column R in the day book.

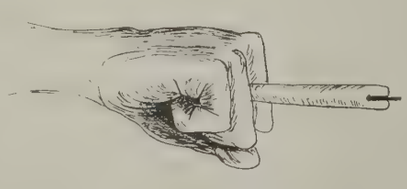
If the reader will trace these entries from one book to the other he will soon get the idea.

In my next paper I will deal with the Cost Keeping and Estimate books.

A WORKING KINK

By W. A. LANE

ONE sometimes has to drive a nail that is just out of reach by holding it with one hand and driving with the other, as in the ceiling or around a corner. By using the following method it is easily done: Bore a hole in the end of the balance handle about ¾-inch or an inch deep—a shade larger than the head of the nail you are going to use.



Drop your nail in the hole head first, hold the hammer by the head, and with a sure motion stab the nail where you want it. Then change ends with the hammer and drive the nail. In my hammer handle I have two holes, one I have filled with beeswax to dip nails into when they must go in hard wood or any place they might land; the other is ready to use as before described.

A QUESTION AND AN ANSWER IN BRICKWORK

SKEWBACK.

I WOULD like to ask you to explain a problem which confronted me recently.

I am a bricklayer. The foreman came to where I was building two brick jambs for a door opening. He said, "I want an arch turned over the opening. Give it a 6 inch rise," the opening was 4 feet wide.

Now, as a bricklayer nowadays is not given time to make a drawing to find the radius of an arch, it occurred to me that it would be convenient to have a formula at hand or in mind to find the fall of skewback without having to make a drawing, so I would be thankful if you could favor me with explanation of such formula in a near future edition of NATIONAL BUILDER?

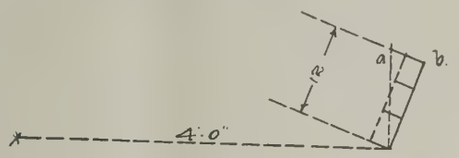


FIG. NO I.

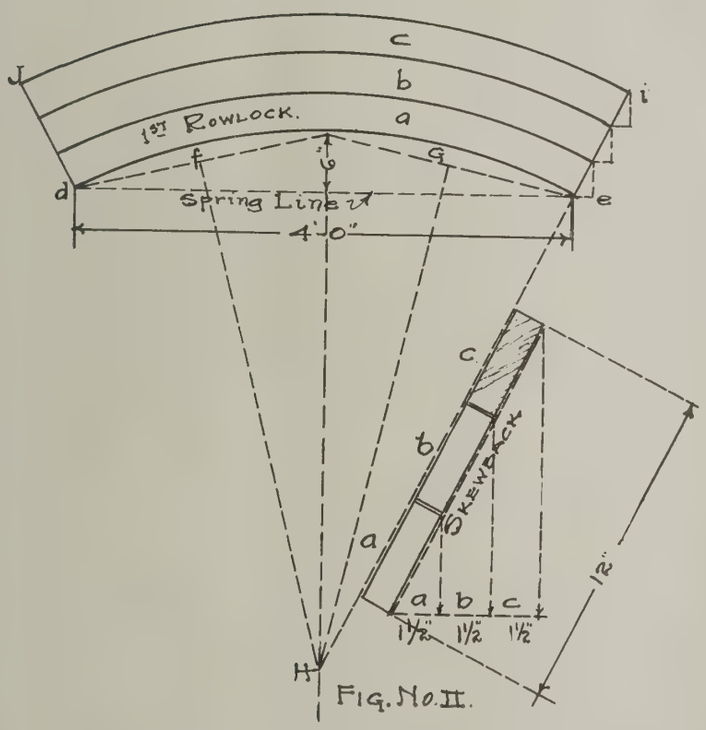


FIG. NO. II.

Replying to the query of our correspondent we would state that there are no arithmetical nor algebraical formulae published nor in existence for determining flake or slope angles of skewbacks, this being a geometrical problem and a matter of drawing, but there is a proportional method which can be followed if the work is hurried, with fairly mathematical and mechanical accuracy as follows:

Referring to the correspondent's sketch (Fig. 1) we find the span between the faces or revels of the jambs four feet, the soffit of the arch or rise six inches. Now if we lay out the arch as indicated in Fig. 2 by joining the point of the rise with d and e by dotted lines, bisecting these and squaring down, we locate the center H, which joined with H-e and H-d produced will give the slopes of the skewbacks e-i and d-J all being done to scale. By enlarging the scale or setting the bricks full actual size we will find that each first brick, on right and left sides, flares or slopes one and one-half inches as J at the bottom of the diagram, similarly with the second and third rings or rolocks b and C or the total flare in the twelve-inch arch is four and one-half inches, a proportion of one-quarter of an inch to each inch of rise, a safe proportion to work from without doing any drawing for radius or going to the trouble of laying out.

For arches the spring lines of which are out of level or "Rampant" arches, as they are technically termed, the slope of the skewbacks will differ and their elevation must be drawn to definitely determine their angles.

We will now take up some difficult forms of "Skewbacks."

Refering to Fig. 3 for the benefit of all readers, will be seen the bonding of two segmental brick arches, each three stretcher brick deep in the rings springing from a finished capstone set on a four brick or 28 inch pier. The bricks forming the intersecting voussoirs below the top, or extrados lines are beveled and overlapped, to bond and tie together, so that there is no straight joints

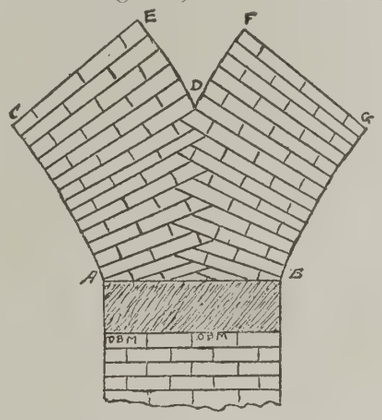
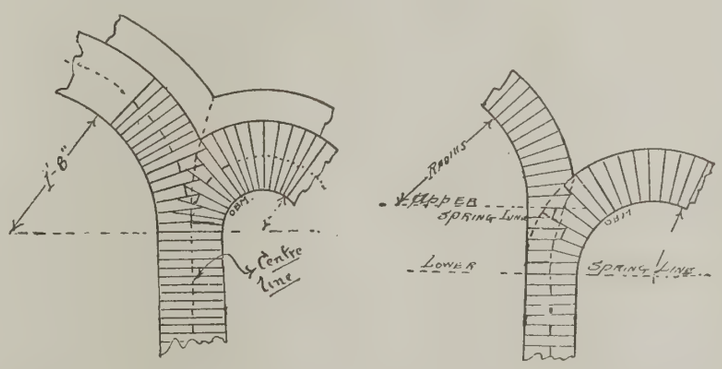


FIG. III.

nor mitres and the headers are carried up from the spring line. These skewbacks demand unusual accuracy in cutting, fitting, and laying, and are best laid out full size on a sheet of paper, drawing board, or clean floor, by commencing at the spring line A-B and after locating the center line, to sweep the soffit and extrados curves and then join the joint lines as A-C, D-E, B-C and D-F where the radiating lines of the right twin arch cut into and intersect those of the left, by this means the joints and beveled ends may be obtained.



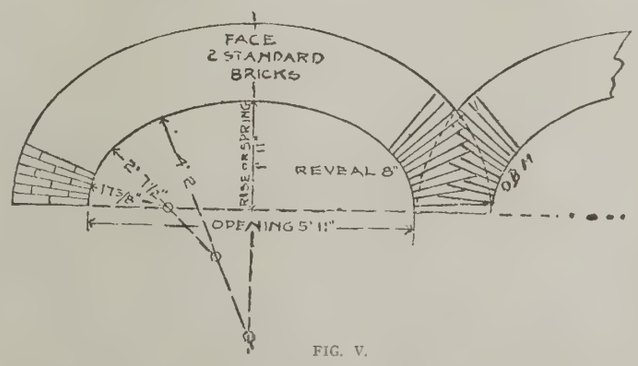


FIG. V.

Fig. 4 shows two more forms of intersecting arch skewbacks which differ from Fig. 3, in having the intersecting arches of various sizes, that in the center of the upper elevation being larger than the two flanking which will cause the intersecting joint, if not overlapped to assume a curve as O-P and if overlapped the joints will of course follow this direction, reversing on the left side, and it will be seen that the greater the arch which intersects its fellow, the more acute will be the arc of the curve of intersection. The

bottom elevation represents three equal vertical and overlapping intersections also correcting radial rod for verifying the joint lines, backs and intersections of sharp curves and those of diverging springing lines; also elliptic curves, which can, from the foregoing

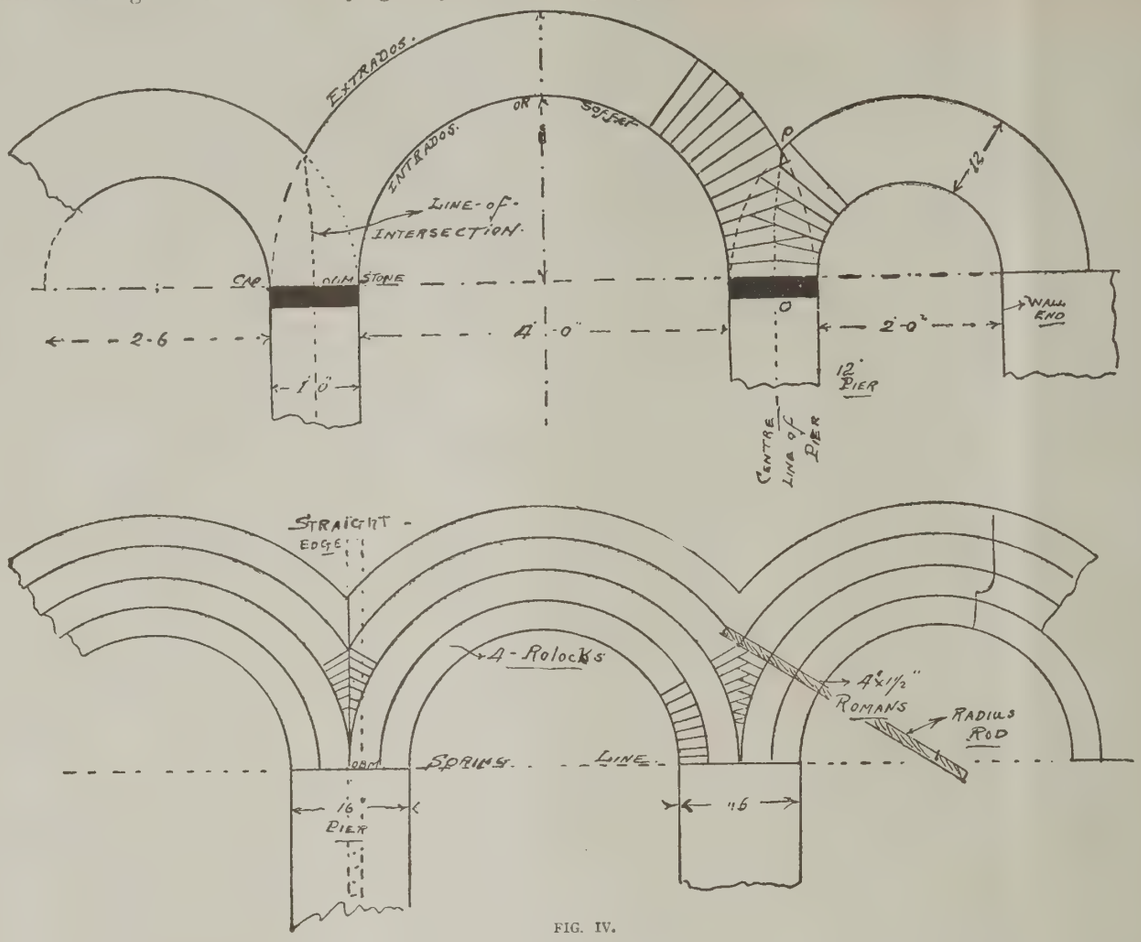


FIG. IV.

all of which will be found practical and useful by operative brick layers.

The three sketches shown in Fig. 5 represents various skew- descriptions and a close study of the diagrams, be laid out either to an enlarged working scale, or full size, as may occur to bricklayers and masons in actual practice.

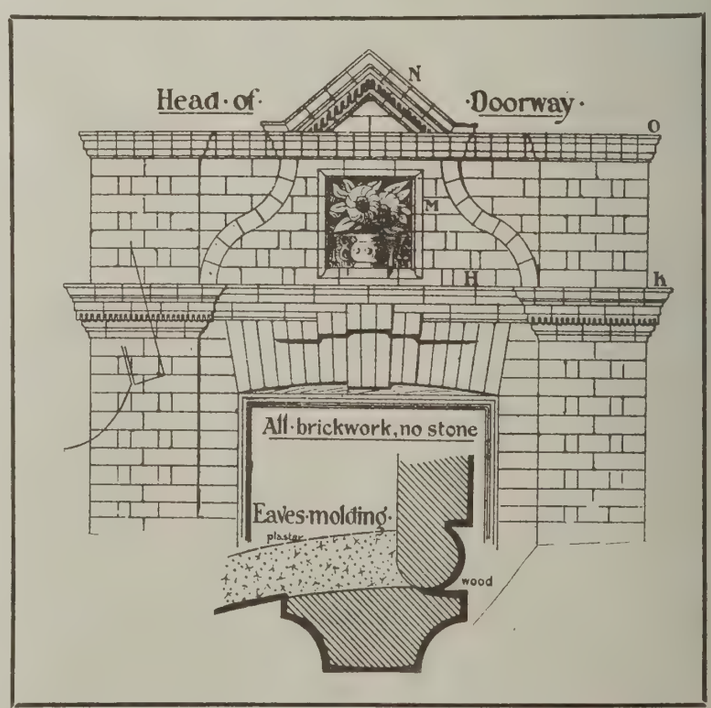
CONCRETING IN WINTER

WINTER brings its troubles to all kinds of out-door building operations and it is a wise builder that can get the bulk of his outside work done when the weather is moderate and have inside work for cold weather. This is not always possible, though, and sometimes lots of work must be carried on right through the winter, even concreting and foundation building.

Frosty weather is not good for anything that contains moisture, because freezing causes moisture to expand when it hardens and thus tends to break down the structure of the material. It is not even good for lumber to just let it get wet and freeze, because it breaks down the bond between the fibers. To a certain extent this same thing holds in regard to concrete and where it is reinforced jobs or an entire structure of concrete it is pretty difficult to handle it in mid-winter and make a success. It can be done by taking precautions to enclose as much of the building as possible and cover the work with canvas and keep fires around the basement to drive out the frost, but it is expensive and not satisfactory. So, a man doing work of this kind in the winter should figure almost double price on it.

There are certain kinds of work; take ordinary monolithic work for a frame house foundation and it can be done right along through the winter by simply taking the precaution to cover fresh work over with canvas or something to keep the frost off at night.

Work like this, that is done in the ground, is protected some by the ground itself, and besides it does not require the strength that is necessary in reinforced construction. Consequently, when the weather is not so cold that the water and sand will freeze in mixing one can put up concrete foundations in winter time and do the work in the wall part of the day and quit a little early at night and cover the work over with canvas or boards and it will do very well. The same thing is true of making cement walks. The surface must be covered over and protected until the primary setting after which it will fare very well.



THE VALUE OF ZINC ROOFS—Concluded from February

By H. M. SANDERS

In regard to making the side seams on the long way of the sheet, when the two sheets are joined together on the incline at pitch of the roof, the best method from an English point of view, is or seems to be that, as shown in Fig. 3, especially on comparatively flat roofs, because of the fact that the upturn of the sides of the sheets are not nailed to the wood roll against which it rests, but is held in position by means of a cleat which gives the free action at this point of the sheet.

The wood roll as shown in Fig. 3, in size, is about 1¾ inches wide at its base, where it joins the roof, 1¾ inches deep, and 1¼ inches across the top. This wood roll of course is nailed to the roof, lengthwise, with its pitch, and placed on centers apart a suitable width to meet the requirements of the width of the sheet zinc used for the roof, with an upturn on each side of same as shown. But before being fastened down to the roof, a cleat 2 inches wide and of sufficient length to form the cleat, as shown by dotted line F. These cleats are placed about 18 or 20 inches apart. As they have to be accurately placed with the center of the cleats on the bottom of the wood roll, it is better to have them placed in position and nailed with a single nail to the bottom of the wood roll before it is nailed to the roof. After the wood roll is nailed to the roof then turn the cleats up against the sides of the roll, and when the sheets of zinc are placed in position with edges turned up as shown at D, the cleat is then turned down over the top edge and holds the sheet in place, as also shown, in Fig. 3. The top of the roll is covered with a loose-fitting zinc cap and fastened to same by means of 1¼-inch wood screws every foot apart, and a zinc cap soldered over them, leaving the outer edges of the cap, which turn down over the upturn of the roof sheets, free action in its expanding and contracting qualities.

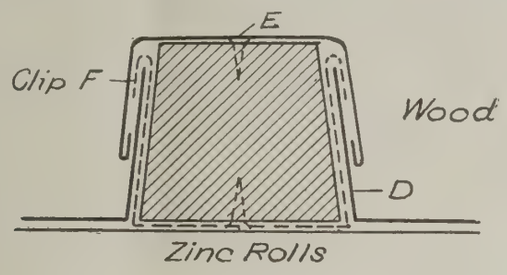
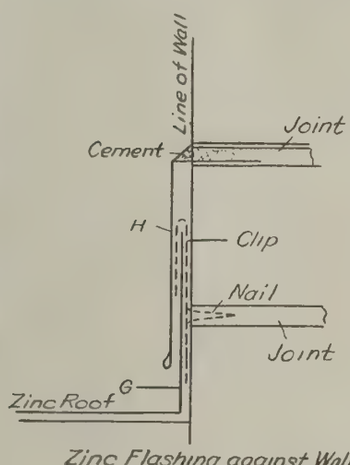
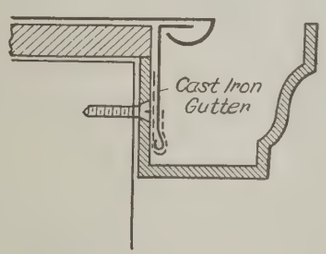


FIG. 3.

In Fig. 4 is shown one method of flashing zinc against the outside walls. As the upturn of the zinc roof is to turn up against the wall about 6 inches, clips, as shown by dotted lines, are nailed to the seam in the wall below the top edge of the upturn G as shown. When the sheets of zinc are placed in position and turned up against these clips, the end of the clip or cleet, is then turned down over the top of the 6-inch turnup of the zinc roof, and holds it down securely in position, without confining it so rigidly as to prevent the expansion and contraction of the metal. After which the cap flashing as shown by H in Fig. 4, is placed in position, and

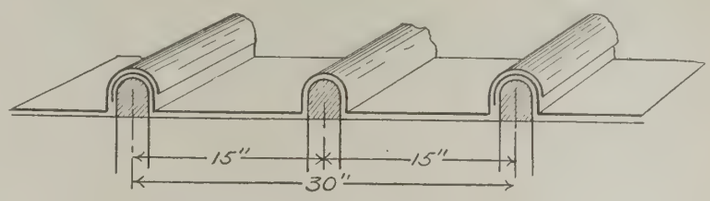


Zinc Flashing against Wall
FIG. 4



Zinc Roof flash into Gutter
FIG. 5

extend down over the top edge of the upturn of the zinc roof about 4 inches, with its lower edge turned up on the inside to stiffen it and make it adhere more closely to the lower roof flange. The top edge of this cap, flashing or apron is to extend into the seam in the wall and then cemented in.



Italian Corrigated Zinc Roofing
FIG. 6

When these zinc roofs are connected at the lower or eave end of the roof, especially when they connect with gutters, they are usually constructed as shown in a simliar manner to that shown in Fig. 5. With the exception that if the gutters are made of sheet metal instead of cast iron as shown, the back of the gutters could extend up to the roof line with an edge to turn out ¾ of an inch, on which to slip over the roll formed on the lower edge of the sheet zinc which forms the roof covering.

But, in such cases of a cast iron gutter, as shown when the back of the gutter does not extend up to the roof line, it requires a strip of the roof metal, fasten to the back of the gutter as shown with its lower edge doubled over on the back to stiffen it, and the top turned out to hook on, so to speak, the lower edge of the zinc roof.

There is another style of zinc roof, that is thought by some to be a still better class of zinc roofs in many cases than those we have described. It is what is called The Italian Corrugated Roof, as we have shown in Fig. 6.

On this plan or method, the corrugates are not close together but are about 15 inches on centers to meet the requirements of the width of sheets 3 feet wide. Usually no roof boards are used for this roof, for the reason that each corrugate fits over the top of the rafter, the top side of which is made round to receive it.

These rafters rest on purlines which are placed from 6 to 8 feet apart, which of course run at right angles with the pitch of the roof.

The size of the corrugates are 3 inches deep and the width of the rafter. The fact that there is no support to the metal roof between these corrugates, would seem an objection in many cases to its use. But still, it is a kind of roof that seems quite common in European countries, as it is being used for covering railway stations, shed and warehouses, etc. For this reason it gives the American people an object lesson to study, as the possibilities for the future, of a more general use of zinc roofs on our buildings than in the past.

RECORD FOR CONCRETE CONSTRUCTION

SOMETHING like a record for speed of construction has been established in the erection of the Manufacturers Home Building, in Vancouver. The structure, which is of concrete, was put up from the water's edge to a height of 103 feet in 118 days. There are about 14,500 square feet of floor area per floor, and the floors are designed to carry a live load of 175 pounds per square foot, the concrete slabs being carried on shallow concrete beams and girders, which, in turn, are carried by hexagonal columns, heavily reinforced to cut down their sizes to a minimum. The entire floors were finished as the work progressed from floor to floor, and were immediately covered with lake sand, to protect them from being marred. The building piers rest on clusters of piles. The largest columns in the basement are 28-inch hexagons and the smallest, in the upper story, are 10 inches square.

Newark, N. J.

I am well pleased with THE NATIONAL BUILDER; enclosed I send you the money for another year's subscription.

D. E. Gould.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

(Continued from February.)

IF we step back slightly and view a house so that we see just the front of it and nothing else, we can get the shape and size of the front, but we cannot tell its depth and the shape of its three other sides. If we step around the house and view these other sides we can get the shape and size of each alone but we learn nothing of the ones we cannot see. If we could be above the house we would see the roof and nothing else. From this view we could tell the size and shape of the house but we could not tell its height.

Now let us suppose that straight lines parallel to the sides of the box be drawn from each point on the block to the co-ordinate planes of projection. These lines just drawn are called projection lines or projectors. Now the points on the planes where these lines intersect with them are connected, giving us the figures of each side of the block on each of these planes. These different views are designated plan or top view, front elevation and side elevation. The left side elevation would be the same as the right, and the rear the same as the front, therefore they are left out of Figure 21 for the sake of clearness.

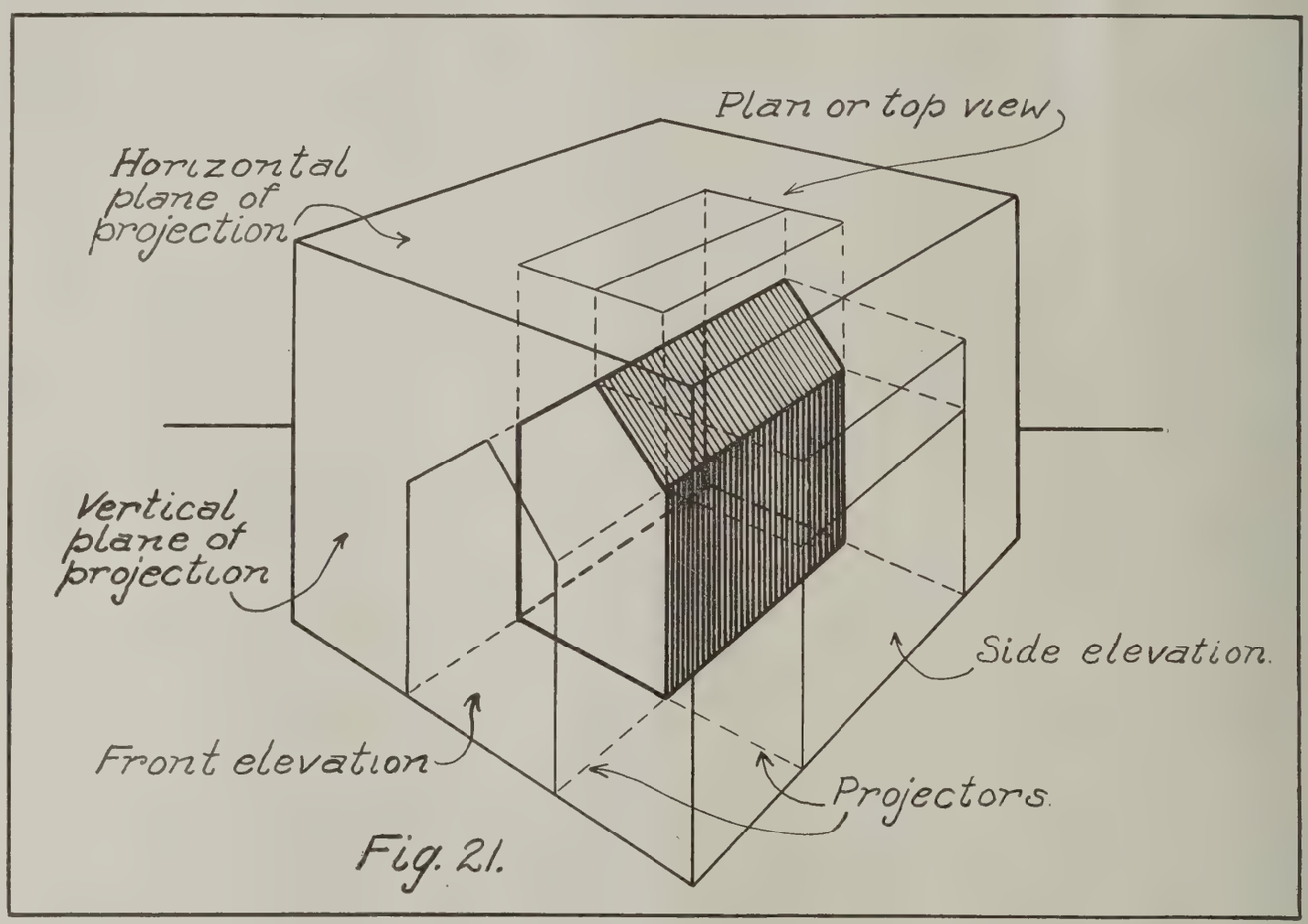


Fig. 21.

The view as we see it from the front is termed the front elevation, the view of the sides the side elevations, and the back the rear elevation or back view. Looking at it from above we get the top view or plan of the roof. If we could take a saw and cut the house around through the first and second floors we would call the section through the first floor the first floor plan, and that through the second floor the second floor plan, etc. These different elevations and the roof plan as projected on a flat surface from the house itself, constitute what is known as orthographic projection. We will now take it up theoretically and work out some of its simple problems.

In Figure 21 let us suppose that we have a rectangular box with transparent sides. Inside of this box and parallel with its edges, we will place a block with a sloping top to represent a house with its roof. The top side of the box is known as the horizontal plane of projection, the front side the vertical plane of projection, and either side on the right or left of the front, the side-verticle plane of projection. These three together are called the co-ordinate planes of projection.

PLATE VII.

ORTHOGRAPHIC PROJECTION.

After laying out the margin lines on your paper, study the figures and text carefully before putting in any of the figures on your plate, as some of them are problems and require more space than is here shown.

If the sides of the box of Figure 21 were hinged and spread out all on one plane we would have a figure similar to Figure A. Here I represents the plans or top view, 2 the front elevation, 3 the right side elevation, 4 the left side elevation and 5 the rear elevation. As stated before the front and rear elevations are alike, also the two side elevations.

Figures B and C show why at least three views are necessary to properly show the shape of an object. If the plan was left from each of these figures there would be no way of telling that one was a square prism and the other a rectangular prism, as the front and side elevations of both are alike.

Figure D gives us the projections of a hexagonal prism. To draw it, first construct a hexagon which represents the plan, then project lines down to form the front elevation, and where the top of the front elevation intersects the right hand projector set the compass point and draw the arcs as shown. From these points complete the figure by drawing in the side elevation. In this figure and some of the succeeding ones, notice the use of the center lines.

Figure E presents a more difficult problem as four views are needed to fulfill the conditions. Here we have a rectangular prism set with its small end at an angle of 30 degrees to the right. To more easily understand the problem it would be well for the student to take a box of that shape and tilt it a little to the right. Then view it down and from each side, and it will clearly illustrate the views here shown.

at an angle of 90 degrees to its base.

Figure G presents a rather complicated problem, but by carefully following the principles learned and clearly seeing each step as the work progresses, little difficulty should be experienced in solving it. It represents a square pyramid whose top has been cut off at an angle of 30 degrees to the horizontal and whose base is 60 degrees to the right. The front elevation is here given, a plan and two side elevations will be needed to complete the drawing.

After completing this plate, do not let your study of orthographic projection end, as it is a very important topic and there have been a number of volumes written on it alone. You can easily work up problems of your own along the line here given, or you can take some small article of furniture and draw it up in three views. And above all keep in mind the principles learned as they are the

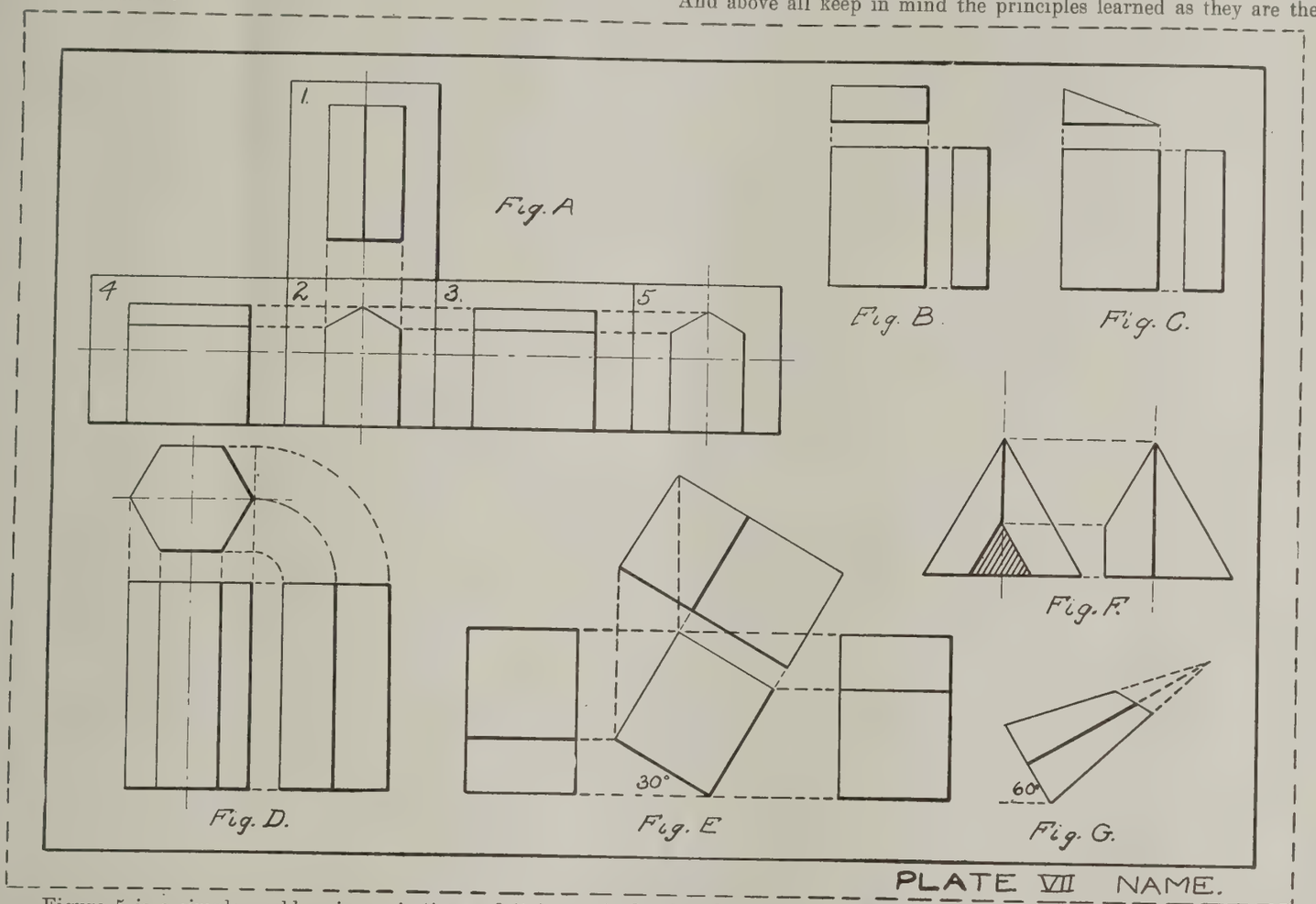


Figure 5 is a simple problem in projection and it is required of the student to complete the figure by putting in the plan. It represents a square pyramid, one of whose corners has been cut off

foundations on which the working drawings will be built further on in this course.

(To be continued.)

Latest Legal Decisions

There can be no mechanic's lien on vacant land, where the uncompleted building, without fault of the owner, has ceased to exist.—Watson v. Alta Inv. Co., 108 P. (Cal.) 48.

A building contract provided that no alteration, addition, deviation, or omission which affected the price or the time for the completion of the work should be done without a written order of the architect, approved in writing by the owner. Held, that there was no power in the architect to waive the provision for a written order.—Van Buskirk v. Board of Education of Passaic Tp., Morris County, 75 A. (N. J.) 909.

Where a building contract provided that the expense incurred by the owner and damages resulting from the contractor's default should be audited and certified by the architect, whose certificate thereof shall be conclusive abandonment, the architect's certificate was admissible in evidence.—Shriner v. Craft, 51 So. (Ala.) 884.

Where a building contract provides that the architect's certificate shall be conclusive as to the expenses incurred by the owner and the damages resulting from a contractor's default, it is conclusive thereon, in the absence of fraud or gross mistakes indicating bad faith or failure to exercise an honest judgment in making out the certificate.—Shriner v. Craft, 51 So. (Ala.) 884.

Where a building contract expressly provides how the loss shall be borne in case the building is destroyed by fire or earthquake, a covenant that the building must continue in existence, and that a destruction thereof before completion shall excuse further performance by the contractor and entitle him to recover for the value of the work done, will not be implied.—Watson v. Alta Inv. Co., 108 P. (Cal.) 48.

A contract between a contractor for alterations on a public school building and a subcontractor provided for "tin roofing cornices, slate work, leader and all metal works for Lincoln avenue school as per plans and specifications by E. F. Gilbert, architect, and to his satisfaction, for the sum of twenty-seven hundred dollars ($2,700). Held, that under this agreement the subcontractor was not entitled to his pay until he had finished his subcontract, nor until the architect was satisfied that the work was properly done.—Meurer v. Kilgus, 75 A. (N. J.) 899.

Where a subcontractor seeks to avail himself of the benefit of the mechanic's lien law, he must bring himself fairly within its provisions, by complying with its terms, and is not entitled to a lien unless he notifies the owner of the land by registered letter previous to the completion of the contract that he has furnished materials, machinery, or fixtures. Mere personal knowledge of the owner that a particular person is furnishing material to the contractor does not supply a statutory notice upon which the person furnishing the materials can predicate a mechanic's lien on the property of the owner.—North Dakota Lumber Co. v. Bulger, 125 N. W. (N. D.) 883.

Where a building contract provided that, if before completion the work should be wholly destroyed by fire or earthquake, the owner should sustain the loss to the extent of the installments paid or due, and the contractor should lose the installments not then due, the contractor, on destruction of the building before completion, could not recover on the theory of substantial performance, though the value of the work remaining to be done was only $48 and the contract price was $13,000; the owner not having received the benefit of the work and not being able to recoup damages for imperfections or omissions therein.—Watson v. Alta Inv. Co., 108 P. (Cal.) 48.



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]



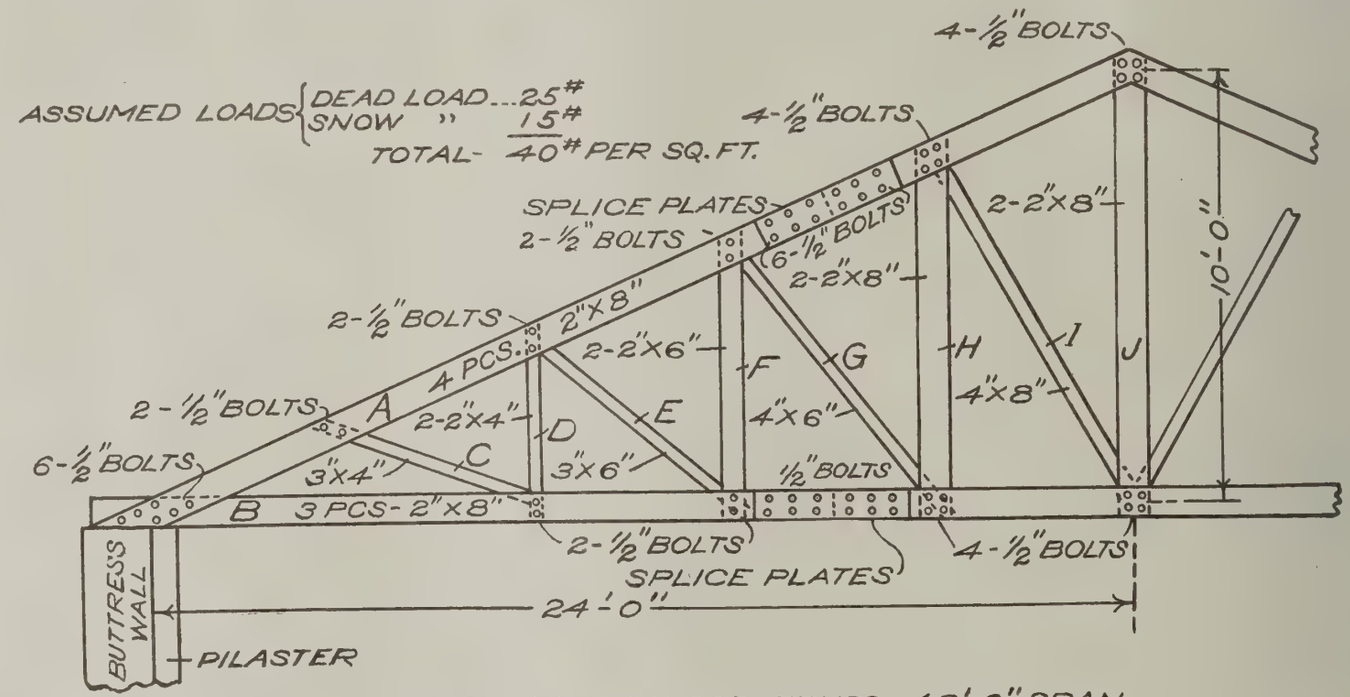
ANSWERS

ROOF TRUSS.

From E. M. K., Nevada, Ohio: I want a design for a roof truss over a span of 48 feet, roof to be light.

The following answer to the foregoing query is submitted for our correspondent's consideration:

In the construction of this truss, the commercial sizes of timbers are used, allowing the use of material from stock instead of having to order long lengths of special sizes from the mill. It also allows the best pieces to be selected for the places where the greatest stress comes. There is also the advantage that the truss can be assembled on the ground complete, taken apart, and the small pieces taken separately up to their places and re-assembled from a suitable scaffold. Of course, if the facilities will permit, the truss can be assembled on the floor of the building and lifted in one piece to its place on the wall. (See diagram above.)



DESIGN FOR A WOOD TRUSS 48'-0" SPAN
TRUSSES TO BE PLACED 10'-0" ON CENTERS

It will be noted that all the connections are made with bolts. This makes a much stronger and safer job than by spiking the pieces together, and, of course, is a great advantage in case it is necessary to make alterations or take the truss down at any time. Only square head bolts should be used, so that they can be made tight. Large washers should be used under all bolt heads and nuts which come against the wood.

It is to be especially noted that this truss is designed for a span of forty-eight feet, with the trusses spaced ten feet on centers. Should the location require a greater span or spacing a corresponding increase in the members will be necessary.

In assembling the truss, note that no cutting off of the timber is necessary, the pieces being spaced to allow the joining pieces to run through. The four pieces of "A" over-lap the ends of "B," making a very strong joint where the greatest stress comes. In like manner the pieces "D," "F," "H" and "J" are joined to "A" and "B."

If it is desired, the members "D," "F," "H" and "J" could be made in the form of rods, but the fastening of the ends require special fittings.

After the truss has been in place long enough for the lumber to be perfectly seasoned, the bolts should all be gone over and left perfectly tight.

CUTTING HIP VALLEY AND JACK RAFTERS.

From B. J. Pittsfield, Ill.

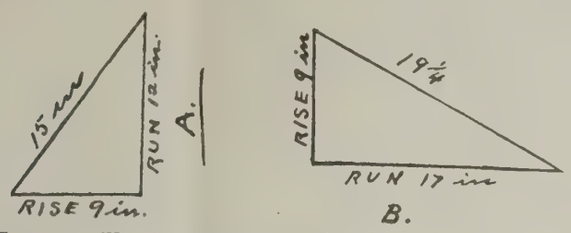
In answer to J. A. B. of Lake Megantic. I might say to his question Yes! and I will try and explain, but before doing so, I wish to say a few words in regard to the way a great many questions are answered.

There are a good many working at the trade who are not very far advanced in mathematics, and as to algebra, geometry and such things, they know nothing about them. When these fellows, who make an attempt at answering these questions, and make drawings and mix them up with algebra and geometry, and expect to be understood they are mistaken, and the more the student looks at it the less he knows about it. I have seen questions answered which were enough to make a young man just starting, throw up the business. Then again, there are men working at the trade, who would not understand a thing, it matters not who explained it, or how simple it was. I think the trouble with some is that there is something out of place with their think tank. You must think with your head, and think hard. When you have mastered a thing, salt it down and try to learn something new. We never get too wise to learn something new, even if we serve our whole life working at a trade. When I see these questions asked, I take it for granted that the one asking them is looking for information.

Now to explain the question for J. A. B. we will first take a roof with 8 inches rise for one foot run. Now for every foot the rafter spans, the rafter is 14 7/16 inches long. Why? Because a rafter is the diagonal of the run and rise and the diagonal of

8 inches and 12 inches is 14 7/16 inches. Now for a roof with 9 inches rise to 1 foot run, the rafter is 15 inches long for each foot that it spans because the diagonal of 12 inches and 9 inches is 15 inches and so on with any pitch roof.

For example notice the drawing A. We see the run is 12 inches and the rise is 9 inches and the diagonal is 15 inches.



Now we will suppose we are going to roof a building 24 feet wide and the roof is 9 inches rise to the foot run. If the building is 24 feet wide, one rafter will span half of the width, or 12 feet, and as we said the rafter was 15 inches long for 1 foot run with 9 inches rise, a rafter 12 feet long would be 12 times 15 inches or 180 inches and 180 inches equals 15 feet, the length of common rafter. This is the length of rafter from out side of wall plate to peak of roof, and does not allow any projections.

The figures that cut the common rafters will cut the jacks, and to get the length of jacks we will say they are to be 2 feet apart or 2 feet on centre. Therefore the first or shortest jack would span 2 feet and as we said the rafters were 15 inches for 1 foot run, of course the first jack would be 30 inches or 2½ feet long. The second one would be 60 inches or 5 feet long, and so on. To get the bevel on jack to fit against hip, we take the run or 12 inches on the tongue, and length, which is 15 inches on blade and cut on blade, and you will have the correct bevel. Of course, you will have to cut your jacks short, one-half the thickness of the hip, or they would be that much too long every time, and would not space out right.

Now for the hip and valley rafters. The diagonal of 12 and 12 is 17 and a hip rafter is the diagonal of a square added to the rise of roof. (See Fig. B). Now to cut the hip rafter, we take 17 inches on the blade and 9 inches on the tongue, 17 cuts the foot of rafter and 9 cuts the top or plumb cut. Now the length of the hip for 1 foot span is 19¼ inches because the diagonal of 9 inches and 17 inches is 19¼ inches. While the hip rafter does not run straight across the building, but diagonally, they are supposed to meet over the center of building, therefore it will be 12 times 19¼ inches to get the length of hip, and 12 times 19¼ inches equals 231 inches or 19 feet 3 inches or the whole length of hip, not allowing anything for projections, and the hip must be cut short one-half the thickness of the ridge piece. To get the bevel on hip to fit the ridge piece, we take the length of hip for 1 foot run which is 19¼ inches on the blade, and its run which is 17 inches on the tongue, cut on the blade and you will have the correct bevel. The valley rafters are the same as the hip and the same figures cut them. The only difference in laying off the common rafter and the hip is that you use 9 and 12 for the common, and 9 and 17 for the hip, and step off the same number of times for each. I hope J. A. B. will have no trouble in understanding this.

CUTTING HIP, VALLEY AND JACK RAFTERS.

From F. L. T., Corpus Christi, Texas.

J. A. B., Lake Megantic, will find suggestions in the December and January numbers for finding the length of rafters without the use of a drawing. The drawing is advised for a complicated roof as mistakes are thus more easily avoided and the different pieces can be marked to correspond to the roof diagram and can thus be quickly found when wanted as the roof is raised. A moment's consideration will show that the rise, run and length of a rafter form a right triangle, the length being the hypothenuse. Now as suggested in the articles mentioned, if we suppose 1 inch to represent a foot, 1/12 inch will represent one inch, we can use the side of the square divided into inches and twelfths. Assume a pitch 9x12. Measure 9 inches on the tongue and 12 inches on the blade. Measure between these points 15 inches for the length of the common rafter for each foot of run. If the run of the rafter whose length is sought be 7 feet, the length will be 7x15 inches or 105 inches. If the run be 14 feet 7 inches the length will be 14 7/12x15 inches. The lengths can thus be quickly measured on the square, "stepped off" on the timber, or calculated with any desired degree of accuracy. Coming now to the hips and valleys, if J. A. B. will use a little imagination and patience he will discover two triangles at the hip or valley he can use. As before, he can use the rise and run or 9 and 17 and obtain nearly 19¼ inches. The distance between the foot of the hip and that of the common rafter at the end of the ridge is equal to the run of the common rafter. Thus we can use the figures 12 and 15 and obtain the same result. If these figures are taken on the square, the square applied to a jack rafter and a mark made along the 15 side, this will give the cut against the hip or valley. Similarly the figure 17 and the figure corresponding to the length of the hip, marking along the portion of the square containing the latter figure will give the cut of the hip or valley against the ridge. These principles are general and can be applied to finding cuts for cornice, braces and bevels of many sorts. Space forbids a detailed explanation at this time but if any reader finds difficulty in applying this method I should be glad to help him, through the columns of this paper.

Note from Editor:—With regard to the above answers we may say that we have got some 10 or 12 other answers to the question. Many of them very good. This is particularly true of one from H. F. G., Grabill, Ind. Another one from A. A. S., Chicago, Ill., and several others to whom we are obliged. We also append the following letter in connection with the answer that may be taken advantage of by such of our readers who may desire to get further information.

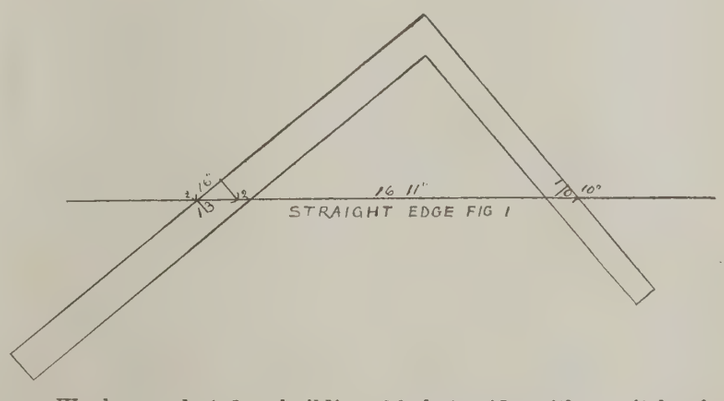
PORTLAND, Jan. 23, 1911.

To THE NATIONAL BUILDER.

If J. A. B., Lake Megantic, will write to W. Brown, 929 E. Davis street, Portland, Ore., he will learn something to his advantage about finding lengths and bevels on hips and jack rafters without a drawing. Being a carpenter and having had years of experience at roof framing I think I can teach a far better rule than drafting of framing from a draft.

HIPS AND VALLEYS.

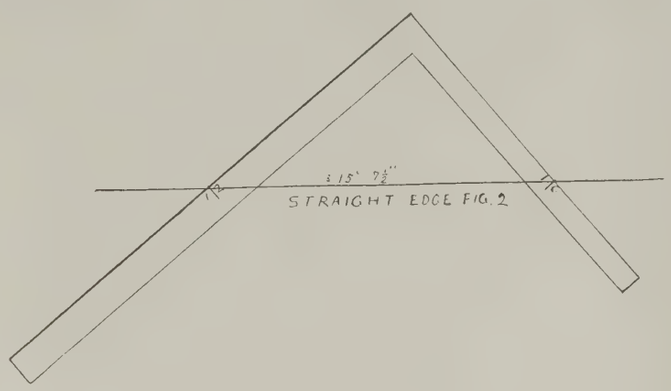
In answer to J. A. B., Lake Negantic, I take pleasure in submitting the following solution to his question. There is a way of finding the lengths, bevels and cuts of hips, valleys and jack rafters without making any drawings. The only tools necessary is a straight edge about 4 feet long and the ever ready steel square with the man behind it who knows how to use it. It is like everything else, it's the man behind the gun that does business. We are not going to make any drawings of roof plans, but will submit a series of straight edge with the square properly applied for obtaining the length, and cuts of the different rafters, just to show how it may be done.



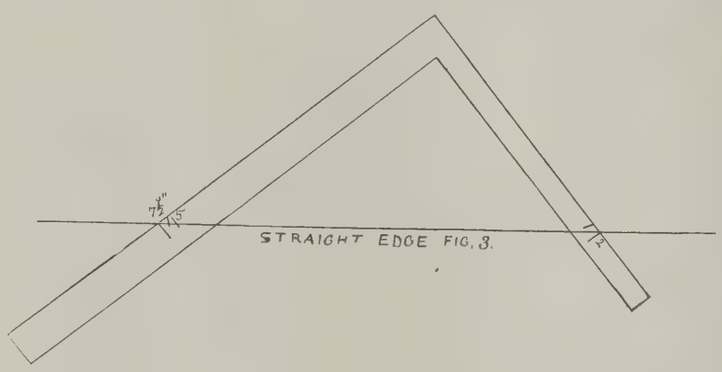
We have selected a building 26 feet wide with a pitch of roof 10 inches rise to the foot run of common rafter. Our selection has been made with a view of getting a roof that would complicate figures to some extent; that is, we don't want it too easy. We want J. A. B. to have to work his head a little to follow us, and then when it comes clear to his mind how it is done he will be right on this matter for all time to come.

Referring now to Fig. 1, we will first place the square on the straight edge in position to find the length of the common rafter. The building being 26 feet wide the run of the common rafter is 13 feet, the rise being 10 inches to the foot the entire rise of roof is 130 inches, or 10 feet 10 inches. Now take the side of the square that is divided into twelfths, so that the twelfths will represent the inches when we are measuring distances. Lay the square on the straight edge with 13 inches on

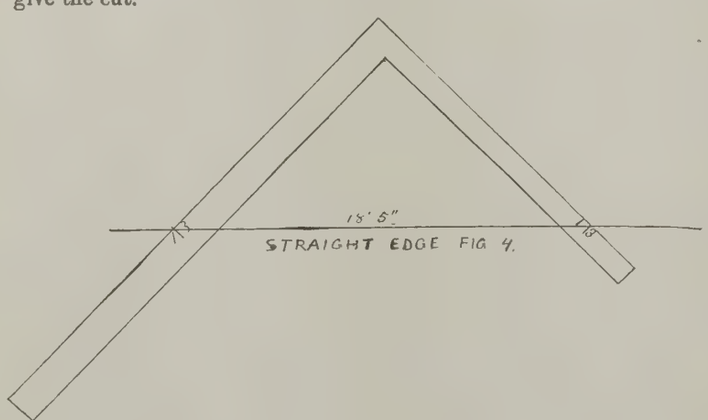
the blade and 10 and 10 twelfths inches on the tongue, and the distance on the straight edge between these two points represents the length of the common rafter, which in this case is 16 feet and 11 inches. Now for the jack rafter measure off on the blade from the 13-inch mark the distance the rafters are to be apart on centers; in this case we have measured 16 inches back, from the blade of the square, square down to straight edge and the distance from 2 to 2 as shown will represent just the amount shorter each succeeding jack will be toward the hip, which in this case is 1 foot and 10 inches.



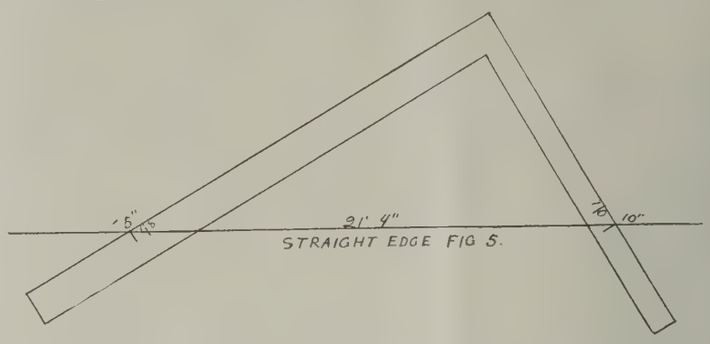
We will now explain how to get the proper bevels. It is customary to take the figure 12 on the blade of the square as a basis to work from because the figure 12 represents a foot run of the common rafter. Our roof is 10 inches rise to the foot, therefore 10 inches on the tongue represents the rise, consequently the square placed on the straight edge corresponding to the figures 12 and 10, as shown in Fig. 2, gives the top and bottom cuts of



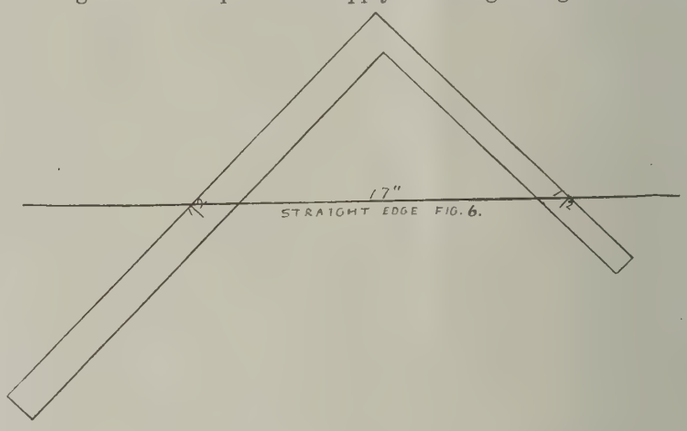
the common rafters. The 12-inch side is the bottom cut and the 10-inch side is the top cut. The bottom cut of a jack rafter is the same as that of the common rafter. The plumb cut at the top is also the same as that of the common rafter. The cut across the back of the jack is different, but is very easy to find. We already have the figures on the straight edge in Fig. 2 that give the cut.



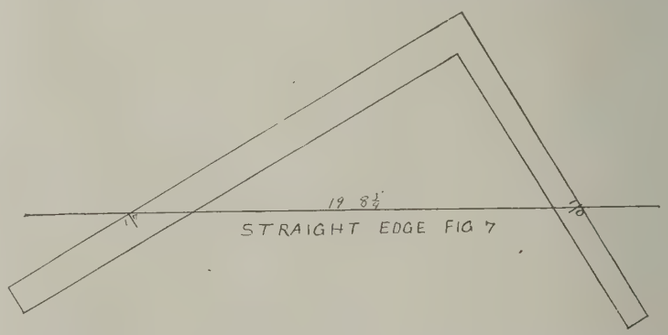
Take the figures 15 inches and 7½ twelfths on the straight edge, Fig. 2, which are in fact the length of rafter for a foot or 12-inch run, and apply them on the straight edge as shown by Fig. 3, and the blade of the square will give the cut across the back of the jack. We will now proceed to find the length and cuts of the hip. The building being 26 feet wide, place the square on the straight edge at 13 inches on the blade and 13 inches on the tongue, then the distance across on the straight edge, 18



feet and 5 inches, will represent the run of hip rafter. See Fig. 4. Now since the rise of the hip is the same as the rise of the common rafter for the corresponding run, take the run of hip, 18 feet and 5 inches, as shown by Fig. 4 on the blade of the square, and the rise of the roof 10 feet 10 inches on the tongue of the square and apply to straight edge as shown



by Fig. 5, and the distance across, 21 feet and 4 inches, will represent the length of the hip rafter, as shown by Fig. 5. The figures giving the top and bottom cuts of the hip are shown in Fig. 5 on the blade and tongue of the square, blade gives bottom cut and tongue top cut; but as we have stated before, it is customary to work from the figure 12 as a basis of calculation, so we take 12 and 12 on the square and straight edge, Fig. 6, and find the distance across to be 17 inches. Now take 17 inches on



the blade and rise of roof to foot, 10 inches, on tongue, and apply to straight edge, as show in Fig. 7. When the blade gives bottom cut of hip and tongue top cut, and the figures are 17 and 10. The figures across on the straight edge will give the cut across the back of a hip where hip joins on the side of a ridge or deck or any similar place. For this take the figures 17 and 19 inches and 8¾ twelfths. These figures are so large that it is not practical to apply them on the square in this manner, so just cut each side in half, which would make the figures 8½x-9 10-12 inches nearly, and for all practical purposes the figures can be called 8½x10; the 10-inch side gives the cut, and this will be a perfect fit.

We have been far more elaborate with this matter than we at first intended, and we advise J. A. B. to be careful and not get his measurements mixed. While the system we have outlined is absolutely correct if correctly followed, yet the framer must know what he is doing or he will fall down just the same.

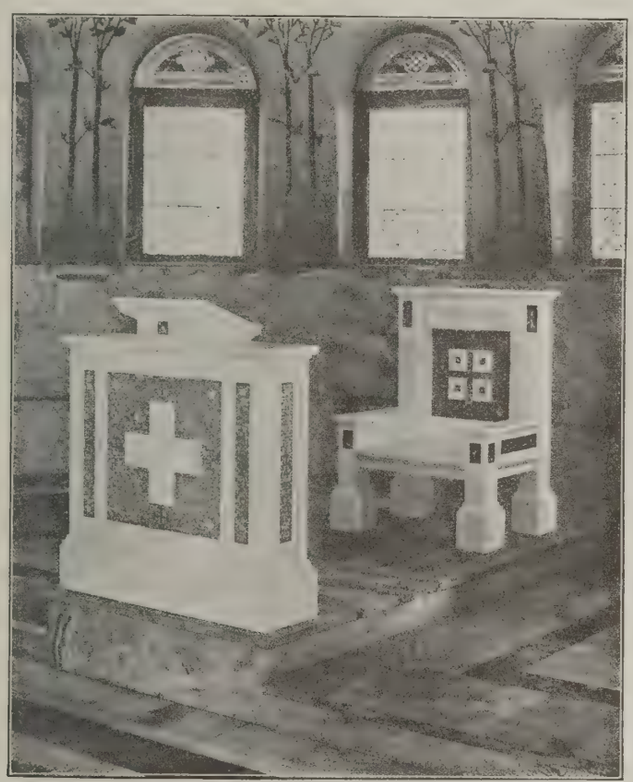
To the experienced it is all easy; others must learn, even though they do sometimes make an error. For a complicated roof like the Russel House roof, we would recommend a roof drawing, as shown by Mr. Stevenson, for there is no man with a head big enough to frame all the rafters required in that roof without the aid of drawings. If he did not have something to guide him in the work he would sooner or later find himself entirely lost, and would find that the roof diagram would be the only means of finding where he was at.

It is not policy to try to do without drawings, where they are needed, and when they are needed they are worth far more than the time it takes to make them. To be an expert at roof framing, either with or without drawings, you must know how to apply the square, and if you thoroughly understand this it will be no trouble for you to make a roof drawing if you should happen to need one.

MISSION PULPIT.

From J. L., El Paso, Texas.

In answer to S. B. R. of Spur, Texas, I submit the following illustrations of a pulpit and chair, which are taken from the



DETAIL OF PULPIT.

Western Architect. The designs are by Harry W. Jones, architect, and I think will be suited to the wants of your correspondent.

If A. D. A., Chicago, who wishes to sell Bemrose's work on "Inlaying" will send his address to Thomas B. Brown, care J. W. Harrigan, 1208 N. Gay street, Baltimore, Md., he may find a customer for his book. We may say that this book may be obtained from Beard & Co., Publishers, Philadelphia.

DRAUGHTMAN.

From "Old Hand," South Bend, Ind.

If S. S., LaGrange, Ind., will read the articles now being published in the NATIONAL BUILDER, on Mechanical Drawing, he should pick up enough information to enable him to draw ordinary objects, with ease. Perhaps if the author of these articles would give a chapter or two on drawing instruments and how to use them, describing the various instruments, how to apply the ink to the pens and other similar information, it would help the beginner very much, as very few young fellows know how to use India ink, or even how to charge a drawing pen.

PAINTING TIN ROOFS.

From N. and G. T. Co., Philadelphia, Pa.

In answer to R. O. N., Scranton, Pa., we are glad to furnish the following information:

A new tin roof should be painted as soon as it is laid, with one coat of approved paint. Two weeks later it should have a second coat, both coats well brushed out. Two thin coats are far better than one heavy coat.

One year later, the roof should have another coat of paint.

After that, painting at three or four-year intervals should be amply sufficient to repair the natural wear and tear of the weather. The interval between paintings can be lengthened as the roof ages and the paint-skin thickens.

If good tin is used, and applied by a competent workman, following standard practice, and given the reasonable attention which, as a first-class article, it deserves, the roof should last as long as the building it covers. In fact we have on record many cases of tin roofs that have been found in such good condition after many years' wear, that in altering or tearing down the old building the tin has been carefully removed and set aside, or else sold for other roofing work.

The tin should be given at least one coat of paint on the under side before laying. The approved paints are red lead, red oxide, metallic brown or Venetian red, mixed with pure linseed oil. Very little if any dryer should be used.

The roof should be carefully cleaned of all rosin spots, dirt, etc., and should be bone-dry before the paint is applied. Keep workmen off the roof as much as possible at all times, before and after painting. Never use paints containing graphite or tar, on tin roofs, good as they may be for other purposes.

PAINTING TIN ROOFS.

From A. Ashmun Kelly, Malvern, Pa.

The question propounded by R. O. N., Scranton, Pa., "is it good policy to paint tin roofs, and if so, what kind of paint should be used," may strike some as being rather absurd, but not so, for a real tin roof would never need painting, and indeed would be the worse for any paint. This because tin will not rust, and therefore will need no protective coating, as what we call tin roofing does. What we have as tin, is simply thin sheet steel very thinly coated with the metal tin, with which there is usually mixed a goodly proportion of lead. Such tin needs paint and needs it bad. Not bad paint, but good paint, and there is nothing better for the first coat at least, than a good oxide of iron paint, mixed with boiled oil, or raw if you prefer. If the roof is done in warm weather and dry, you will not need any artificial drying, the oil will dry itself in due time, and make a better protective coating. Two coats at most, and one coat, properly mixed and laid on will do. Graphite paint of best quality is an excellent roof paint also. It wears well, and the only objection I find is that it is slippery, making walking on it, if steep, rather perilous.

CEMENT CRACKING.

From H. U. C., Detroit, Mich.

In reply to G. R. G., Bridgeport, Conn. The trouble with your cement work arises from too much water in the surface finish, or from too much work with trowel. When a rich mixture is troweled to any extent, the suction created by the tool draws particles of neat cement to the surface where they dry. This often causes fine cracks, known as checking, map cracking, and crazing

SHINGLE DIP.

From G. M., Chicago, Ill.

Replying to C. G. W., Rome, N. Y. There are a number of stains that can be made without using linseed oil, for "Shingle Dip," but none of them are as reliable as those having linseed oil as a base. A good dip may be made by using crude petroleum, if color is of no consequence. This may be thinned down to the right consistency with benzine. The color will be, when dry, a dark bluish green. Other coloring matter may be mixed with the petroleum and benzine which will give other shades. Another method is sometimes employed by using commercial kerosene, mixed with such coloring matter as may be desired. Sometimes dry Portland cement is mixed with the kerosene; this has tendency to make the shingle less liable to take fire, a danger that is always present when petroleum products are used. Sometimes the coarsest sort of fish oil colored by some mineral colors to suit, is used. Shingles dipped in this, however, take a long time to dry, and must be kept separate during the drying process. Cabot's shingle stains, made by Samuel Cabot, Inc., Boston, Mass., or "Timberasphalt," an Indian Refining Company (Cincinnati) preservative would probably be better than the home-made article.

QUESTIONS

BAY WINDOW.

From N. S., Minneapolis, Minn.

Permit me to ask through the columns of your paper what the average cost of a bay window would be, not including carpenter labor? Dimensions: Length, 9 ft., depth, 3 ft., and one story in height, with shingle roof. The glass in the windows to be of double strength.

SHINGLING GABLE.

From L. R., Westbury, L. I.

I would like to have you put before your readers some information in regard to the right way of shingling a diamond in



How can one avoid the double course at point A-B? If there are 2 or more methods? Has the length C-D got to equal A-B, in other words can the diamond be longer than broader?

the peak of a building. I want to avoid the double course at the point where the diamond begins to close in after reaching the widest point. I think others would like to know about this too.

CURVED SIDING.

From D. S. P., Scranton, Pa.

Will some kind reader please describe the simplest method of laying out the curve on siding that has to be bent around a semi-circular curve of two-foot radius, and oblige a new subscriber?

OFFICE BOOK FILE.

From Geo. H. B., Kiota, Colo.

I would like to see a design or diagram of a good office book file in an early issue of THE NATIONAL BUILDER.

CORRESPONDENCE

A CRITICISM.

Oil City, Pa., Feb. 2, 1911,

Editor, NATIONAL BUILDER:

Dear Sir: No. 1 of Vol. 52 of the NATIONAL BUILDER is at hand again full of useful information. Also I noted that Mr. Geo. Rice has been around again to the different architect's offices and has gotten some more of his ususal second-hand, mostly unreliable, information. Some time ago he had an article about concrete store fronts and concrete window frames. I believe in concrete, have had considerable experience in concrete work, but concrete store fronts and window frames are not practicable. They would obstruct far more light than wood or metal ones, and Mr. Rice ought to know it. His drawings are such that any ten-year-old boy would be ashamed of. Mr. Rice seems to have no practical knowledge of concrete or other building material, but seems to get all his information second hand. I have been a subscriber to THE NATIONAL BUILDER since October 15, 1905, and have always found it to be a paper of practical and useful information, except the articles by George Rice—I fail to see any information of value in them. To my mind his writing will discredit the paper. I preserve every copy of it. The copies are far too valuable to throw away. Well, I have used enough space and time.

Respectfully yours,

Oil City, Pa. T. G. P.

OUR PRACTICAL COLUMN

A CIRCLE THROUGH THREE POINTS.

If you want to draw a circle through three given points *not* in a straight line proceed as follows and as shown in Fig. 7. Let A C B be the three given points; upon A and C with any radius greater than half A C mark arcs intersecting at D and E; upon C and B with any radius greater than half C B mark arcs intersecting at G and H; through E D and G H draw lines intersecting at J; upon J as center, with J C as radius, mark the circle through A C B.

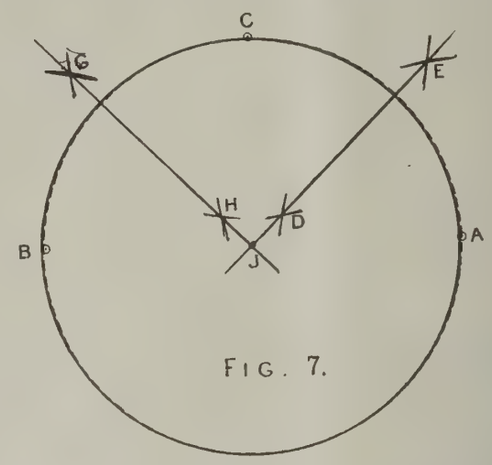
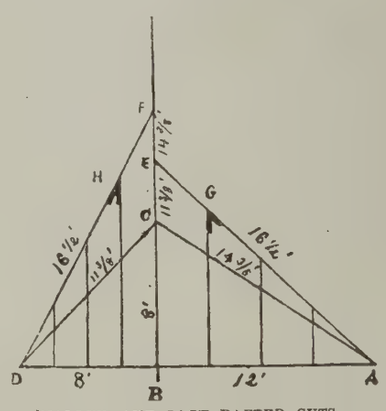


FIG. 7.

This system is often used in laying out circles or segments of circles when the center is not obtainable or cannot be found.

VALLEY AND JACK RAFTER CUTS.

The cut represents a building 24 feet wide, and one-third pitch, which gives 8 feet rise, with a pediment 16 feet wide and one-half pitch, which also gives 8 feet rise. As roofs of different pitches reverses the order of taking lengths and figures, it is difficult to keep the method clear in one's mind.



VALLEY AND JACK RAFTER CUTS.

Referring now to the cut, A, B is the run on the third pitch roof, B, D is the run on the half pitch roof, B, C is the rise of both roofs, A, C is the length of common rafter on the third pitch roof, and D, C is the length of common rafter on half-pitch roof. Set off length of common rafter on half-pitch roofs, as B, E, and set on length of common rafter on third pitch roof, as B. F. Connect A, E and D, F for position of valley rafter for finding the lengths and bevels of the different jacks. For the length of jacks on the half-pitch, space them on the run of third pitch, as shown from A to B, and draw perpendicular lines to valley line A, E, which gives length, and the bevel across the back is shown at G. The figures which give the cut for the bevel across the back of the half pitch jacks are 12 on tongue and 11⅜ on blade, the blade gives the cut. For the length of jacks on the third pitch roof space them on the run of the half pitch, as shown from B to D, and draw perpendicular lines to valley line D, F, which gives length, and the bevel across the back is shown at H. The figures which give the cut for the bevels across the back of the third pitch jacks are 8 on the tongue and 14⅜ on blade, the blade gives cut.

DIRECTIONS FOR TAKING BOARD MEASURE ON STEEL SQUARES.

The inch graduations on the outer edge of the square are to be used in combination with the fine parallel lines ruled lengthwise on one side of the square.

After measuring the length and width of the board, look under the 12 inch mark for the width in inches. Then follow the line on which this width is stamped toward either end, until you reach the inch mark on the edge of the square whose number corresponds with the length of the board in feet, and the number found under that inch mark on the line you are following will be the feet and inches contained in the board; the number to the left of the inch mark being feet, and that to the right inches.

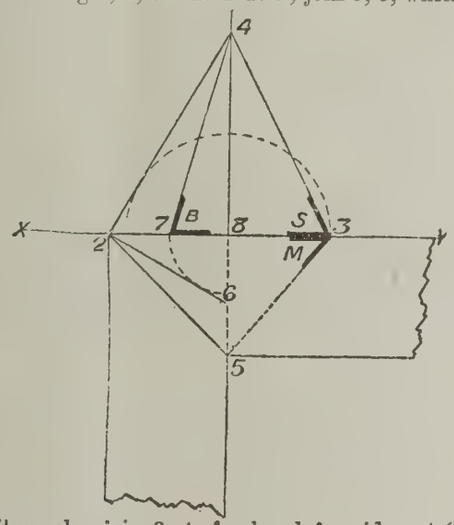
For example—Suppose a board to be 11 inches wide and 16 feet long:—Under the 12 inch mark, on the outer edge of the square find 11, which represents the width of the board in inches. Then follow out that line to the 16 inch mark, and you will find 14-8 which means that the board contains 14 feet and 8 inches.

This supposes boards to be 1 inch in thickness. In calculating plank or timber thicker than 1 inch, the result given on the square, is to be multiplied by the thickness. For example—If the above dimensions were for a plank 3 inches thick, multiply 14 feet 8 inches, by 3, which gives 42 feet and 24 inches, which equals 44 feet. Suppose it was a board ½ inch thick, multiply 14 feet and 8 inches by ½, which gives 7 feet and 4 inches.

Never use kerosene to clean a blued square.

BEVELS FOR MITERING HOPPERS.

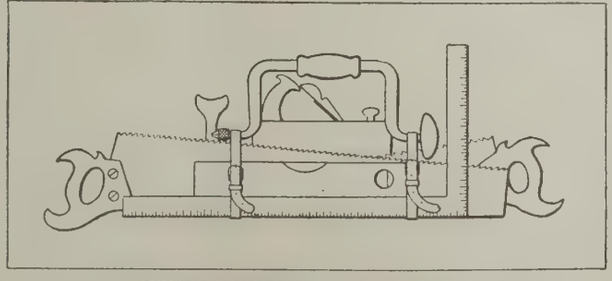
Draw part plan of hopper, 1, 2, 3, also 2, 4, which is inclination of hopper side; project up from 8 to meet. With 8 as center, and radius touching 2, 4, cut X Y at 3; join 3, 5, which gives bevel



"M" for mitre; also join 3, 4, for bevel for side cut "S." Sometimes hoppers are housed together. To get bevel for edge of stuff in the latter case, make 2, 6 square to 2, 4; with center, 8, radius touching 2, 6 cut XY in 7; join 7, 4; and the butt level as seen at "B." This method applies to square hoppers. The shape of the angle pieces is the same as in the backing of hip rafters.

UNIQUE HANDLE FOR CARRYING TOOLS.

Carpenters, electricians, plumbers and others having to carry tools any distance, may find the following suggestion of considerable assistance: Arrange tools into a compact parcel, leaving the brace

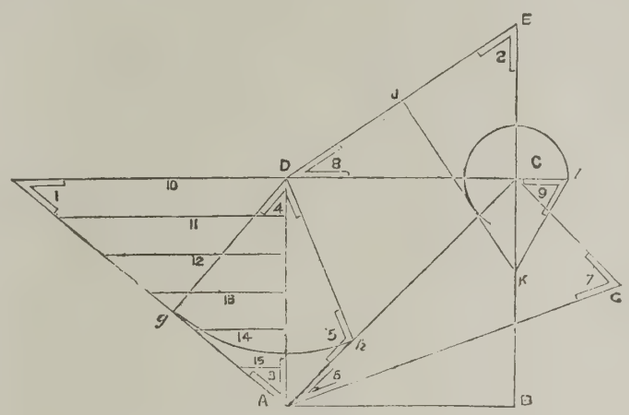


UNIQUE HANDLE FOR TOOL PACKAGE

out. Having procured two straps, put one around each end of bundle. Before buckling straps, place the brace on top of pack, then fasten straps over each end of brace, and you have a handle which will greatly reduce the tedium of carrying tools any distance.—Popular Mechanics.

HIP ROOF.

This diagram exhibits a short and correct method for finding the bevels for the different cuts, and also the lengths of the jack rafters required in the construction of a hip roof. Let A B C D be the horizontal plane, and C D E the elevation of one-half of the hip; prolong the line C D to F, and make D F equal to D E; joint F A and also A C; on the line A F let fall a perpendicular from D, meeting F A at g; take D for center and D g for radius, and describe the arc to meet A C at h; join D h. Square down a



line from C to G and make G C equal to C E; join A G, which gives the length of the hip rafter. The bevels: No. 1 is for the sidecut and No. 2 for the downcut of the jack rafters for fitting the side of the hip rafter; No. 3 is the sidecut and No. 4 is the downcut for the end of purlin to fit the side of hip rafter, and No. 5 is the bevel for backing the hip rafter. The bevels 6, 7, and 8 need no explanation. It may be remarked that the bevel No. 4 is only correct when the height of the roof is equal to one-third of its base; and when the height varies from that proportion, the method for finding the bevel is shown at C, which gives a correct rule under any conditions. From any point on line D E J square down a line meeting B C at K; from C as center, describe the arc touching the line J K, and meeting the end of the line D C at 1; join 1 K, and in the angle the bevel No. 9 is seen, and is equal to the angle No. 4. The jack rafters are Nos. 10, 11, 12, 13, 14, 14, and their lengths can be found exactly if a large scale is used—say 1 inch to the foot.

BOOK NOTICES

(Notice.—All books noticed in these columns may be obtained from this office at publishers' prices. All postage or express prepaid. Money and address must accompany all orders.)

WHITE PAINTS AND PAINTING MATERIAL: Source and manufacture; composition and properties; use and formulas; physical tests and chemical analysis. By W. S. Scott, C. E. Cloth, 493 pp. Published at "The Modern Painter" office, Chicago, Ill., 1910. Price, $3.50.

This work is evidently the result of much labor and thought and is seemingly one of the most comprehensive and thorough works on the subject of paints that we have come across for some time. Nothing seems to have been overlooked that would be considered necessary to a full understanding of the constituents of paints and oils. The physical tests which the author gives are of much more importance to the master painter than is a chemical analysis. Physical tests have been made a specialty, which renders the work quite valuable. The painter who follows closely the chapter on physical tests will be able to know all the qualities of the materials he makes use of in his work and will be able to employ them with great economy and efficiency by virture of the knowledge obtained from this chapter. Indeed, if there is any fault in the work, it seems to be in the lengthy and doubly clear descriptions the author gives in this special chapter.

In dealing with white pigments—particularly white lead—the same analysis has been adhered to throughout, and lead in all its forms and its results is dealt with at length, such as litharge, red lead and lead sulphides, along with zinc whites are dealt with in a plain and understandable manner—showing their qualities of endurance, color and adaptability.

Tables and formulas are given for the use of every possible kind of paint, mineral vegetable or otherwise, and showing the action of regents on the principle—white pigments, with directions how to use the formulas. Combination paints, oils, turpentines, benzine and all adulterations of paints are especially mentioned and described. Taking it all in all the work is a valuable addition to the literature of paints, oils, varnishes and pigments and, in our opinion, every painter or dealer in paints who is desirous of knowing much about the materials he uses, or deals in, should possess a copy of this valuable work.

ART-CRAFTS LAMPS—HOW TO MAKE THEM: By John D. Adams. Published by Popular Mechanics Company, Chicago, Ill. 87 pp. Cloth. Price. 25 cents.

This is another of those excellent hand books that are being published by this company, and is full of good and instructive material for the amateur mechanic. It contains 16 designs for lamps with details suitable for many places, but more particularly for the bungalow or summer cottage. It is illustrated with 17 well drawn illustrations in which the dimensions of the materials used are given—a very important matter to the amateur. The making of a lamp shade can easily be accomplished by anyone who will follow this book closely and who has any knowledge of tools and the manner of using them. For ladies who are fond of making fancy and unique articles in wood, brass, pasteboard, and glass, or combined, the making of these shades will give them ample opportunities to display their skill and good taste, and we can recommend this little low-priced book to every person who loves to use tools and "make things."

The book is well bound, printed on fine strong paper and is a marvel of cheapness.

HEAT: By J. Gordon Ogden, Ph. D., Professor of Physics and Chemistry, Fifth Avenue High School, Pittsburg. Strongly bound in cloth. 119 pp. Published by the Popular Mechanics Company, Chicago, Ill. Price, 25 cents.

This book is one of the series of handbooks on industrial subjects now being published by the Popular Mechanics Company of Chicago, and is a well thought out little work on the subject of which it treats. It deals with the nature of heat and how it is measured. How low temperatures are produced. The effects of low temperature upon some matters. The production and uses of high temperatures. The effects of high temperatures on the rare metals. How heat travels; how it is measured. Expansion and contraction. Energy and fuels. Manufacture of artificial ice; steam, boilers and engines. The application of heat to the many purposes to which it is now applied. The work is well illustrated, is plainly written, and full of instructive and interesting matter, and its low price (25 cents) places it within reach of everyone who desires to know anything about heat and its effects on the economics of nature.

BUILDING CONSTRUCTION: In two volumes. By Beresford Pite, F. R. I. B. A., Professor of Architecture, College of Arts. Frank T. Baggallay, F. R. I. B. A. H. D. Searles Wood, F. R. I. B. A. E Sprague, Assoc M. Inst. C. E. Published by Longmans, Green & Co., 39 Paternoster Row, London, New York, Bombay and Calcutta, 452 pp. Cloth. 1910. Price, 18s net.

Volume 1 is divided into three parts. The first part covering brickwork, sites and foundations, walls, piers, arches, ancient and modern brickwork, molded, plain and glazed brickwork. Second part covers stonework, materials, tools and methods of preparing. The third part covers carpentry in all its phases, including methods and materials, construction in metals, elasticity, nd strength of materials, beams and girders, struts and columns and designs of frame structures.

The work is decidedly the best text book we have seen for many years, as it covers nearly every subject within the scope of its intentions. It is a book which the ambitious student of building construction cannot possibly do without. It is furnished with a copious index, gotten up on a liberal scale and so arranged that the subject wanted can be obtained with very little trouble.

In the preface the editor says that the aim of these volumes on building construction, while treating the subject in a practical manner, is to give to it also architectural expression. With this object in view, the whole has been intrusted to well known architects for revision on these lines. Existing books on building construction are, in most cases, excellent in many respects, but often fail to place before the students the treatment which is necessary, if buildings are to be, not only sound, but also architecturally satisfactory. Building construction in itself is merely a skeleton. Its effective covering is architecture, skilfully applied.

While this book is English and many of the methods described are English, and not in use in the United States, yet the greater part of its contents will appeal to American constructors and workmen in general.

BACKBONE OF PERSPECTIVE: By T. W. Taylor, C. E., University of Virginia, M. C. E. Cornell University, Professor of Civil Engineering, University of Texas, Member Am. Soc. C. E. 56 pp, 40 illustrations and diagrams. Cloth. Published by the Myron C. Clark Publishing Company, Chicago. Price, $1.00.

The author of this little book attacks the question of perspective on much different lines than the usual ones adopted by authors who write on this subject. Mr. Taylor seems to have grasped the subject of perspective, and so simplified and condensed it, that any intelligent person should be able to understand the whole theory of perspective after carefully reading the book.

The different phases of perspective are exhibited and fully explained, and the low price of the book places it within reach of every ambitious young draughtsman in the country, and we can heartily recommend it to those of our readers who are reaching out for better things. It is printed on fine, strong paper, from good sized type and is durably bound.

TWENTIETH CENTURY SHEET METAL WORKER: A modern treatise on modern sheet metal work. By H. E. Osborne. 86 pp. Illustrated. Cloth. Published by the American Artisan, Chicago, Ill. Price, $1.00.

This is an exceedingly useful book for tin and sheet metal workers, as it shows and describes the methods of laying out the lines through which the metal may be cut to form the various shapes for all sorts of work required in the making of household utensils, cornices, sheet metal piping, water troughs, fittings, and roof coverings of every description.

KEY TO THE STEEL SQUARE.

The above title is the name given to an ingenious little instrument, perfected by the well known authority on the use of the steel square, Mr. A. W. Woods, which is meeting with a good sale throughout the country. With it, anyone can instantly find what figures to use on the common steel square for the rafter cuts, together with their lengths from one to twenty-four inch rise per foot run. Having the lengths given decimally for one foot run, it is an easy matter to find the lengths for any run.

The instrument is about three inches in diameter, on either side of which is pivoted at the center a disk—one side giving the length and cuts of the rafters, while on the other side is given the table for finding any angle in degrees. By turning the disk until the slot in same rests opposite the pitch or angle desired, only the figures for the lengths and cuts for that pitch, or angle, will be exposed, thereby preventing errors.

Fig. 1 shows the disk set opposite the 5/12 pitch. Note the figures at the top of the slot is 10 and represents the rise to the foot run. The next is 15.62 and represents the length of the common rafter. The next is 16.4 and represents the length of the hip or valley; 5/12 opposite the slot represents the pitch. .42 is the equivalent of 5/12 expressed in decimals. The latter is given as a handy reference to translate decimals to common



FIG. 1.

fractions, so that the same can be more readily found on the steel square. Thus, the fraction .62, as shown in the slot, is equal to 5/8 of an inch. .4 is practically 5/12 and .69 is between 2/3 and 17/24 of an inch, either being practical. Just above the slot are shown 12, 13 and 17. These are set numbers and represent the figures to use on the tongue for the seat cuts of the respective rafters, while just above is given the abbreviated instructions for the side cuts.

In Fig. 2 is shown the application of the square to the timbers for obtaining the cuts as follows:

Referring to the illustration at A, 12 and 10 will give the seat and plumb cut. The length for one foot is 15.62 and this taken on the blade and 12 on the tongue will give the side cut of the jack, the blade giving the cut. These same figures will give the cut across the face of the board to fit in the valley, or over the hip; the tongue giving the cut. By taking 5 on the tongue and 15⅝ on the blade, the latter will give the side cut of the jack to fit against the octagon hip. At B is shown the application of the steel square for the seat and plumb cuts of the octagon hip or valley. At C is shown the application of the square for the seat and plumb cuts of the hip or valley. Its length for the corresponding length of the common rafter is 19.69 inches and this taken on the blade and 17 on the tongue, will give the side cut of the hip or valley; the blade giving the cut.

Other pitches are treated in the same manner. Much other valuable information is contained in the key, all of which is explained in book of instruction, together with a neat morocco case, suitable for carrying in the picket, is given with each book and key. In short, it is a ready reckoner and a great time saver to the possessor of one of these instruments. The above description applies only to the rafter side of the instrument.

The retail price is $1.50, postpaid, and can be had from THE NATIONAL BUILDER.

CUT OUT AND SEND

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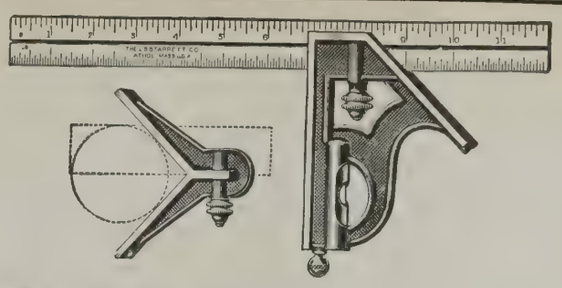
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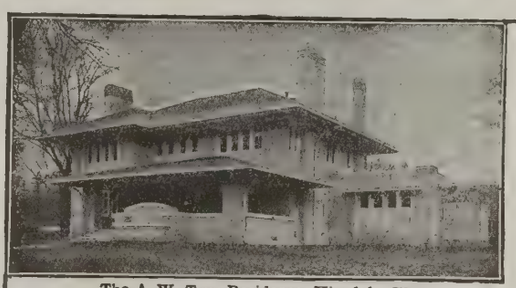
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The Keasbey & Mattison Company, Factors, Ambler, Pa.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE WASHINGTON RED CEDAR SHINGLE.

It is only about twenty years since the manufacturers of lumber and shingles were forced, through the scarcity of timber in the other sections of our country, to begin to draw on the supply of the Pacific Northwest.

One of their first important finds was that the red cedar of the state of Washington could be manufactured into shingles that were as near perfection as any shingle made.

This is extremely reasonable, for when you stop to consider that the red cedar shingle is manufactured from the really wonderful red cedar trees—some of them six hundred years old, many of them towering two hundred feet and over, into the air, and having a base diameter of eight feet and over—which have withstood the ravages of the elements for centuries—it is easy to see why a roof covering, or siding covering manufactured from this material from nature's storehouse, is almost indestructible.

A home builder is interested chiefly in two things; first, he must build a house that will stand—but even the inartistic man appreciates things that are beautiful, and it is the aim of every home builder to not only build substantially, but to build a home that will be really beautiful.

Washington red cedar shingles are beautiful shingles. Even if unpainted or unstained, their light reddish hue makes them attractive, and it has been proven that these shingles, not only readily absorb stains and paints, but hold them, and the best of permanent attractive color effects can be obtained.

The shingle manufacturers on the Pacific Coast realize fully that there is a market for their product in all parts of this country, and it is not surprising to know that some of the Pacific Northwest wholesalers are shipping these shingles in large quantities to the New England states, and also to the Southern Gulf Coast states (the field at one time held exclusively by other shingles), as well as to the state of California, itself a shingle producing state.

A WONDERFUL PRODUCT.

A sample of Lignine Wood Carvings, unwrapped and unprotected, recently reached us by mail, in perfect condition, and when we say Lignine Wood Carvings are a wonderful product it little expresses it. The fine condition of this sample seems to prove the claims of the makers.

To be able to reproduce oak, mahogany and walnut with full depth of grain, showing distinctly the flakes and chisel marks, is a remarkable achievement.

Ornamental Products Company of Detroit, Mich., claim that their carvings are stronger and more durable than wood. They claim that their products will not chip, check, crack nor shrink. They wish to prove it to all users of carvings.



The superior quality of their carvings is easily understood for the reason it costs no more to make designs of good detail than those of poor effect and as they cut but one master model, it is a good one.

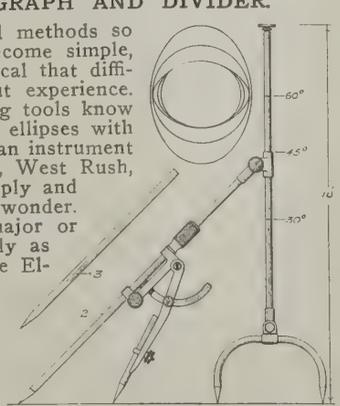
The price of Lignine Wood Carvings is many hundred per cent cheaper than hand carvings and this appeals to the manufacturer.

Lignine Wood Carvings have been on the market five years and have saved the manufacturer thousands of dollars.

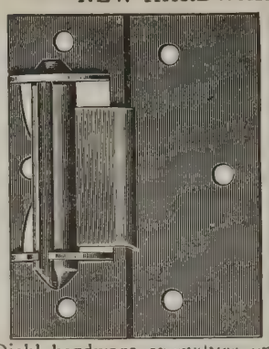
A post card will bring to our readers a sample of Lignine Wood Carvings and their beautiful catalogue. We are sure you will be glad to have these. In writing mention THE NATIONAL BUILDER.

THE KELLEY ELLIPSOGRAPH AND DIVIDER.

Inventive genius has simplified methods so that the almost impossible has become simple, and in numerous cases so mechanical that difficult problems are handled without experience. All with any knowledge of drawing tools know how complicated is the striking of ellipses with the ordinary tools. Quite recently an instrument has been invented by J. T. Kelley, West Rush, N. Y., that does this work so simply and easily that it is little short of a wonder. It will draw an ellipse of any major or minor axis as easily and accurately as a compass will strike a circle. The Ellipsograph can be readily and instantly adjusted for any desired ellipse or curve, and is so simple in construction that anyone can understand and use it at once for the most difficult work. It is a valuable aid to the draftsman, pattern maker, carpenter, builder and contractor. The Kelley Ellipsograph is positively guaranteed and sold at the low price of $3, carrying charges prepaid. Address, J. T. Kelley, West Rush, New York, and mention the NATIONAL BUILDER.



NEW HARDWARE SPECIALTY CATALOGUE.



The Diehl Novelty Company's new catalogue for 1911 is now ready for distribution and will be mailed to any of THE NATIONAL BUILDER readers on request.

The Diehl line of hardware specialties are not only novel but practical and durable, and right up-to-date in every way. Mr. Diehl, the inventor of these specialties, personally attends to the manufacturing end and guarantees that they are made with great care and accuracy.

The Diehl Novelty Company are putting out some specialties this season which they state will be of interest to all carpenters and builders, as well as to the consumer. Many difficulties will be overcome and considerable saving made by using the Diehl hardware specialties on every job. The accompanying illustration shows their new separable and reversible hinge No. 20, designed for storm and screen doors.

This hinge is made of open hearth, wrought steel, 14 gauge, and finished in black baked japan or oxidized copper. A sample set of hinges will be sent for 25 cents in stamps nd you can get a new catalogue at the same time.

A ONE MAN PORTABLE DERRICK.

The cut below shows the Taylor Portable Steel Derrick manufactured by John L. Taylor, the inventor, 1034 W. Lake street, Chicago, and is one of the most useful articles a contractor can possess for hoisting all kinds of materials. This derrick is constructed entirely of Malleable Iron and Steel, which makes it far superior in strength and durability than if ordinary metals were used. It is made in two sections so that one man can handle it and place in position for operation or shift its position. To erect, the base section is first attached to the joists or scaffold, and the top or beam section slipped on the base without the use of bolts or screws. Clamps are furnished with the base making bolts and lag screws unnecessary to make it rigid.



The drum will carry two hundred feet of quarter-inch cable and is attached to beam section. The operator stands directly behind the derrick and works a crank with each hand, getting more power by a push and pull motion at the same time. Another essential feature is the swivel hook which allows the twist in a cable to unwind. The beam section has a circle swing and is also equipped with two pulleys at top which give it adjustable capacity and speed.

This machine is the result of long experimenting and practical tests and is highly recommended by present users. Its one man portable features and easy operation are time savers as well as its strength by being constructed of malleable and steel. You will be much interested in the catalogue which will be sent on request.

Asbestos "Century" Shingles are continually gaining in favor. Their many advantages have resulted in their being used on thousands of buildings in this country and Europe. Among recent orders is one for several carloads to be used on the Pennsylvania State South Mountain Sanitorium for Tuberculosis. Orders in hand for further operations in other sections of Pennsylvania will require twenty carloads. Other recent orders received by the Keasbey & Mattison Company include the government buildings at West Hingham, Mass., which require several carloads the Atlantic City pumping station, Absedon, N. J.; the Hartman Stock Farm, Columbus, Ohio, and the Pabst Stock Farm, Oconomowoc, Wis.



For Temperature-Proof and Sound-Proof Walls, Floors, Ceilings

LINOFELT

Linen Felt made from Flax Fibre

Is the only Good Building Quilt to Use in the Walls of Your House to Make Separate the Outside and Inside, the Heat and Cold, the Sound and Quiet

It is an insulating quilt—made from flax—the lightest quilt cubical contents considered—does more than what building paper is "supposed" to do—keeps residences and buildings warm in winter, cool in summer—saves 40% of fuel bills—is sanitary, odorless—the best sound deadener—same sound heard 200 feet through boards is heard only 2 feet through **Linofelt**—makes homes quiet and restful—equally valuable in Northern and Southern climates—no home is too small to afford **Linofelt**.

Linofelt has been determined by hundreds of architects, builders, carpenters, property owners all over the continent to be best for insulating walls, ceilings, floors. All know **Linofelt** is more than 38 times as effective as building paper *by test.*

To Architects, Contractors, Carpenters

We have never failed to get the enthusiasm of architects, builders and carpenters who have become acquainted with **Linofelt.** All dislike building paper. Our beautiful FREE book is crowded with details, methods, plans, building and residence data, the results of tests—also information about Lith Board and Rock Wool. Send for your book today; and let us offer you our service covering planning of buildings you have in contemplation.

UNION FIBRE COMPANY
19 Union Avenue Winona, Minn.

THE PHILIP CAREY CO., *Distributors*
Branches and warehouses in all the large cities in United States, Canada and Mexico.



Get This Interesting FREE Sample

FREE Sample and Book COUPON

Union Fibre Company,
19 Union Ave., Winona, Minn.

Gentlemen:—Kindly send me by an early mail the FREE Sample of **Linofelt** and a copy of your beautiful ..... Book. (Designate whether Contractor's, Builder's, Architect's or Carpenter's Book.)

Name .....

Address .....

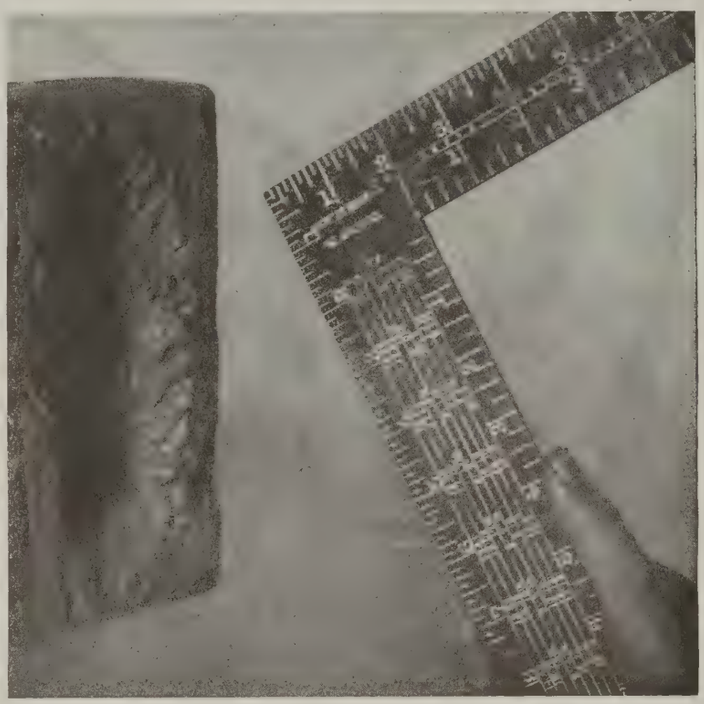
Mail This NOW

It DOES What Building Paper Is "Supposed" To Do

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NICHOLLS GUARANTEED TOOLS.

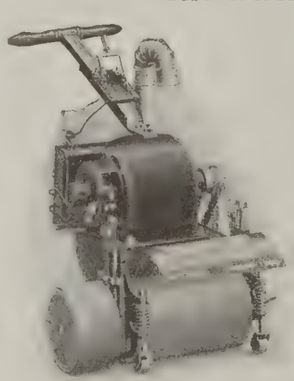
The Nicholls Manufacturing Company, Ottumwa, Iowa, have been offering some very good bargains in their advertisements in THE NATIONAL BUILDER. Their True Mitre Box, with its positive center and octagon stop, which, with the mitre stops, will take in 95 per cent of the work done with mitre boxes, is one of the useful tools they call attention to. The Nicholls New Sawtooth Roller Marking and Mortise Gauge, is a late addition to the Nicholl's line. By making this gauge with a sawtooth wheel, it runs true with the edge of board, regardless of knots or cross grain wood. The line made by the wheel is easily seen, as the marks are like punch marks and reflect the light from all sides.



This is the actual picture of a Nicholls Hardened Corner Square, with which we chiseled out this brick, showing what their hardened corners will stand. See how sharp the corner is.

The Nicholls Hardened Corner Framing and Standard Squares are well known to every carpenter and contractor in the United States. These hardened corner framing squares have become very popular. They are made in polished steel, oxidized copper and nickel plated, and are a mighty fine square in every way. All Nicholls tools are guaranteed and can be had from the dealer—or direct from the factory if the dealer will not supply the carpenter or contractor with them.

THE RAPID FLOOR SURFACER.



Floor surfacing is one of the difficult problems when installing floors that necessitate an even and smooth surface. The machine here shown is the Schlueter Rapid Floor Surfacer, manufactured by M. L. Schlueter, 103 North Canal street, Chicago, Ill., and embodies the correct methods in obtaining these results.

It is constructed for one man operation and sands the floor, removing all roughness and raised portions and gives the floor a fine sandpaper finish. Each machine is equipped with an automatic dust collector, making it possible to surface floor in the finest residences, offices, etc., without inconvenience and annoyance, also this prevents dust from injuring working parts of machine.

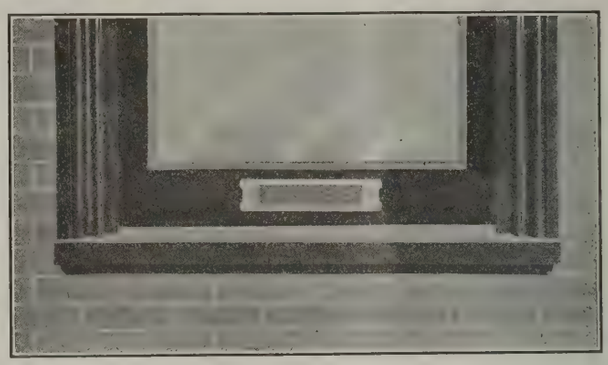
The sanding roller is covered with pure rubber, which forms the cushion on which is clamped the surfacing or polishing materials (sandpaper or cloth) to be used. This roller is held in place by side plates with springs, allowing the roller to adjust itself to the floor.

When starting the motor the roller cannot grind into one spot on the floor, as the machine is so constructed that the operator can leave the machine without stopping the motor, as the roller is automatically raised from the floor the moment the handle is released.

Contractors and builders having floor surfacing to do should send for full particulars and free trial proposition. This machine is made in several sizes.

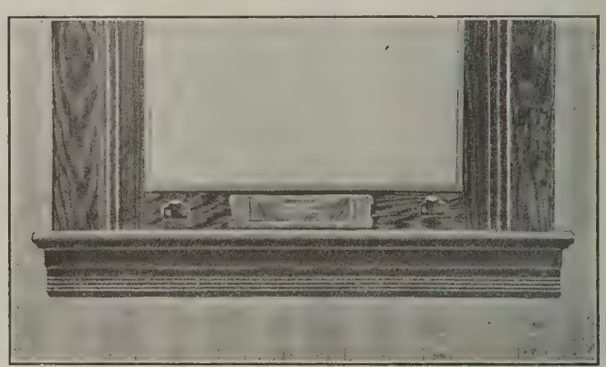
A SASH VENTILATOR OF REAL MERIT.

Natural ventilation simply means the withdrawal of foul air and the admission of pure air in a natural, not forced manner. If it comes in small quantities through cleanable screens, so that no dirt, rain, snow or drafts reach the interior and the device is not cumbersome or costly, every builder and contractor will agree that a big problem in ventilation has been solved. Methods of mechanical ventilation in washing the air are expensive to install and costly to maintain. For three years expert inventors and practical builders in Erie, Pa., have combined their efforts with



a view to lessening the disadvantages and removing the defects of existing room ventilators, so that a scientific, simple and non-expensive device could be perfected.

They have recently succeeded and the Ideal Manufacturing Company are flooded with orders from Maine to California. Greatly enlarged facilities now permit the immediate shipment of ventilators. The Ideal can be quickly fitted by a carpenter into any sash over two inches deep and one and three-eighths inches thick, or, if preferred, it is furnished in a special rail to go under a raised sash. Sleeping rooms, bath rooms, offices, school rooms, churches, public buildings when equipped with the Ideal Sash Ventilator, give that comfort to the occupants only known to those

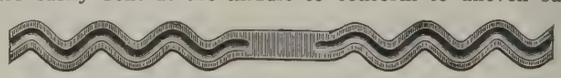


who insist that pure air is essential to real health and happiness. Fresh air indoors means practically exemption from colds and coughs. The ventilator is adjustable to any air current and can be fitted into either the upper or lower sash. The slant of the device permits moisture to run out. The finish is plain or to match the rest of the hardware trim and of non-rustable material throughout. The retail price of a single ventilator is $1.50, with liberal discounts to architects, builders, and contractors. The advertisement of the company appears elsewhere and correspondence is invited.

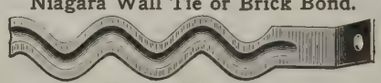
The Ideal Ventilators are commended after investigating their construction, and conversation with those who had used them for a year or more with absolute satisfaction.

GALVANIZED WALL TIES.

Contractors and builders who have suffered annoyance and loss from wall ties that give and become useless, will be interested in Niagara Wall Ties, which are scientifically perfect, having the principle of the keystone, and offering greater resistance than any bond on the market. A hollow wall, when the wall ties are used, is stronger than a solid wall of the same thickness where they are not used. They are easily bent at the middle to conform to uneven surfaces.



Niagara Wall Tie or Brick Bond.



Niagara Veneer Tie or Brick Bond.

The veneer ties are bent at the end and have a hole punched, ready for nailing, and are fastened to the sheathing easily and rapidly with a common nail. Under any ordinary circumstances, it is impossible to produce the slightest approach to a separation of the parts. Every architect should put wall and veneer ties in his specifications, as every building contractor needs them.

Any contractor or builder will do well to write on his letterhead to the Niagara Falls Metal Stamping Works for Folder 14 NB, which illustrates a line of builders' goods, including sash pulleys, sash chain, etc. Their address is 127 10th st., Niagara Falls, N. Y.

Washington Red Cedar Shingles Defy the Weather

It is a fact. Wooden shingles, made from the red cedar of the State of Washington, are as near "absolute perfection" as any known shingle. A red cedar shingle rightly painted the right kind of a shingle stain is as good will last for twenty years, and many such roofs have stood the weather for longer.

When a man builds a home, he wants first: utility, then beauty. Even the man who is not artistic, appreciates and wants the beautiful things. And only with wooden shingles, and the best of wooden shingles, can utility and beauty be combined in their highest degree.

"BUCKEYE BRAND" RED CEDAR SHINGLES

Are picked shingles. Only the best of the best are worthy to be stamped with this name. On shingles it is a quality mark. Your retail dealer can get them—and will be glad to, if you ask and insist on them.



—Courtesy of Keith's Magazine.

RED CEDAR SHINGLES ARE BEAUTIFUL AND ECONOMICAL



—Courtesy of Keith's Magazine.

AN ALL SHINGLE HOUSE—SIMPLE BUT ATTRACTIVE

"BUCKEYE BRAND" RED CEDAR SHINGLES

Were given the only Double Grand Prize, awarded shingles at the Alaska-Yukon-Pacific Exposition, Seattle, 1909. That means much to every architect, to every contractor, builder and carpenter—and to every home builder.

Ask your retail lumber dealer for "Buckeye Brand" Red Cedar Shingles.

R. J. MENZ LUMBER CO.

SEATTLE, WASH., U. S. A.

PACIFIC COAST LUMBER AND TIMBER LANDS

Menz Timber Gold Bonds

Profit Sharing Interest Bearing Deed Protected

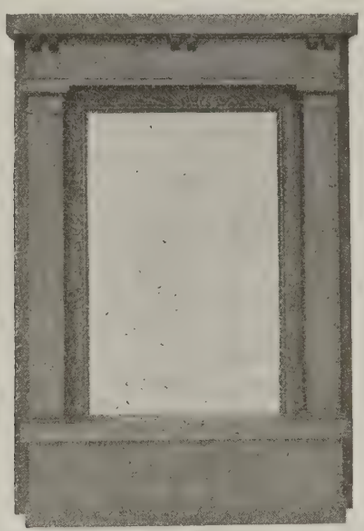
BUCKEYE BRAND RED CEDAR SHINGLES

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS IT WILL HELP.

NEW CONSOLE DESIGNS.

The console design shown in the Northwestern Grille Works' advertisement on another page in this issue is their No. 657. The stock used is quarter-sawed oak and birch, the height is 86 inches, and width 60 inches, with plain mirror 30x50 inches. There are two leaded lights, 8x46 inches, case is 8¼ inches deep, clear, and each console has rubbed and polish finish.

The console shown in this article is another very attractive design, and also an exceptionally well made console in every way. This console is 88 inches in height, width 60 inches, glass opening 34x54, column 6 inches, and wood stock is quartered oak, rubbed and highly polished finish.



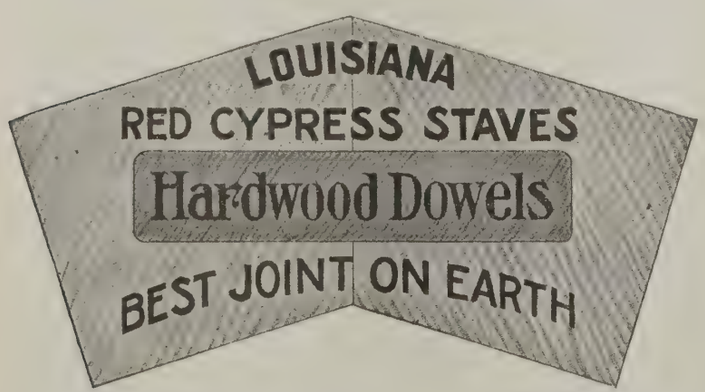
This is only one of the many beautifully designed consoles manufactured by the Northwestern Grille Works, 1824 Milwaukee avenue, Chicago. The new catalogue being made up now and ready for mailing in about 60 days contains many original console, grille-colonial openings, sideboard, buffets and china closet designs. The Northwestern Grille Works have been selling direct to the NATIONAL BUILDER subscribers for nearly ten years, and are held in high esteem by their customers. They use the best of materials, employ experienced workmen and do everything possible to give each customer a square deal.

Working along this line, and doing business continuously at their present location, they have built up a large trade among contractors and builders all over the country. The new catalogue will be mailed when off the press to architects, contractors and builders who are on their list, and if not already on, it would be a good thing to drop a line now for a copy.

THE HUBER CYPRESS COLUMNS.

The Huber Builders' Material Co., 39-43 Vine street, Cincinnati, Ohio offered a number of attractive bargains in last month's NATIONAL BUILDER. The line shown in their advertisement consisted of a front door, cottage window, yellow pine stairs and newel casing, base, quarter round, grille and a Huber cypress colonial column.

Many of our readers will be especially interested in the cypress columns at this time, when so much is being written in praise of "Cypress, the Wood Eternal," as it is called. Mr. Gustav Stickley, the well-known craftsman, states that it is the best American wood for all exterior use, such as shingles, timbers, pergolas and all mill work subject to weather. Its slight natural oil makes it practically impervious to moisture, so that it does not shrink or swell like other woods, and it is very durable when protected by merely a coat of oil.



So in offering their carefully selected genuine Louisiana red cypress porch columns, the Huber Builders' Material Co. claim they are manufacturing and selling a column which will give perfect satisfaction for the longest time. They state that they "air-dry" their lumber for at least one year, eliminating as much contraction and expansion as possible. It is this expansion and contraction that causes solid or other columns to sometimes split or open up badly at the joints. The Huber cypress colonial columns are built under the wooden dowel system, and dowels were used by our forefathers to hold the framework of the largest buildings in permanent position,

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



Consoles, Columns and Grilles

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG No. 16

It contains many beautiful designs of Consoles, Columns and Grilles.

NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO



DON'T ORDER Lignine (Wood) Carvings, Unbreakable

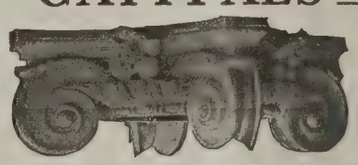
INVESTIGATE

Send postal for FREE sample and catalog. One cent investment saves dollars. LET US PROVE THIS.

ORNAMENTAL PRODUCTS CO.
West Lafayette Ave., DETROIT, MICH.

INTERIOR AND EXTERIOR **CAPITALS** and Ornaments

Plastic Relief Work a Specialty



Most Complete Catalog ever issued

DETROIT DECORATIVE SUPPLY CO.
Limited
812 14th Avenue DETROIT, MICH.

Wood Carvings for Interior Finish



SEND 15c for catalogue showing 1,000 designs on Ramps, Easements, Newel Posts, Mouldings and Balusters.

Write Today

WADDELL MFG. CO. 67 Colbrook Street Grand Rapids, Mich.

ARCHITECTURAL DRAWING MADE EASY

By I. P. HICKS

94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over

170 PAGES—CLOTH BOUND—PRICE $1.00

I. P. HICKS, Box 22, Station A Omaha, Neb.

CARPENTERS' Ready Reference For Roof Framing

is a copyrighted book that gives lengths of common, hip valley and jack rafters, and the figures to use on square for all cuts for following pitches:

1 1 1 3 5 3
4 3 2 8 8 4

Also octagon rafters for same pitches and a scale for polygon miters up to ten sides. Can be carried in vest pocket. A handy and time-saving book for anyone to have. Sent postpaid, for 25c.

E. OEHRLE, 2567 Dodge St., Omaha, Neb.

PHŒNIX INSIDE SLIDING BLINDS

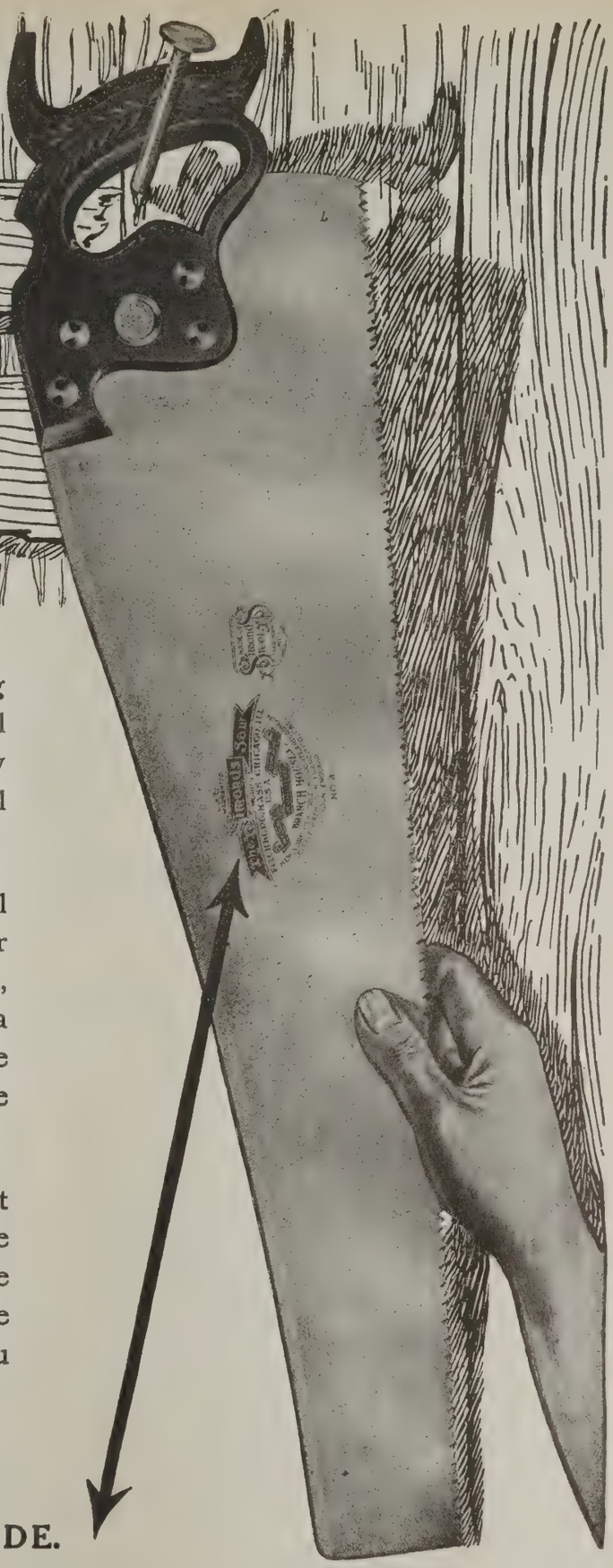
COMFORT CONVENIENCE ECONOMY

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.

Write for Catalogue P-T.

PHŒNIX SLIDING BLIND CO., Phœnix, N.Y.

Simonds Saws



THE very first step taken toward making a Simonds Saw—the making of the steel—is specialized under a Simonds Process. By it we produce Simonds Special Crucible Steel—for Simonds Saws only.

No other process produces a better steel for Saws. It is tough, flexible, with a temper taking quality that makes it when treated, tempered, ground. finished, and made into a saw blade, in the Simonds way, in the Simonds shops, the best saw that can be bought at any price.

Another thing: should even the slightest defect crop up in a Simonds Saw, while in the process of making, that condemns it to the scrap heap. Remember you can always be sure of buying high grade quality when you buy a **SIMONDS.**

To buy the right saw, let it be rip, hand or panel, see that the Simonds (Si-monds) name is on the **BLADE.**

Let us send you a free copy of Simonds "Guide for Carpenters." Tell us what kind of a Saw you will need soon.

Simonds Manufacturing Company

Fitchburg, Mass.

CHICAGO, ILL. NEW YORK CITY | NEW ORLEANS, LA. PORTLAND, ORE. | SAN FRANCISCO, CALIFORNIA | SEATTLE, WASH. LOCKPORT, N. Y. | MONTREAL, QUE. LONDON, ENG.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

and they are also used in the construction of high-class furniture, and today in fully 95 per cent of the doors manufactured in this country. The Huber cypress columns have special construction features in the staves, and waterproof glue used. The smooth satin finish found only in Huber columns is obtained by a method distinctively belonging to the manufacturer of this line of columns. These columns are primed with pure white lead and linseed oil, insuring protection from the weather and making the best possible foundation for further painting.



The manufacturers have just added a new and most important feature to these Huber columns. Two thick, round blocks of wood are glued on the inside several inches from each end, which protects them from being damaged by the rough handling usually given columns in shipping. Wooden strips are nailed on the outside, full length of column, insuring delivery in first-class condition. The Huber Builders' Material Co., 39-43 Vine street, Cincinnati, are getting up a new catalogue fully describing their Dowel Joint Colonal Columns and other millwork specialties. They take special care in attending to inquiries and orders, and claim that the prices quoted on their line are the lowest, when quality of material, workmanship, etc., are considered, that can be had.

MANTELS OF QUALITY.

An artistic mantel adds a tone of luxury and refinement to a room that is afforded no other piece of furniture. When buying it is well to select from the line that is designed by the most famous artists and designers and from a company that is well established and known.

The Central Mantel Company, 1237 Olive street, St. Louis, Mo., have been in business for many years. They employ the most skilled talent in every department and are equipped to turn out strictly high class goods and by making them in large quantities and selling "direct to the consumer" they state they can save the buyer from 35 to 50 per cent on every purchase and at the same time give perfect satisfaction to the buyer.

The $25.85 mantel offered in their advertisement in this issue is furnished in select oak or birch, mahogany finish. The price includes their Queen Coal Grate with best quality of enameled tile for facing and hearth. The mantel is 82 inches high, 5 feet wide. It is furnished with round or square columns, full length or double. The gas grate is $2.50 extra. This $25.85 mantel is one of the Central Mantel Company's best sellers and they state it is really a $40 mantel.



The design shown with this article is a higher priced mantel than the one described in the Central Mantel Company's advertisement. It is of the French style of architecture during the period of Louis XV and is a very rich design and in strict accordance with that period.

Special attention is called to the size of the mirror and to the height of the mantel. The careful detail of the mantel in its every part, especially carvings, which are cut by skilled mechanics, will not escape the eye of those who are lovers of art and who buy with a view to obtaining the best. This mantel can be furnished in mahogany or white enamel finish and where something especially nice is desired, it will add greatly to the attractiveness of any room.

The Central Mantel Company will send free to carpenters, contractors and builders, a 112 page catalogue which they state is the finest ever issued and which contains illustrations of a line of mantels which can give our readers an unusually large number of beautiful up-to-date designs to select from.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN
Steel Measuring Tapes
With Instantaneous Readings can be used at all times and under all conditions, with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catologue No. 12.
THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York • Windsor

ARCHER'S "QUICK ACTION DOVE-TAILER"
FOR WOOD TURNING LATHES
Only tool known making perfectly square shoulder and dove-tail true to size and taper on balusters. Can dove-tail 1000 balusters per day of 10 hours.
Price, $15.00 F. O. B. Richmond, Va.
DAVIS & ARCHER, 2515 Hanover St., Richmond, Va.

Whipple's Automatic Blind Hinge
Reasons Why THEY ARE THE BEST
Cannot slam or blow off.
No fastening required.
No blinds to trim or catches to interfere.
Will hold blind—open, half open or closed.
Write Today for Circular E
We also manufacture a flush hinge, constructed on same principle
Two styles, for brick or wood buildings
R. P. WHIPPLE & CO. 277 Main St., Springfield, Mass.

DREW'S HAND SCRAPER
Positively meets the requirements of a scraper which does work properly and satisfactorily. It has been thoroughly tried and comes nearer to perfection than any other hand scraper in existence.
For cabinet or floor work the DREW HAND SCRAPER is unsurpassed. Ask your dealer about them—if he cannot furnish them write to us for information, or we will upon receipt of price ($2.00) express one, charges prepaid.
Patent Applied For.
DREW & JUDD
191 Genesee St., ROCHESTER, N. Y.

COLD WEATHER TROUBLES IN SHINGLING
OVERCOME BY
Pearson's Nailer
for it works as well in one season as another Wear your gloves or mittens and (with it) drive more nails than you ever did. Quit using your mouth as a nail pouch. PEARSON NAILERS are made in two sizes.
The Blue Nailer is for common 3d No. 14 wire nails and the Red Nailer is for the galvanized 3d, No. 13, 1¼-in. wire nails. $3.00 each express prepaid. Money cheerfully returned if Nailer is not as represented.
Write for Circular "N,"
PEARSON MFG. CO. : Robbinsdale, Minn.

Topp's Framing Tool
A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED
Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.
IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.
PRICE, $1.75
G. A. TOPP & CO., Indianapolis, Ind.
See tool at Your Hardware Dealer's.

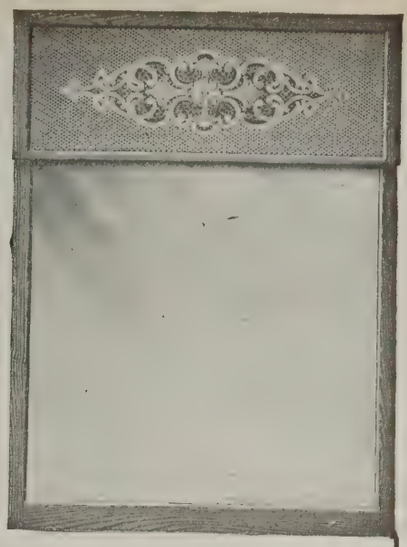
Van Dorn's Steel Joist Hanger Has no Equal
Send for Catalogue
THE VAN DORN IRON WORKS CO.
CLEVELAND, : : OHIO
Structural Steel and Ornamental Iron Workers
No. 1—Steel Joist Hanger for Wood Header.
No. 4.—Steel Joist Hanger for Brick Walls.



Many Special Fancy Designs Always Carried in Stock



Why Have Fancy Doors and Windows Made to Order?



St. Regis Art Window

Top light is Art Nouveau, carried out on a background of Crystal Moss Glass, which gives a wonderfully brilliant and sparkling effect. Made up in drawn White Metal Bars, strongly made, with bottom light of American Double-Strength Glass, "A" quality.

Price, 3 ft. 8 in. x 5 ft.—1⅜

$5.32

Planet Window

Unique and attractive. Top sash glazed Battenberg design, combined with Marine picture. Bottom glass Double-Strength, "A" quality glass. A great favorite.

Price, 3 ft. 8 in. x 5 ft.—1⅜

$3.12

La Fayette Door In great demand for fine houses where quality is the first question. The soft pine used is selected with greatest care to get artistic effects in the natural grain. Glazed with magnificent **Polished Plate Glass with 2-inch Bevel.** Dealers would ask double our price. 2 ft. 8 in. x 6 ft. 8 in.—1¾ **$8.93**

Art Glass Doors and Windows at Half Dealers' Prices!

Beautiful, Highest Quality Fancy Glass Shipped to You Direct at Prices Less Than Dealers Ask for Plain Goods

These handsome doors and windows are made in Splendid Polished Bevel Plate, Art Nouveau styles of rich Venetian glass set in metal, exquisite Sand Blast designs and other artistic combinations. Every pattern is right up to date. Every purchase means a saving of 50 to 75 per cent on your order.

Our Building Material Catalog shows designs that will harmonize with every style of architecture, from bungalow and cottage to mansion. Safe delivery is guaranteed. Thousands of contractors buy from us exclusively.

Our Building Material Catalog is Our Only Salesman—It Will Save You 50% On Staple Millwork and Lumber!

We sell everything in building material at actual wholesale prices—one price to all.

Our great five-story concrete warehouse here in Davenport is packed with Doors, Windows, Mouldings, Flooring, Inside and Outside Finish, Roofing, Lumber, all ready to ship on receipt of your order. We can get a complete house bill started to you within 48 hours. And we will save you 50% on every item. Our orders come in from every State. Even with a long freight haul we save you big sums.

Catalog FREE! Send for It and let it prove to you the wonderful saving you can make. All material listed is new, fresh, high grade goods. You throw money away when you pay trust prices. Investigate!

Gordon-Van Tine Co., 567 Federal St., Davenport, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A GREAT RECORD.

It is with much pride that the A. S. Aloe Co. refer to their business career of sixty years. With this long experience in handling supplies for architects, engineers, draftsmen and builders, the Aloe Co. are in the position to give the best quality at the lowest prices. Their latest catalogue is now ready, and embraces civil engineers' and surveyors' instruments, material for architects and draftsmen, draughting room furniture, blue and black print papers. The central geographical location of the A. S. Aloe Co., 511 Olive street, St. Louis, Mo., enables the company to fill all orders with the utmost promptness. As their valuable new catalogue shows the latest improvements in instruments and supplies, it will be in large demand. The Aloe Co. make the liberal offer to send the catalogue free upon request. Better send a postal at once and mention the NATIONAL BUILDER.

GREAT NORTHERN RAILROAD EXHIBIT CAR EXPLOITING WASHINGTON RED CEDAR SHINGLES.

The railroads of our country are great opportunity builders, and one of the prime reasons why this is true, is their loyalty and willingness to advertise and exploit the good products in their territory.

Mr. James J. Hill, who, so far as the northwestern section of our country is concerned, deserves to be called the "Master Builder," is, through a number of exhibition cars, showing the various products of the northwest section, and thus doing some splendid exploitation work for this part of the country.



Exhibit of R. J. Menz Lumber Co., Alaska-Yukon-Pacific Exposition, Seattle, Washington, 1910. Awarded Five Grand Prizes, and the only Double Grand Prize to Any Exhibit of this Character

It is noteworthy that part of an exhibit of Washington red cedar shingles, which was shown at the Alaska-Yukon-Pacific Exposition, by the R. J. Menz Lumber Co. of Seattle, Wash., was chosen by the Great Northern Railroad as the best exponent of the Washington red cedar products. This exhibit was awarded in addition to several grand prizes, the only double grand prize awarded a shingle and lumber exhibit, at this exposition.

On the roof of the cottage among the trees shown in the accompanying illustration are the red cedar shingles for which the state of Washington is famous the world over. It is claimed that there is no roof covering equal to the Washington red cedar shingle. Of all roof coverings provided by nature or by man, it is the one least affected by climate changes.

Annual shipments of red cedar shingles from Washington Mills located west of the Cascade mountains, approximate 25,000 carloads. The Washington red cedar shingles displayed in the Menz exhibit, embodied all the varieties manufactured on the Pacific Northwest coast, in 16-, 18- and 24-inch lengths and they were all of the "Buckeye Brand" which brand is registered and handled exclusively by the R. J. Menz Lumber Co. of Seattle, Wash.

The use of the "Buckeye Brand is limited to red cedar shingles that will exactly conform to the descriptions incorporated in the name stencil. The keynote of the successful introduction of "Buckeye Brand" shingle to the Eastern trade is shown in the motto "If Better Shingles Could be Made, We Would Make Them."

The R. J. Menz Lumber Co.'s "Buckeye Brand" red cedar shingles are sold through dealers, the advertisement in this number being placed before the NATIONAL BUILDER'S readers in order that when specifying or buying wood shingles they can secure a shingle which is so good that the manufacturer is willing to place his brand on them.

The R. J. Menz Lumber Co., Seattle, Washington, issue a catalogue descriptive of Pacific Coast products which is very interesting and instructive. They will be glad to correspond with dealers, architects, contractors and builders interested in "Buckeye Brand" of shingles.



If It Pays Over 1,000 Contractors to Use Convertible Builders' Levels

it will pay you to investigate why the "STERLING" is the strongest and most accurate Convertible Level made, and how its use will save you its cost in one season's work. Send for Catalogue, Manual and special offer for this month.

Level guaranteed for two years

PRICE Complete, $60.00

ISZARD-WARREN CO., Inc., 136 No. 12th St., Sole Makers Philadelphia, Pa.

Do Your Work on the Level AND USE A

WHITE'S Improved Builder's LEVEL

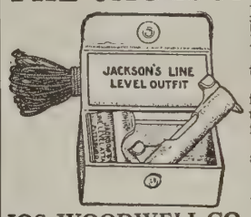


which will guarantee you against errors. It will pay you to investigate its merits.

Write for Catalogue and Special Prices

DAVID WHITE CO., 421 East Water Street Milwaukee, Wis.

THE JACKSON ALUMINUM LINE LEVEL



Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

This is possible because the Aluminum Line Level weighs only one-fourth ounce and is easily and quickly attached to a line. Levels thus taken are guaranteed to be accurate on a stretched line from one to forty feet. Besides, from its construction, it can be used as a Pocket Level.

This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

PRICE $1.00, POSTAGE PREPAID

It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

JOS. WOODWELL CO., Sole Agents, 201 Wood St., PITTSBURG, PA.

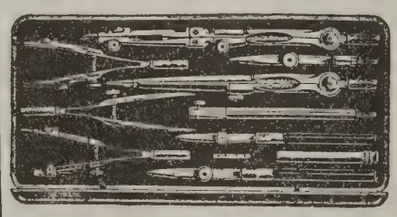
Drawing Materials **Surveying Instruments**

Drawing and Blue Print Papers, Architects' and Builders' Levels, Drawing Instruments, T Squares, Triangles, Scales, Inks, etc. Steel and Metallic Tapes, Builders' Levels. Repairing promptly executed.

Catalogue on Application

127 Fulton Street New York **KEUFFEL & ESSER CO.** General Offices and Factories Hoboken, N. J.

CHICAGO 111 East Madison St. ST. LOUIS 813 Locust St. SAN FRANCISCO 48-50 Second St.

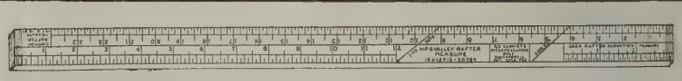


ALOE THE STANDARD FOR 60 YEARS

FREE! FREE! FREE!

Our new catalogue of Civil Engineers' and Surveyors' Instruments, Architects' and Draughtmen's Material, Draughting Room Furniture, Blue and Black Print Papers, is now ready for distribution, and will be mailed on receipt of request.

A. S. ALOE CO., : 511 OLIVE STREET, : ST. LOUIS, MO.



SCHMIDT'S PITCH MEASURING RULES

For Framing Rafters

ROOF FRAMING is easy, accurate, and quicker with these rules, no figuring or setting. Use it like a common rule. The pitch on one foot run is divided into 12 inches of pitch measure for hip and common rafters. The rules are from 1 inch rise to a foot run and up, two different measurements on each. Roof framers should not be without them.

They are time savers. Price per rule $3.00 postpaid

Send for circular telling about the rules, and how to make roof framing easy

R. D. SCHMIDT, 738 West Fourteenth Street, Davenport, Iowa

DIAMOND TOGGLE BOLT AND HEAD.

Diamond Toggle Bolts are made with pressed heads in one piece, no rivets.

An ordinary stove bolt nut is inserted in the slot as shown, and when bolt is inserted is locked into the toggle head.

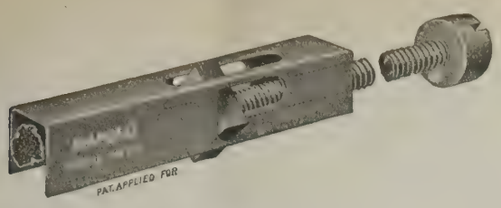
This type of toggle is recommended for its great strength, the nut of the stove bolt having direct bearing on both sides of the head against the surface of the hollow wall to which it is attached.

It will sustain the same amount of weight as a stove bolted through the wall.

Diamond Toggle Bolts are so designed that as soon as the bolt is

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turned the job is finished, no cutting off of thread ends being necessary.

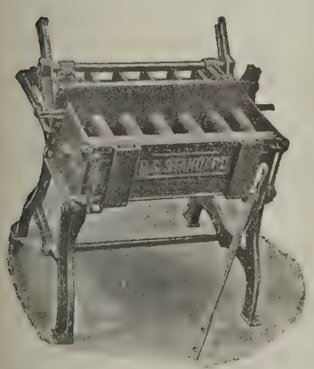


These bolts are another of the improvements for which the manufacturers of the "Diamond Specialties" are famous. For further descrip-



tion and prices address Diamond Expansion Bolt Company, 90 West street, New York.

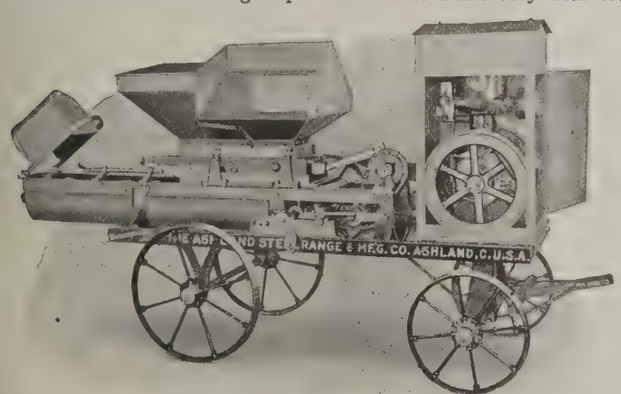
ECHOS FROM THE LATE CHICAGO CEMENT SHOW.



The Chicago Cement Show has once more passed into history. Competitors met in friendly contest and gracefully submitted their cases for decision to an intelligent and interested body of concrete workers. These men are no longer novices when it comes to detecting real merit in concrete machinery. For this reason, a line such as our U. S. Standard concrete mixers and cement building block machines may expect only good results from such a contest. Never has a similar exhibition brought us as many actual sales, nor as many complimentary comments. The reason is obvious. For five years the U. S. Standard machines have made for themselves an honorable record in every state of the Union. They are no longer an experiment, and people are not afraid of them as they would be of a new and untried machine.

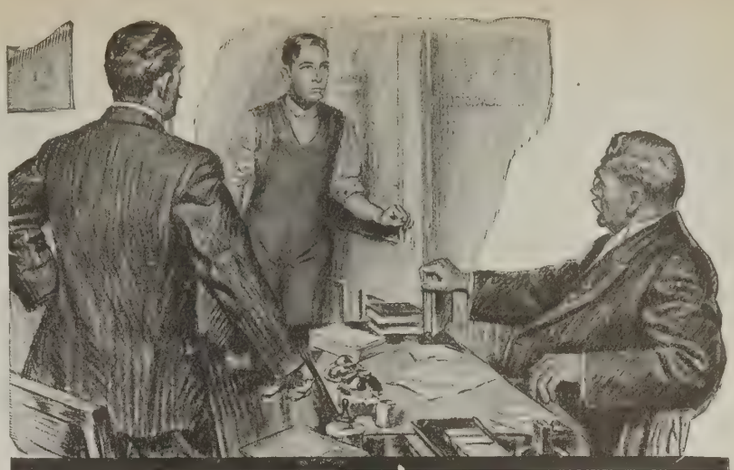
The U. S. Standard Junior and Senior Block Machines manufactured by the Ashland Steel Range & Manufacturing Company are both built upon the same basic principles, the former building a 16-inch, the latter a 24-inch long block, and all fractional lengths thereof. Both of these machines build hollow blocks 6 inches, 8 inches, 10 inches and 12 inches thick and veneer blocks 3 inches, 4 inches, 5 inches and 6 inches thick. The equipment also provides plates for circular blocks, angle blocks of any desired angles, porch pier blocks, chimney blocks, etc. These machines are capable of producing a greater variety of styles and sizes of blocks without additional investment than any other machine made, and for simplicity, speed, completeness, strength and beauty of blocks cannot be equaled.

The Ashland Steel Range & Manufacturing Company's U. S. Standard mixers are continuous mixers. The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically. With the U. S. Standard measuring is positive and does not vary with coarse



or fine, wet or dry ingredients. Special features are accuracy in measuring, correctness in proportioning and thoroughness in mixing the ingredients. All these operations are automatic and absolutely reliable.

The Ashland Steel Range & Manufacturing Company, Ashland, Ohio, will forward upon request descriptive literature to the NATIONAL BUILDER readers as will aid in selecting such machinery as will be best suited for their special needs.



Will YOU Be Ready When YOUR Chance Comes?

Will YOU be chosen as the right man when the big opportunity comes? Are YOU better prepared to rise from the ranks than the men beside you?

Could you fill satisfactorily a position requiring knowledge of "hows" and "whys"? Could you direct the work of others so as to get the best results? Would any employer be safe to trust your planning and figuring and doing?

To make it short, have you **any** special equipment? Is there **anything** in you to command big pay?

Every month three hundred like you are writing voluntarily to Scranton to tell of positions bettered and salaries increased through study of I. C. S. Courses. They not only waited and watched for Opportunity, but **prepared** for him. And when he came they were ready.

Now they are giving orders instead of taking them. Now they are salaried men instead of mere wage earners. Now they are free from worry about age limits, hard times, etc.

Through study of I. C. S. Courses, shop hands have become draftsmen, foremen, and superintendents; carpenters and masons have made themselves contractors, architects, or structural engineers; clerks have advanced to high-salaried places as advertising men, window trimmers, show-card writers, or chemists; farmers' sons have mastered electrical or civil engineering; miners have qualified for positions as inspectors, foremen, superintendents, or mining engineers; firemen have won quick promotion through study of steam engineering; young men everywhere have prepared for Civil Service positions, or studied successfully surveying and mapping, bridge engineering, illustrating and designing, gas engineering, automobile running, sanitary plumbing, textile work, navigation, or some other occupation covered by one of the 214 Courses of the I. C. S.

It will cost you nothing but postage to learn all about the salary-raising plan of the I. C. S.

Mark and Mail the Coupon NOW

International Correspondence Schools
Box 1332, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

Architect	Telephone Expert	Mining Engineer
Arch'l Draftsman	Bridge Engineer	Mine Foreman
Contracting & Building	Civil Engineer	Railroad Constructing
Building Foreman	Surveying & Mapping	Textile Manufacturing
Building Inspector	Mechanical Engineer	Chemist
Structural Engineer	Mechanical Draftsman	Commercial Illustrat'g
Structural Draftsman	Stationary Engineer	Bookkeeper
Concrete Construction	Electrical Engineer	Stenographer
Plumb. & Steam Fitting	Electric Wireman	Advertising Man
Heating & Ventilation	Electric Lighting	Window Trimming
Plumbing Inspector	Electric Railways	U. S. Civ. Serv. Exams.
Estimating Clerk	Heavy Elec. Traction	Automobile Running

Name _____

Street and No. _____

City _____ *State* _____

Present Occupation _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE INFLUENCE OF SHINGLE STAINS UPON THE DEVELOPMENT OF THE SHINGLED HOUSE.

It is not too much to say that the invention of shingle stains has made the wide vogue of the shingled house possible.

It was known from the first that paint was not fit to put on shingles, because it would cause them to rot more quickly than as if they were not treated, and the coloring effect was not artistic. Paint forms a coating over the surface of the shingle and prevents the escape of the moisture, which it is impossible to entirely keep out of the shingle. This hastens decay, and painted shingles are often found which look sound, but are really nothing but a crust of paint.

The invention of shingle stains by Mr. Samuel Cabot, chemist, of Boston, in the early 80s, solved the coloring problem, and Mr. Cabot's ingenuity also added to his discovery of the great merit of preserving the shingles. At that time the preservative value of creosote was very little known except to scientific men, but Mr. Cabot knew it, and used it as a basis for his Creosote Shingle Stains. This gave him a combination that produced soft, transparent and velvety coloring effects that were fully as durable as the best paint; also thorough preservation of the wood by means of the creosote, and at a cost that was only about half that of paint, both for buying and applying. In other words, he cut down the cost one-half, and produced an infinitely more artistic result, and instead of hastening the decay of the shingles, as paint did, it prevented their decay.

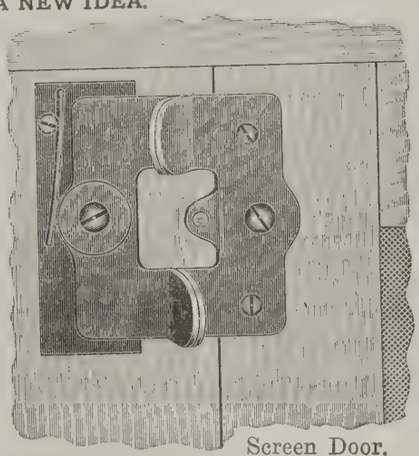
The colors and shades in which Cabot's stains are made are infinite, and the artistic qualities of the stained shingle house have so appealed to the architects and owners that shingled houses have become universally popular. In fact, the experience with the shingled house has taught people that they can use shingle stains upon rough siding with splendid effects, and bungalows all over the country show evidence of this development. One of the oldest architects said that in the discovery of shingle stains, Mr. Cabot had made the first improvement in exterior coloring in half a century.

A NEW IDEA.

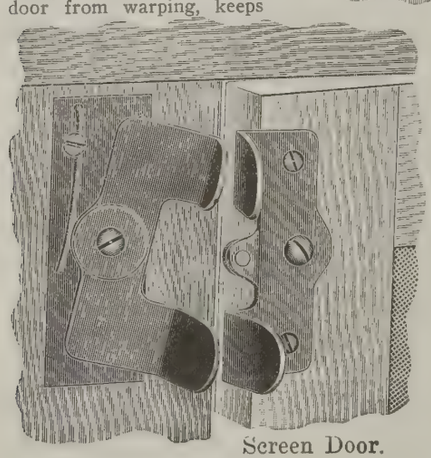
The R. G. Winter Manufacturing Company, 2104 Vliet street, Milwaukee, Wis., manufacturers of the Sensible hangers and fasteners, are placing on the market, a new catch, called the Sensible Screen Door Catch.

The many good points of this new catch are clearly shown in the accompanying illustrations. These illustrations show the catch reduced just one-half the actual size.

The circulars being sent at this time to architects, contractors and builders state that the Sensible is the catch that catches securely but quietly. It prevents the door from warping, keeps out the flies and reduces the noise of slamming to the minimum. Special attention is called to a small rubber cushion in the catch which prevents the slamming of the door, and to the ease with which this catch can be put on by the carpenter.



Screen Door.



Screen Door.

The R. G. Winter Manufacturing Company exhibited this catch at the Dealers' Hardware Convention in St. Paul recently and it was well received by the many hardware dealers examining it, on account of its simplicity and ease of opening, closing and securely holding the door.

Circulars are being mailed and can be had with prices on request.

IMPORTANT CHANGES IN PASSENGER DEPARTMENT GRAND TRUNK RAILWAY SYSTEM.

On account resignation Geo. W. Vaux, Mr. Harry G. Elliott has been appointed General Passenger Agent at Montreal, and is succeeded in Chicago by Mr. J. D. McDonald as assistant general passenger agent.

Mr. McDonald has a wide acquaintance with the railway and newspaper fraternity, having for many years represented his company at Buffalo as agent in charge of the Niagara Frontier, and for the past eight years as district passenger agent at Toronto, where his territory embraced the Highlands of Ontario resorts, including Muskoka, Lake of Bays, Temagami and the Cobalt region.

Mr. McDonald was secretary of the entertainment committee at Buffalo, when the meeting of the American Association of General Passenger Agents met there prior to opening of the Pan-American Exposition; was one of Geo. T. Bell's aids is looking after the general passenger agents at their Portland, Maine, trip, and also two years ago when they had two special trains to the Canada resorts.

Mr. McDonald's territory embraces what is known as the western division, being that portion of the Grand Trunk Railway System lying west of Detroit and Port Huron, and also all territory west of Chicago to the Pacific Coast and Southwest to the Gulf of Mexico.

With Its Back to the Wind and the upward sloping opening in the back taking the full force of the wind, the Iwan Volcano Revolving Chimney Top makes a sure draft on the chimney.

Mountings can be bought separately and the hood and vane can be made in your shop according to patterns furnished free with all iron mountings. Sizes 6 to 12 inches.

Prices and catalog sent promptly.

Iwan Brothers, 1509 Prairie Avenue, **South Bend, Ind.**



ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS

and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

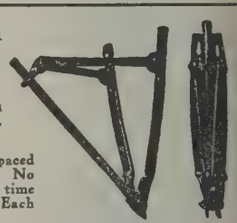
KIMBALL BROS. CO., Council Bluffs, Iowa



1000 Pounds Easily Carried on

THE ASHLAND Folding Scaffold Put up with Four 10d. Nails.

Strongest and Best Bracket made. Instantly adjustable to any spaced studding or pitch of roof. Can be used on any kind of siding. No pins or bolts used in adjusting. No boring holes in siding. Saves time and money on every job Special Discount for First Order in Each Locality. Write for Circular N and Prices.



Ashland Folding Scaffold Co., : 17 Washington Street ASHLAND, : OHIO

"Diamond N" Expansion Shields



Have increased holding power on account of the corrugated ribbed exterior surface.

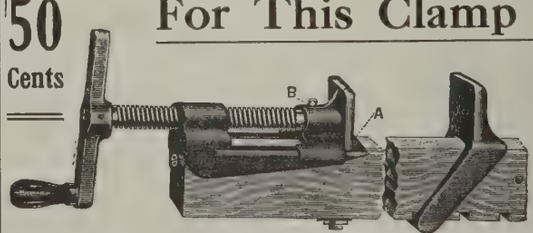
Securely clamped together without the use of springs or wires.

A better shield at the same price.

DIAMOND EXPANSION BOLT COMPANY

90 West Street, corner Cedar, - - - NEW YORK

50 Cents **For This Clamp Fixture**



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO. 321 N. May St., CHICAGO

CALDWELL SASH BALANCE



Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

It actually costs less to lay a Slate Roof and to **keep it in perfect condition** during the whole life of any building—than to get similar results with any other roofing material.

Sea Green and Purple Slate

is the toughest and best roofing slate ever quarried. It is easy to handle—easy to lay—outlasts any building. Its first cost is the only cost—there are no paint bills—no repair bills. It is fire-proof—lightning proof.

Let us give you the **proofs**—tell you why it will pay you—how it will please your trade—and send you our book "Roofs" giving interesting facts on comparative roofing costs and values. All free for the asking.

American Sea Green Slate Co.
150 Clark Street, - GRANVILLE, N. Y.

FIREPROOF CORTRIGHT METAL SHINGLES



Selling Talk No. 11

4186 Buildings Burned

A recent issue of a publication devoted to insurance interests records 4186 fires which they directly attribute to the use of wood shingle roofs.

In view of these appalling facts why is it that property owners still continue to risk the total loss of building after building by roofing them with wood shingles?

Especially when the remedy is so readily obtainable in Cortright Metal Shingles.

Cortright **are** fireproof and stormproof besides being more handsome and durable than either wood or slate.

Cortrights as a matter of fact will outlast the building itself and flying embers from a neighboring fire such as shown in the picture above can have no effect on a roof of Cortright Metal Shingles.

Will you let us send you the proofs of all this? All we're waiting for is your name. A postal will do.

CORTRIGHT METAL ROOFING COMPANY - - - - PHILADELPHIA AND CHICAGO

SIMPLE, SCIENTIFIC SASH VENTILATOR

Practical proven device for putting pure air in, poor air out. Does not disfigure windows nor offer projections interfering with dusting or washing windows. non-rustable brass throughout. Adjustable to any air current. No drafts, dust or insects.



Results far better than from costly cumbersome affairs formerly used. Cost small. $1.50 per single ventilator, delivered. Liberal discounts to architects. Builders and Contractors. Tested for three years by experts. Users are delighted. Get the facts and keep the profits.

Secured Through the

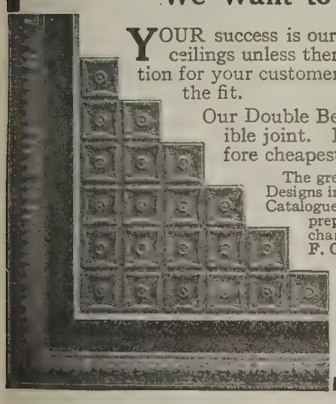
IDEAL SASH VENTILATOR.

Write for Details

IDEAL MFG. CO., - ERIE PA.

Your Success is Our Necessity

We Want to Show You Why



YOUR success is our necessity, because you will not buy our ceilings unless there is profit in them for you and satisfaction for your customers. Most of your success depends upon the fit.

Our Double Bead Lap produces a dust proof and invisible joint. It is simplicity itself. Easy to fit, therefore cheapest to erect.

The great variety of our Art Metal Ceiling and Sidewall Designs insure the customer's preference when shown our Catalogue. Send us plans with measurements and we will prepare drawings of appropriate ceilings, without charge, and name you low price on all material, F. O. B. your station.

Get our catalogue B and agency proposition

The TIFFIN ART METAL CO.
Tiffin, Ohio

MORE HEAT AND LESS FUEL



This shows the Jahant Down-Draft Furnace without the casing, pipes, etc. The air enters the inlet marked "Draft" and rises through the two cast iron smoke-proof pipes that lead to the top of the fire box. Being colder and consequently heavier than the air directly over the fire, it falls and forms a down draft through the center of the fuel until it becomes heated and rises to the service pipes. The Jahant Down-Draft Furnace consumes every piece of fuel to a fine ash and liberates every unit of heat.

$10 Down Send us $10 with plans of the rooms you desire to heat and we will send the proper sized Jahant Down-Draft Furnace with full instructions for installing. You can pay the balance in monthly installments. Write for our big furnace book. It is free.

The Jahant Heating Co.
2 Mill St., Akron, Ohio



"BERGER'S" Classik METAL CEILINGS

are so superior to other steel ceilings that they receive immediate preference—and they cost no more. We know, and we wish you to know, that you can profit handsomely by selling these ceilings. Their unit parts are made up in hundreds of attractive combinations which include dome, beam, arch and cornice effects.

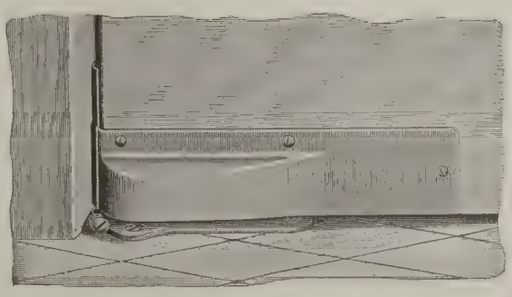
With our fine illustrated catalogue, you can show your customer many designs from which to select. Write for this beautiful book to-day.

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The Berger Mfg. Co.
CANTON, OHIO

St. Louis
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1910 "Standard" Floor Hinges



sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

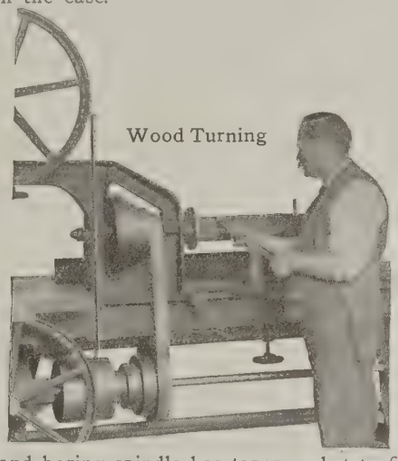
The STANDARD MFG. CO., : Shelby, Ohio

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BUFFALO CRAIN COMBINATION WOODWORKER.

The Buffalo Forge Company, Buffalo, N. Y., holds the exclusive rights for manufacturing and marketing the Crain Combination Wood Worker, which is the most recent invention in its field. The machine appears to be thoroughly practical and possesses many features which make it admirable for use in contractor', builders', carpenters' and repair shops.

The principal parts, such as the band saw, rip saw, planer, lathe, etc., are of very ample dimensions and easy to adjust. A highly advantageous feature of this machine is that three men can work independently at it at one time, each one having ample elbow room. The majority of operations common to a woodworking shop can be performed on this machine without any extra attachments, simply by a quick and easy change of a few tools. The power consumption must be considered very low, being only 4-H. P. at full load. This means quite a saving in power, especially if an electric motor is used as is often the case.

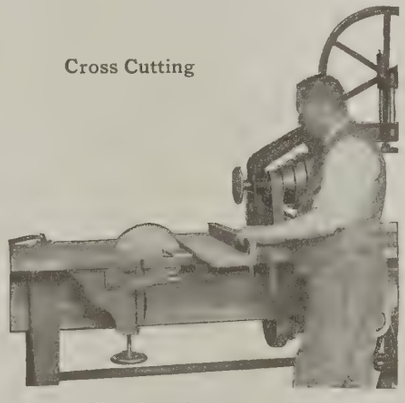


Wood Turning

The lathe and boring spindle has taper socket to fit the ordinary taper shank twist drills, and is also threaded so a face plate or a chuck of any kind can be screwed on.

The boring table can be raised or lowered to bring the work to the height desired for boring. The work can be bored at any angle up to 45 degrees. The boring table is provided with clamps to hold the work firmly in any position.

The band saw has a large, well-supported table; the wheels are 27 inches in diameter, and will saw through any thickness up to 12 inches.



Cross Cutting

The saw arbor will take circular saws 12 inches in diameter. An adjustable cut-off gauge is furnished which can be adjusted to cut to any angle up to 45 degrees.

The planer head is pivoted so that it can be set either horizontally or vertically, or at any angle between, and be used for jointing lumber straight, chamfering or rounding corners, or do work of any irregular shape. It can be used for working mouldings of any kind by making bits of the shape desired. The head furnished with the machine will take bits of different sizes up to 10 inches, and is so made that the bits can be easily and quickly changed. This head is also provided with an adjustable screw by which it can be raised or lowered.

HEATING INFORMATION.

An excellent book on efficient heating of the home has just been published by The Holland Furnace Company of Holland, Michigan This book contains valuable facts, not only on the proper construction of furnaces, but the saving in fuel when the correct methods are used.

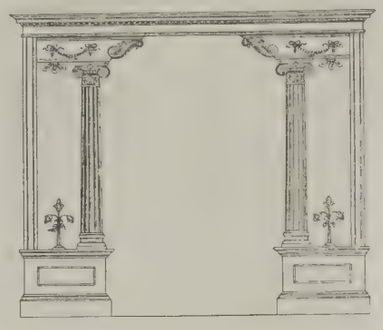
Long experience in the heating business has enabled this concern to secure this practical information and it is put in book form for the benefit of parties interested in furnace heat in houses and homes.

Holland furnaces embody the correct ideas, based on this long experience. They are constructed with double grate surface, patented cored, air-admitting, double firepots, which burn fuel from both sides and top, thereby consuming gas, soot and clinkers with the least smoke.

This book is sent without cost upon request, and as the heating question is an important one to architects, contractors and builders as well as owners, it would be to advantage to obtain a copy. In writing mention THE NATIONAL BUILDER.

GRILLE OPENING AND CONSOL WORK.

Nineteen years in one location, and doing business continuously all that time, is a record that any company can be proud of, and especially so in the manufacture of grilles, openings and consoles. In this line of building material, not only does the workmanship enter into every little piece that goes to make up a grille, but to stand the test of years, only thoroughly seasoned and kiln dried lumber of the better grades and the best glue, etc., can be used.

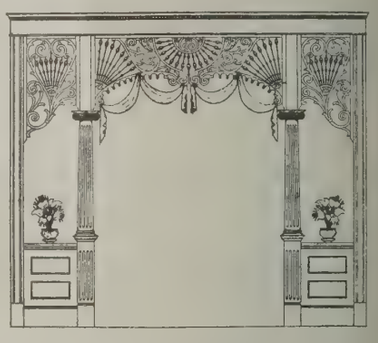


Way back in 1892, the Chicago Grille Works began the manufacture of grille work at their present location, and have been doing business right there, all of these years, but now on a much larger scale.

The same careful attention to details, the courteous and prompt answers given to every correspondent, and the latest designs and best materials and workmanship has made the Chicago Grill Works thousands of satisfied customers and friends among not only contractors and builders but also among the owners who have these grills in their homes.

Beginning with a few designs, they now offer their customers selections from an attractive, fifty-page catalogue. The different designs are described in such a plain clear way that there can be no misunderstanding in ordering from this catalogue.

Prices are quoted on plain red oak, unselected birch, yellow pine, cypress—not varnished. For woods other than these, prices will be given on request, and prices quoted are for goods crated F. O. B. Chicago.



Years ago one of the best liked pieces of grille work was the Chicago Grille Works No. 55, and the fact that it is still one of the frequently selected designs, speaks well for its beauty and workmanship.

No. 55 has a square post 5¼ inches, columns 5 inches, composition caps; center drop of grille 14 inches; ends drop 36 inches, and the pedestals extend 21 inches from jambs and are 30 inches high.

No. 102, another very popular design, illustrated here, shows a colonial opening which, during the past few years, has had a large sale and has been placed in many beautiful homes. This design is constructed with a special view to electric light wiring. The cut shows electric lights on the pedestals and beam brackets. It is carried in stock for 5½ to 6¼-inch jambs. Either plain or reeded columns can be had for the same price. Pedestal measurements are: Length over all, 26½ inches; height, 20 inches; width, 8 inches; cap, 10 inches; columns, 6 inches; base, 5 inches; neck, composition caps, beam brackets with composition ornament. Length over all, 33 inches; width, 5½ inches; face, 9 inches.



The console design shown here is a new one, and is made with pilasters instead of columns. The pilasters have beautiful composition ornamentations, which also appear on top frieze. The height is 7 feet, 6 inches; width, 4 feet 11 inches, and mirror 40x58 inches. This design is made in oak and birch.

The Chicago Grille Works, 838 Wells street, Chicago, are getting up a new catalogue, which architects, contractors and builders will find a first-class reference in specifying and buying materials from in this line. It can be had by those interested in up-to-date design in the line, reliable materials and good workmanship.

A well designed grille, colonial opening or consol adds not only to the attractiveness of the home, but also to the value of the property, and the new catalogue will aid in making the right selections for the home owner.

The Chicago Grille Works do not stop at the designs shown in their own catalogue, but will be pleased to manufacture anything in the line of grille work shown in any catalogue.

"I have been told," said the confident performer, "that I make my violin sound like the human voice."

"Yes," replied the candid friend, "but there are so many kinds of human voices."—Washington Star.

Amatite ROOFING



Saskatoon Fair Buildings, covered with Amatite Roofing, Saskatchewan, Can.

60,000 Feet of Amatite Roofing

The accompanying view shows a series of buildings at the Saskatoon Exposition, all of them covered with Amatite Roofing.

Amatite was selected because it was inexpensive, easy to put on, required no care or attention or expense afterwards, and would give excellent durability.

If ordinary smooth roofing had been used, these roofs would require painting every year or two at considerable expense and trouble. Amatite, however, has a mineral surface which *requires no painting.*

Amatite is the most economical solution of the roofing problem known.

Amatite Roofing requires no skilled labor to apply; it costs no more (in fact, much less) than most other roofings; and the fact that it requires no painting makes the total expense far below that of any other type of roof covering.

You can use Amatite on every kind of steep roofed building. We supply galvanized nails and liquid cement for the laps free of charge.

Send for sample, booklet and further information. Address our nearest office.

BARRETT MANUFACTURING CO.

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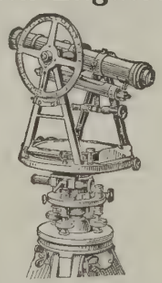
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Talk No. 2—by the Man from Akron

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They are an exclusive feature of Akron Eclipse Spirit Levels. You'll find them in no other make. Those two little lines show you exact **level** at once. Nothing left to guesswork. No straining the eyes on a cloudy day or in a dark corner to read the level. You can read the Akron instantly even at a considerable distance.

Akron Eclipse Levels

are not only the most accurate and easiest reading levels in the world, but they are the most durable of all. The stock is made of finest laminated hardwood. All spirit tubes are carried on rubber bearings, incased in an outer tube of heaviest steam-gauge glass, which gives great strength and withstands the jars and falls of daily use without the least injury.

All glasses are adjustable, insuring absolute accuracy at all times.

Made in 33 styles and sizes for every purpose; some with two plumbs, some brass bound. You'll find the best level for **your** purpose in the Akron line.

If your dealer doesn't sell Akron Eclipse levels, we'll fill your order direct. Write today for catalog and price-list, mentioning your dealer's name.

Look for this trade-mark the Sign of a Perfect Level

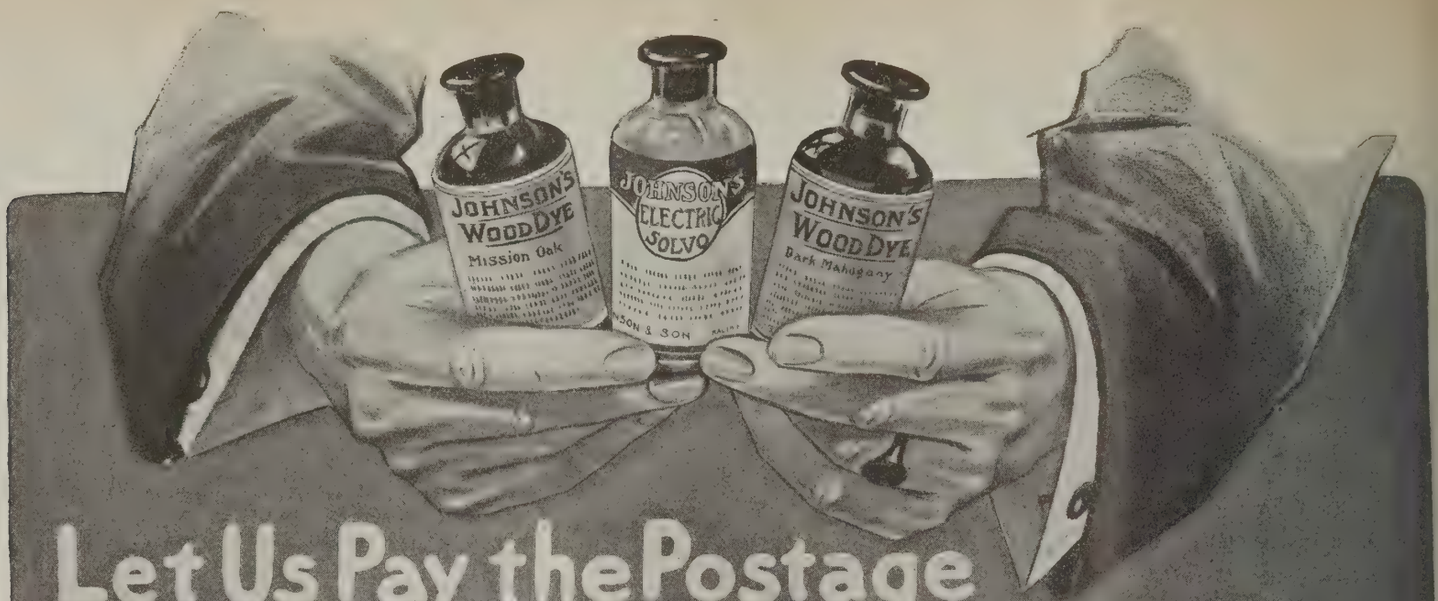
AKRON ECLIPSE SPIRIT LEVEL

THE BAKER-McMILLEN CO.
DEPT. A
AKRON, OHIO

This is the Feature that Distinguishes Akron Levels from all others

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NAT BUILDER



Let Us Pay the Postage To You On All Three Free—For a Test



Johnson's Prepared Wax

is a complete finish for all hard and soft wood—equally well adapted for use on floors, woodwork and furniture. May be used on the bare wood or over Dye, Paste Wood Filler or any finish—simply apply with a cloth and bring to a polish with a dry cloth or brush.

Johnson's Prepared Wax gives that beautiful, artistic, dull finish so much in demand. Prepared Wax does not show scratches and heel marks, and work finished with it may be easily kept in perfect condition.

Johnson's Prepared Wax contains a larger percentage of hard, expensive wax than other wax finishes on the market, and for this reason it covers a larger surface and can be brought to a more beautiful and lasting polish. It does not become soft and tacky in warm weather or warm climates—or from the heat of the body.

Ask your Dealer for Free Sample

Johnson's Crack Filler



is a paste filler for cracks, crevices and nail holes. Should be applied the same as putty, but it is much superior to that article as it does not chip, crack or come out of place. When Johnson's Crack Filler has hardened it takes Johnson's Wood Dye the same as the wood.

Ask your dealer for free sample of Johnson's Crack Filler and test it out.

Johnson's Paste Wood Filler



is made in five shades for filling the grain of all wood, soft and hard. Manufactured from the best and most expensive silex, linseed oil and the best Japan dryer, and is guaranteed to give satisfaction.

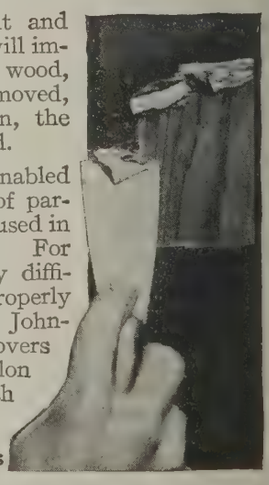
All wood which is to be finished natural should be given a coat of Johnson's Natural Paste Wood Filler No. 10 and a finish-wax, Under-Lac and Wax or Under-Lac and varnish.

We recommend the use of our colored shades of Paste Wood Filler where a golden oak, dark oak and Antwerp finish is desired on hard woods, also for use over Johnson's Wood Dye where a filled grain effect is desired.

Ask your dealer for a free sample of any shade of Johnson's Paste Wood Filler.

Johnson's Electric Solvo

is the best and most efficient paint and varnish remover on the market—it will immediately soften all old finish on wood, glass or metal so it may be easily removed, leaving the surface bare and clean, the same as before any finish was applied.



Through a secret process we are enabled to use a much smaller percentage of paraffine in our Electric Solvo than is used in any other remover on the market. For this reason you will never have any difficulty with the new finish drying properly if the old finish is removed with Johnson's Electric Solvo. Many removers contain enough paraffine in one gallon to prevent many gallons of new finish from drying.

Ask your dealer for free samples

S. C. Johnson & Son, RACINE, WISCONSIN

Wood Finishing Authorities.

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Send Coupon Now for Free Samples of Johnson's Artistic Wood Finishes

EVERY practical contractor and builder can better his work, better his profits and better his reputation by using Johnson's Wood Finishes. You can prove this at our expense—it will cost you nothing—save you much. We want to send you free working samples and Johnson's Illustrated Color Book—"The Proper Treatment for Floors, Woodwork and Furniture"—giving complete directions for their use.

We want every contractor and builder to accept this free offer. Mail coupon or postal today.



Johnson's Wood Dye

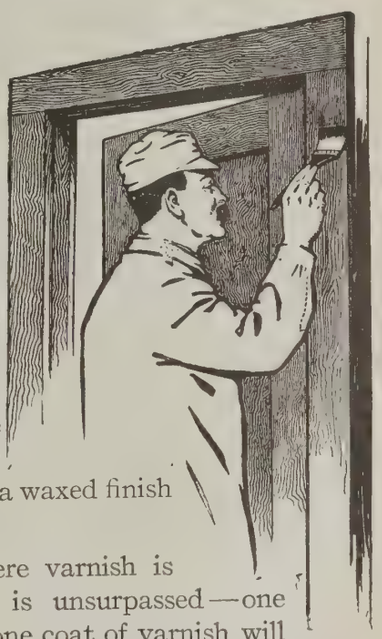
is not a mere surface stain—but a deep-seated dye, penetrating the wood and fixing a deep, rich, permanent color entirely different from ordinary stains, which are only "skin deep."

Made in fourteen attractive shades.

When used in combination with Johnson's Prepared Wax or Johnson's Under-Lac, inexpensive soft woods such as pine, fir and cypress, may be made as beautiful and artistic as costly hard woods.

Ask your dealer for free samples and prove it for yourself

Johnson's Under-Lac



A spirit finish vastly superior to shellac and varnish—not thick, sticky and slow drying like varnish, neither does it dry too quickly like shellac. Under-Lac should be used over Johnson's Wood Dye and Paste Wood Filler, where a higher gloss than a waxed finish is desired.

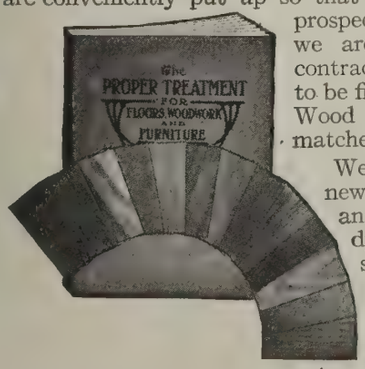
For a first-coater, where varnish is to be used, Under-Lac is unsurpassed—one coat of Under-Lac and one coat of varnish will give a better finish than three coats of varnish without the Under-Lac.

Under-Lac is particularly adapted for finishing linoleum and oil-cloth—dries hard so the floor may be walked on in an hour.

Ask your dealer for free samples and convince yourself of the merit of Johnson's Under-Lac. Gallons $2.50.

Johnson's Color Panels and Illustrated Book

Let us send you free a complete set of wood panels showing all shades of Johnson's Wood Dye on various woods. These panels are conveniently put up so that you can easily show them to prospective customers—by doing so we are sure you will procure many contracts at profitable prices for work to be finished with Johnson's Artistic Wood Finishes. The dye *always* matches the panels.



We will also send you a copy of our new book illustrated in many colors and containing color plates of the dye. This book gives full instructions for finishing and refinishing all wood—soft and hard. It is invaluable. Present the attached coupon to your leading paint dealer for samples, wood panels and book. Or mail coupon to us giving dealers' name and we will send them to you from Racine.

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N. B.-3.

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Present this coupon at your dealer's, or mail direct to us for free samples.

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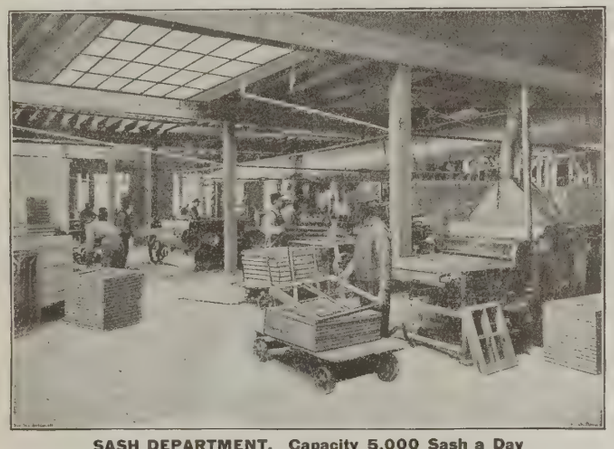
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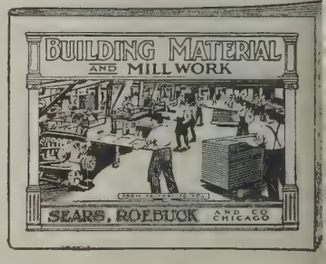


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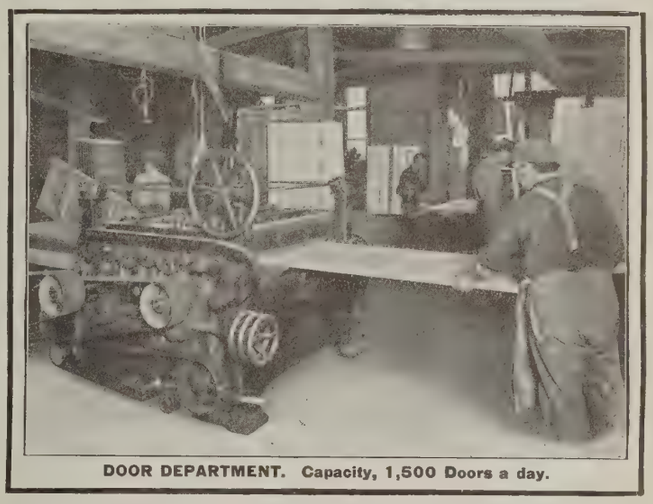
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Gentlemen:—I am sending you a photograph of the house built from material shipped from you and according to your plans. I am well satisfied with the quality of materials and your prompt shipment. After a close estimate I can say that **I have saved on this property $1,000.00.**

Very truly yours,

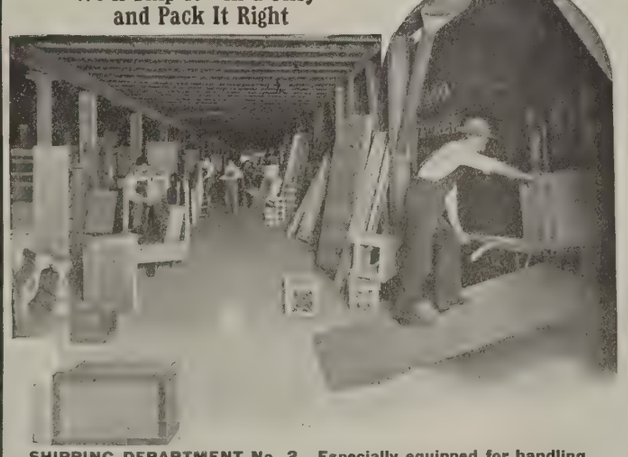
Frank Chamberlain.



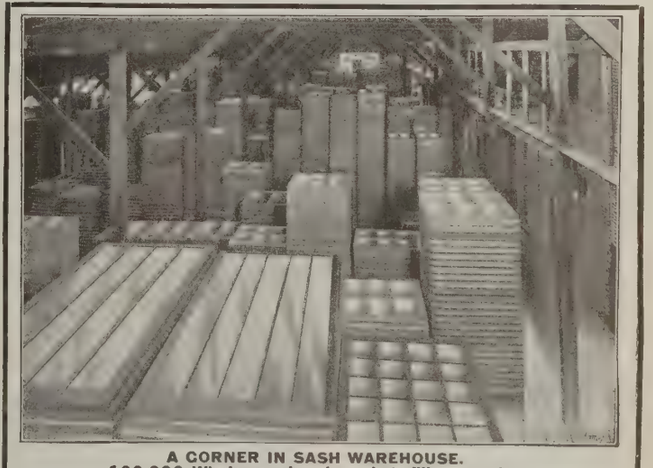


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Thinking of Sending a Trial Order? We'll Ship It "In a Jiffy" and Pack It Right



SHIPPING DEPARTMENT No. 2. Especially equipped for handling less than carload orders. Capacity, ten carloads a day.



A CORNER IN SASH WAREHOUSE.
100,000 Windows, glazed, ready to fill your order.

$500,000.00 WORTH OF MATERIAL ALWAYS ON HAND TO FILL OUR CUSTOMERS' ORDERS. Our enormous stock of doors, windows, door and window frames, columns, moldings, etc., enables us to meet demands on short notice. We sell our goods in such large quantities that our supply is always FRESH, CLEAN AND PERFECT IN EVERY WAY.

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CHICAGO, ILLINOIS

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PRODUCERS OF
ROOF SLATES
BLACK GREEN PURPLE RED

Slate Blackboards
Guaranteed Strongest and Best Finish
Pamphlet with setting instructions on application

The E. J. Johnson Co.
Main Office:
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$1.00 Good For $1.00
TO INTRODUCE
The SELF-SETTING PLANE
(As long as this Ad appears.)

Any dome in this paper is good for one dollar, in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our Planes are not sold.

If you want more than one Plane and they are not sold in your town we will allow you dealer's discount.

List price of **Beech Wood Planes:** Smother $3.25, Jack $3.50, Fore $3.75 and Jointer $4.50.

Do not say the price is too high until you try it, then if the Plane is not worth to you, twice its cost, return it at our expense and the trial won't cost you a nickel.

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

If you don't want a **Self-Setting Plane** now, send us a dome and the addresses of ten carpenter friends, no matter where they live, and we will send you a hard, tough, carpenter's pencil and circulars.



Gage Tool Co. VINELAND, NEW JERSEY

The Excelsior Dumb Waiter


Sent complete to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. Send for Descriptive Pamphlet.

R. M. RODGERS & CO.
175 Washington Ave., Brooklyn, N. Y.

Richards-Wilcox Trolley Hangers
For your Garage job.

We can handle any sliding door proposition. Let us solve your difficulty. Mention your dealer's name when you write.

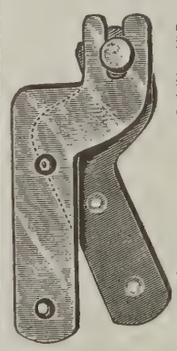


Our Catalogue Should Interest You

RICHARDS-WILCOX MANUFACTURING CO.
AURORA - - - - ILLINOIS

THE "E-Z-way" SCREEN HANGERS
NEVER ALLOWS SCREEN TO BIND OR STICK WHEN HUNG—
ALWAYS FIT SNUG TO BLIND STOP

Everything Done from the Inside of the Building

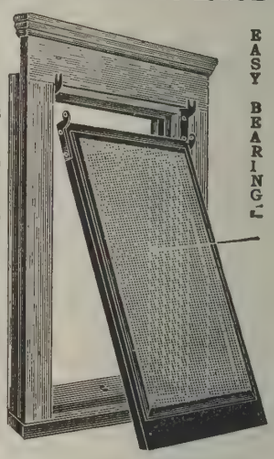


"E-Z-way" Hangers are made of 18 Gage Black Iron and are electro galvanized. THEY WILL NEVER RUST.

You can hang one-half to two-thirds more screens in a day with "E-Z-way" Hangers than with any others.

TRY TWO DOZEN SETS FOR $1.00—NO PERSONAL CHECKS

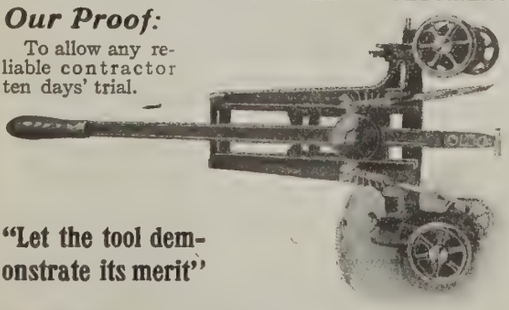
Use a No. 1 Hanger on a 1 Inch - Casing
" No. 2 " " 1¼ "Brick Mould
" No. 3 " " 1½ " " "



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Patentees and Manufacturers
2214 East 18th Street
KANSAS CITY, MO.

Our Door Lock Mortiser
IS A PROFITABLE INVESTMENT

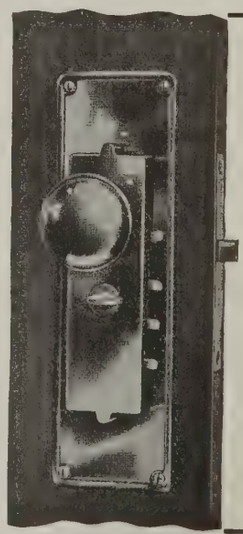
Our Proof:
To allow any reliable contractor ten days' trial.



Our Claim:
It will cut an opening for a mortise lock in three minutes in any kind of wood, plain or veneer.

"Let the tool demonstrate its merit"

Western Office RIVERSIDE, CAL. **A. W. MILLER MFG. CO.** Main Office CINCINNATI, OHIO



Dayton Keyless Locks
REMOVE ALL THE KEY NUISANCE

Cannot be picked—Easily and instantly opened in 3 seconds—day or night—by just touching one or more of the sentinels you see here on the side of the lock.

Architects, contractors and carpenters will find them money winners—meeting every want in locking and opening doors, and giving absolute protection.

SALESMEN WANTED

Let us tell you about them—also about our padlock having 38,005 combinations. Write today.

THE DAYTON KEYLESS LOCK CO.
804 U. B. Building, DAYTON, OHIO

THE "EUREKA" SPIRAL SCREWDRIVER

PUSH ON THE **HANDLE and THE SCREW GOES IN**



Will Drive a Screw in Hard or Soft Wood
QUICKER AND EASIER THAN ANY OTHER
THE "EUREKA" SPIRAL SCREWDRIVER
is made in two sizes from the highest class materials—No. 1, 14 in. long opened, 9 in. closed; and No. 2, 19 in. long opened, 12 in. closed. Can be used as an ordinary screwdriver.

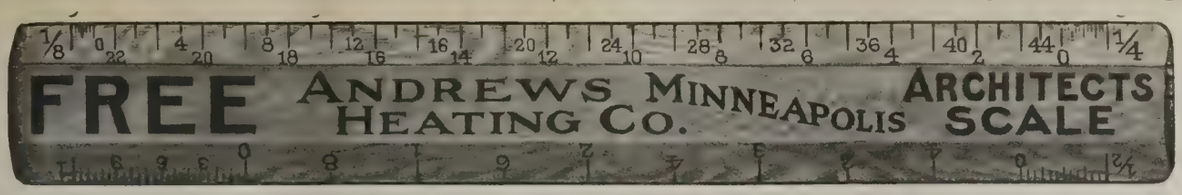
GET ONE TODAY FROM YOUR DEALER

DECATUR COFFIN CO., E. North St., DECATUR, ILL., Manufacturers

OLDEST AND BEST

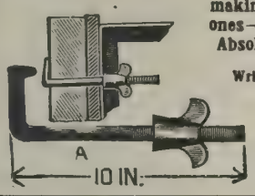
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Send us Two [or] More Names of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.



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WHAT WOULD YOU SAY if you had Wall Brackets that would last a lifetime?



Be decidedly cheaper than continually making wooden ones—would it not? Absolutely safe, too.

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The Taylor Steel Scaffold Bracket

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OVER 1000 MACHINES in use in the City of Chicago



The Only Practical Circle Swing Hand Power Derrick

For hoisting timber, joists, flooring, door and window frames, stone, concrete blocks, iron girders, etc. Fully equipped, ready for use

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Band Brake $1.00 Extra

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DON'T PUT SASH WEIGHTS IN YOUR WINDOWS—THEY ARE OUT OF DATE

THE "AUTOMATIC" SASH HOLDER

is better and cheaper, more convenient, less perplexing, easier to put in, more reliable, more durable, more satisfactory.

The "Automatic" Sash Holder is the new modern, up-to-date device that dispenses with cumbrous sash weights, kinking cords or ribbons, useless weight pockets, misfit pulleys and reluctant balances, and saves all the time, labor and expense of fitting them in place.

Architects are specifying them, Contractors and Builders are buying them. Sash and Planing Mills are providing for them, Carpenters are putting them into old and new buildings.

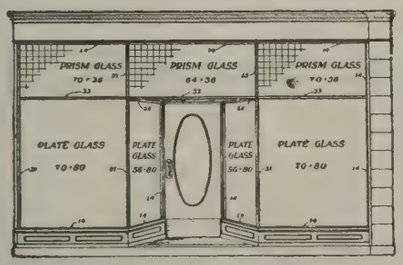
Prevent rattling and permit the window to be moved up and down with ease. Hold it safely at any point desired.

Sample sent on request

Sold by hardware dealers or direct from us. Correspondence solicited. Representatives and side line travelers wanted all over the world.



AUTOMATIC SASH HOLDER CO.
279 Broadway, New York City.



Strength

of construction, combined with artistic appearance and absolute reliability is the particular feature of Petz Store Front Construction. An unparalleled record of "no breakage" tells the story. It explains why insurance companies recommend them and why careful men insist on having Petz Bars in their store fronts.

When Petz Bars are used the plate glass is set in from outside, making the installation both quick and easy.

A BOOKLET ON "MODERN STORE FRONT CONSTRUCTION" IS YOURS FOR THE ASKING. WRITE TODAY.

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FOREMAN $1900 A YEAR | SUPERINTENDENT $2500 A YEAR | CONTRACTOR $3000 A YEAR



Learn to Fill BIGGER SHOES!

Don't be satisfied with merely pushing a saw and driving nails. Be a *master* of your craft. Learn to *plan* as well as to work—to use your *brain* with the *same skill* that you use your hands.

Learn to fill a *big-salaried* job—the kind of a job that hundreds of other men, with no more natural ability than you, are filling with ease and success.

HOW YOU CAN DO IT

You can *master every detail* of your line of work, *every branch* of building construction, *every angle* of architecture and carpentry—can do it in your spare moments and at almost no expense at all. You can have the knowledge and experience of over *four score experts* at your command, ready for instant use whenever you want it—can fit yourself to *fill any first class position above you that you desire*—simply by allowing us to place in your hands this great ten volume set *without your sending us one cent in advance.*

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- Wiring Door Bells
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- Lettering

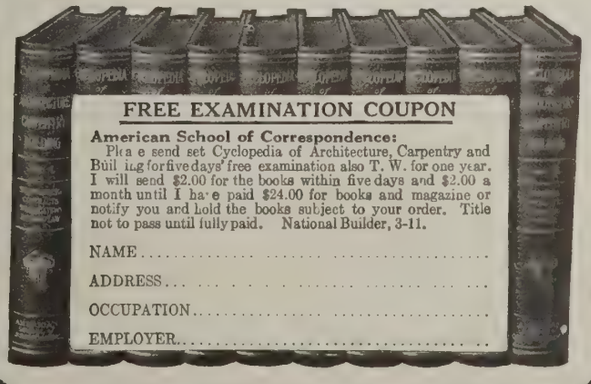
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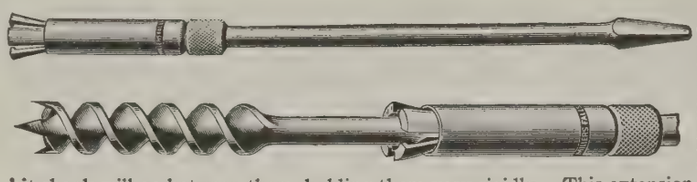
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Extension Bit Holder, No. 5



It has been found very difficult to make a strong and adequate bit extension of a dimension so contracted as to follow a 5/8 inch bit into a hole, without either breaking the chuck through its weakness, or losing the bit in the hole being bored. As these extensions are used largely for boring between partitions, such results may be rather disastrous through the loss of the bit in the partition, or marring the grace of the structure into which the hole is bored. The chuck to No. 5 is a little less than 5/8 inch in diameter, so will follow a bit of that size. The four jaws are made in one piece from steel, and are exceedingly strong and so constructed that the square corners of the bit shank will go between them, holding them very rigidly. This extension is durable and capable of performing all that can reasonably be expected of it. The tool is most useful to electricians and plumbers.

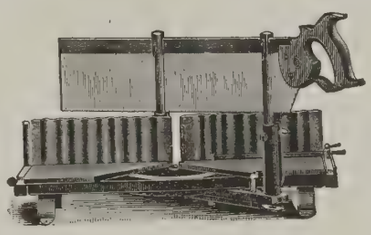
Price, in lengths of 12, 15, 18 and 21 inches, each $1.50
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Put up one in a paper box.
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Made of STEEL - Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw

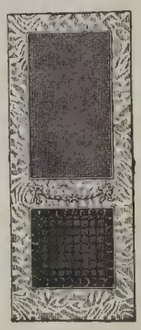
Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

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GOODELL MFG. CO., Greenfield, Mass.

CUSTOM MADE
FLY SCREENS



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS

Our screens are made from kiln dried lumber and have water-proof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced

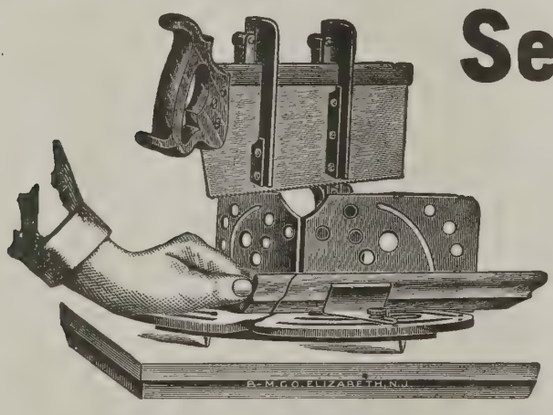
Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

A. J. PHILLIPS & CO., Le Roy Street, Fenton, Mich.
28 Years Experience. 3½ Acres of Floors

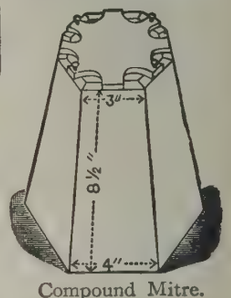
DORN'S REVOLVING MITRE BOX

A MITRE BOX FOR A LIFE-TIME



Sent on 10 Days Trial

The Famous Dorn Revolving Mitre Box. Will saw compound as well as plain mitres any width with a back saw 4 inches wide.



Compound Mitre.

Send for Booklet Called "Tools That Last"

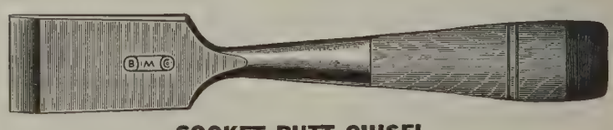
OUR "CHISEL" GUARANTEE

We guarantee that our chisels will hold their edge all day with one sharpening, even if used on quartered oak across the grain.

Chisels look simple, but there is no tool of which such hard work and varied service is required. Recognizing this we have given the choice of the steel, regardless of cost, and the design of these chisels, the most extensive study and experimentation, and in their manufacture the greatest care and highest order of skill is employed.



BEVELED EDGE BUTT CHISEL



SOCKET BUTT CHISEL

SPECIAL OFFER

To further increase the number of carpenters who insist on having B. M. Co. Chisels we will sell direct to readers of the National Builder, express prepaid, any chisel or set of chisels with privilege of returning after ten days trial if they do not prove to be the BEST EVER USED.

BRAUNSDORF-MUELLER CO., - - - Elizabeth, N. J.

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Designers and Workers in Decorative Glass
Quality not Quantity
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Workers in Art Glass and Mosaics. Catalogue free

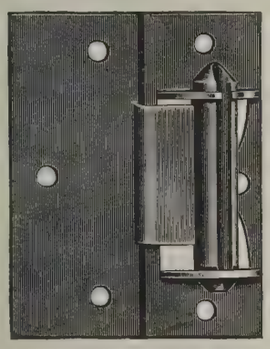


Samson Spot Sash Cord

IS made of extra quality fine yarn, and warranted free from imperfections of braid or finish. It can always be distinguished by our trade mark, the Colored Spot. Carried by all dealers. Send for samples and tests.

Samson Cordage Works

BOSTON, MASS.



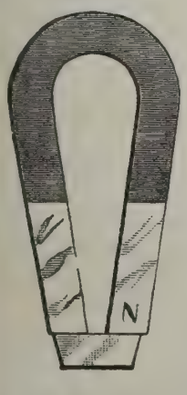
Diehl's Separable and Reversible Hinge No. 20

This hinge is designed for storm and screen doors. The door may be swung at right angles and lifted from its bearings without removing the screws, as the shank slides through the small slot in the upper ear so that it makes it very easy to change from storm to screen doors and from screen to storm doors without removing the hinges. Hinge No. 20 is made of open hearth wrought steel, 14 gauge, and finished in black baked japan or oxidized copper.

A Sample Set of Hinges will be sent upon receipt of 25 cents in stamps.

The Diehl Novelty Company SHEBOYGAN, WISCONSIN

Mention National Builder.



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Send for it at once and get posted on the latest and most up-to-date designs in

BUILDERS' HARDWARE

It's Free, and it's the best arranged and easiest understood Builders' Hardware Catalog published for Carpenters and Contractors.

This MAGNET and REHM'S NEW CATALOG will save you money on every job.

REHM HARDWARE COMPANY
1503 Blue Island Avenue, Chicago, Illinois



"That Coupon Gave Me MY Start"

"It's only a little while ago that I was just where you are now. My work was unpleasant; my pay was small. I had my mother to take care of, and it was tough sledding trying to make ends meet. I hadn't had much schooling. I didn't *know enough* to fill any better job than the one I had.

"One day I saw an advertisement of the American School. It told how other men got better positions and bigger salaries by taking their courses. I didn't see how a correspondence course could benefit me, but as long as it didn't *cost* anything to mark the coupon I thought it was worth investigating at least. I marked the coupon and sent it in on the next mail.

"That was two years ago last April, and now I'm drawing more every week than I used to get in a month."

If YOU want a better position, if YOU want to get into congenial work, if YOU want a salary that's worth while—

Sign the Coupon NOW

American School of Correspondence
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Opportunity Coupon

AMERICAN SCHOOL OF CORRESPONDENCE,
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Please send me your Bulletin and advise me how I can qualify for the position marked "X."

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.....Auditor	..... Moving Picture Operator
..... Business Manager	..... Steam Engineer
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.....Reclamation Engineer	.....College Preparatory

NAME.....

ADDRESS.....

OCCUPATION.....

Nat'l Builder 3-'11

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

This Is To Certify

that I have sharpened thirty-five (35) hand saws with one E. C. S. Keen Kutter Special Slim Taper file.

I have sharpened as many as 15 or 20 a number of times.

ROB'T MCDONOUGH,
Contractor and Builder,
Mexico, Mo.

E. C. SIMMONS KEEN KUTTER TRADE ST. LOUIS MARK U.S.A.



Sample free upon request

E. C. S. KEEN KUTTER
Special Slim Taper Files

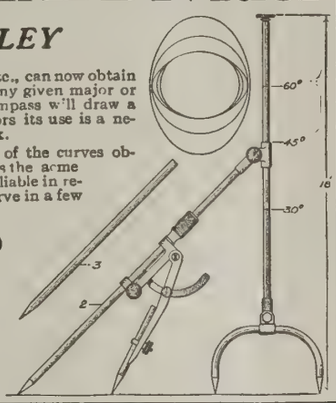
go clear to the bottom of the tooth. Slimmer than any others, and shaped for easy filing. Cut accurately by modern improved machinery. Tempered by natural gas, which gives them a peculiar hardness and toughness. If not at your dealer's, write us for free sample.

SIMMONS HARDWARE COMPANY (INC.)
ST. LOUIS AND NEW YORK, U. S. A.

A Wonderful New Ellipsograph and Divider
—called the KELLEY

Draftsmen, Pattern-makers, Mechanics, etc., can now obtain an instrument which will draw an ellipse of any given major or minor axis, just as readily as an ordinary compass will draw a circle. For carpenters, builders and contractors its use is a necessity for saving time and doing perfect work.

Illustration shows the machine and a few of the curves obtainable with the KELLEY Ellipsograph. It is the acme of simplicity in operation and is absolutely reliable in results. It can be adjusted for any ellipse or curve in a few seconds and is readily understood by anyone.



Price Complete $3.00

We positively guarantee satisfaction. Send $3.00 for this unique instrument and we will send one by return and pay charges. It will pay for itself in a saving of time, labor and worry.

J. T. KELLEY
WEST RUSH, N. Y.

STANDARD HANDBOOK OF ESTIMATING DATA

Every man in the building trade needs it.

READ WHAT OTHERS SAY:

It is a very handy book, not only valuable but comprehensive.

I think it the nearest correct, and the shortest cut to business, the busy man has yet found.

It fills a place that has been wanted for years.

Your Standard Handbook is the best book of its kind ever written.

For all the 30 years I have spent in estimating and building I would not be without it for twice the cost.

Just what I want and well worth the money. Thank you for calling my attention to it.

PRICE, ONE DOLLAR

THE BUILDERS' AUXILIARY COMPANY; 325 Old South Bldg., BOSTON, MASS.

Ask for particulars of the "*Builders' Auxiliary*," the latest and most efficient system of *estimating* and *cost accounting* for building contractors.

The VOLTZ UNIVERSAL SASH BAR



Makes any angle, allows for settling of building—keeps windows from frosting. The mostbeautiful,practical and durable bar in the world. Made in metal.

"Holds with a grip of iron, yet with a touch of velvet." Glass set from the outside. More good features explained in our catalog—it's fine—send for a copy before you build or repair. Write today.

VOLTZ MFG. CO.
1101-1103 S. 8th Street, :: St. Joseph, Mo.

PERFECT COLUMNS

THEY NEED NO ARGUMENT

CUNNIUS PATENT

EXAMINE THE CONSTRUCTION

PATD OCT 27 1908

STEEL BOUND

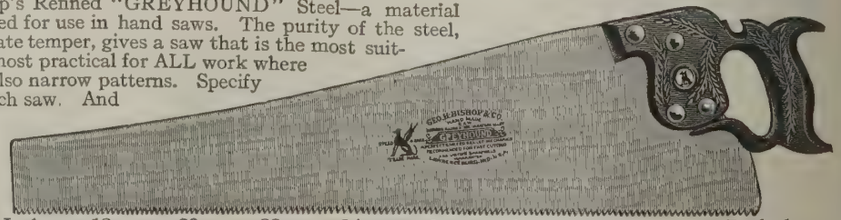
Made in All Kinds of Wood, Any Size
Do Not Open or Crack
For information and prices write
CALVIN CUNNIUS, Long Branch, N. J.

GREYHOUND HAND SAWS

SPEED & EASE
TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. **This saw will be imitated by others—but not equalled.**

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



THE PULLMAN SASH BALANCE

Fits Where Nothing Else Will

INVESTIGATE the PULLMAN! It will be a time and money saver for you on many jobs where you cannot use the old style cord and weights.

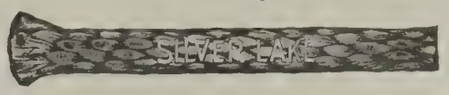
The most modern new work calls for PULLMAN Sash Balances in *all* windows, for they are absolutely reliable, never wear out or get out of order. All dealers sell them.

CIRCULAR ON REQUEST

PULLMAN MFG. CO., 10 Allen St., Rochester, N. Y.

WHEN YOU GET TO **SASH CORD** USE **SILVER LAKE**

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

Was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D.R.BARTON 1832. ROCHESTER.N.Y.

MACK & CO., Sole Makers

Brown's Race Rochester, N. Y.



BAY STATE

Brick and Cement Coating

Is a sure protection to concrete against dampness. It also can be used on stucco and brick where tints are desired.

It does not destroy the desirable texture of either concrete or stucco and is weather proof and has great resisting qualities to acid.

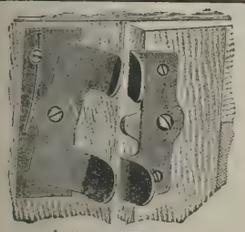
Architects, contractors and engineers everywhere are specifying it.

Address for a book which gives full particulars and shows the class of construction on which it is used, Dept. 12.

Wadsworth, Howland & Co. Inc.

Paint and Varnish Makers and Lead Corroders

82-84 Washington Street Boston, Mass.



Screen Door

THE SENSIBLE SCREEN DOOR CATCH

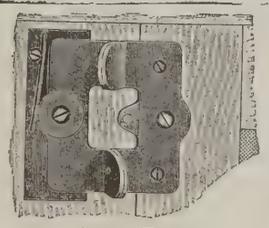
A New Idea

The Sensible is the Catch that catches securely but quietly—prevents the door from warping, keeps out the flies, and reduces the noise of slamming to the minimum. Note the simple adjustment. Illustrations in this advertisement show catch one-third of actual size. Write for prices. Sample set mailed upon receipt of 25 cents.

MANUFACTURED BY

R. G. Winter Manufacturing Co.

2104 Vliet Street, : : MILWAUKEE, WIS.



Screen Door

CONCRETE MACHINERY

The greatest mixer made All kinds of styles of the latest cement block and brick machines and molders from $5 and up; in fact WE MAKE EVERYTHING IN CONCRETE MACHINERY low prices but high grade) GET CATALOG N. FREE.

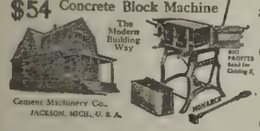
SYSTEMATIC CONCRETE MIXER

28 ADVANTAGES



CEMENT MACHINERY COMPANY

$54 Concrete Block Machine



CEMENT IS CHEAP—BIG PROFITS

making concrete products and building sidewalks Get a mixer. Get started. Prospects brighter than ever; things are going to boom in the cement industry. Get free Catalog "N."

CEMENT MACHINERY CO., Jackson, Michigan

LOW FREIGHT RATES

On Machinery and Household Effects

That's what we can offer SHIPPERS from points east of the Mississippi River destined to Interior and Pacific Coast Points by our plan of shipping in CARLOAD LOTS. Latest maps of any principal western state free on application by addressing Forwarding Department of the

TRANS-CONTINENTAL FREIGHT CO.

215 DEARBORN STREET, CHICAGO

29 Broadway, New York
625 3rd Street, San Francisco

322 West Sixth Street, Los Angeles
305 Main Street, Seattle

MIRACLE CONCRETE



MIRACLE MOLDS

have revolutionized pipe making. Cement pipe can be made for one-third the cost of clay.

24" concrete pipe costs 35c per foot to make.

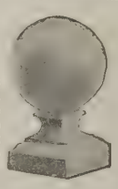
24" clay pipe sells for $1.25 per foot.

An outfit for making 24" cement pipe costs $50.00, other sizes in proportion.

Every size profitable.

ORNAMENTAL CONCRETE

Molds for Lawn Vases porch columns and balusters -- also fence decorations, make up a part of the equipment of every concrete worker.





$1.50 is the cost of a concrete Lawn Vase that sells for $10.00, easily meeting the competition of iron vases of $20.00 and $25.00.

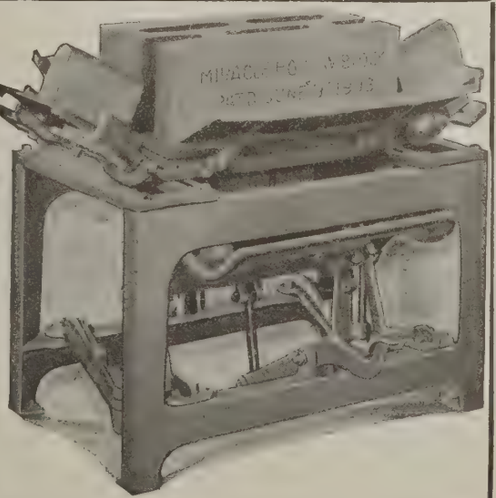
Special ornamental mold circular enclosed in every catalog.

MIRACLE BLOCK

Its distinctive feature is the two overlapping rows of air spaces, which make it the only one piece frost and moisture proof block on the market.

Handsome residences and garages, substantial factories, barns, stores, and public buildings erected with it. Block Machine is automatic, rapid and adjustable.

Exclusive protection given with each machine.



Big 128 page illustrated catalog free to those interested in the cement business.

MARSH COMPANY

974 Old Colony Bldg., CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

U. S. Standard Cement Mixers and Block Machines

ARE THE STRONGEST, LONGEST AND EASIEST WORKERS ON THE JOB



U. S. Standard Junior Block Machine.

OUR **U. S. Standard** Junior and Senior Block Machines are both built upon the same basic principles, the former building a 16″, the latter a 24″ long block and all fractional lengths thereof. Both of these machines build hollow blocks 6″, 8″, 10″ and 12″ thick and veneer blocks 3″, 4″, 5″ and 6″ thick. The equipment also provides plates for circular blocks, angle blocks of any desired angles, porch pier blocks, chimney blocks, etc. These machines are capable of producing a greater variety of styles and sizes of blocks without additional investment than any other machine made, and for simplicity, speed, completeness, strength and beauty of blocks cannot be equalled.

THE **U. S. Standard** are continuous mixers. The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically. With the **U. S. Standard** measuring is positive, and does not vary with coarse or fine, wet or dry ingredients.

SPECIAL FEATURES—Accuracy in measuring, correctness in proportioning and thoroughness in mixing the ingredients. All these operations are automatic and absolutely reliable. Detailed information will be furnished upon application for our Catalog No. B.



Senior No. A

THE ASHLAND STEEL RANGE & MFG. CO. ASHLAND, OHIO

Got Any Bars to Bend?

Then you want an "ACME" —of— course

Use it once and you'll never look at any other



Patented

Clamp bears on bar 7 inches. Can't slip. Cast steel base. Nothing to wear.

WITH OUR "ACME" BAR-BENDER

ONE MAN can bend 1¼ in. bar cold. Cannot slip. Not a loose part on it. Most powerful, simplest and all-around valuable bender on the market.

HOW ABOUT METAL LATH?

or REINFORCING STEEL? We sell the best only.

Can't you make use of our expert ENGINEERING STAFF? Others do. We furnish absolutely reliable engineering counsel—make plans, give details, guarantee accuracy, and help you in many valuable ways. NO CHARGE to our customers. Better look this up.

WHAT ARE YOUR BEAD NEEDS?

Our "C. B. S." MAHONING Bead is the best and cheapest bead made for erecting on wood. No clips required. Perfect reinforcement for plaster angles. Clips furnished where required for brick or tile work.

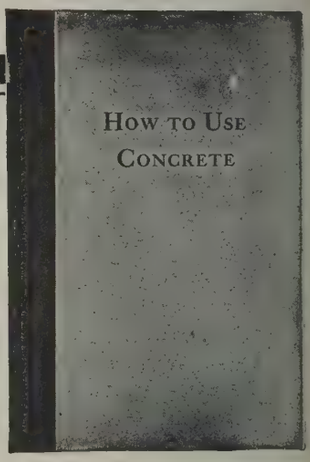
"THE CONTRACTOR'S DEPARTMENT STORE"

Write for Catalog Right Now

CHICAGO BUILDERS' SPECIALTIES CO.

MAIN OFFICE: 456 OLD COLONY BLDG., CHICAGO
BRANCH OFFICE: 900 LINCOLN BANK BLDG., LOUISVILLE
EASTERN AGENTS: Wiener Machinery Co., 50 Church St., NEW YORK

HOW TO USE CONCRETE



Price $1.00

Every carpenter, builder and contractor should have this book. Over 240 pages telling how to make concrete steps, walks, balusters, laundry tubs, vases, porch columns, wainscoting, blocks, tile, brick, etc. Full instructions for making molds, proportioning mixtures and placing the concrete.

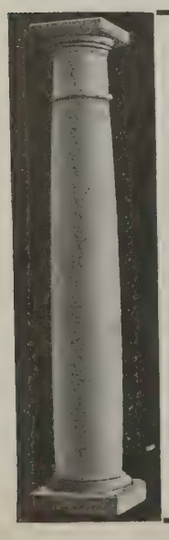
WRITTEN IN PLAIN ENGLISH

This is a book for the man who works with his hands. The instructions are clearly given and illustrated with a hundred diagrams and pictures. The book is printed in large clear type on fine paper. Bound in cement-colored cloth.

One Dollar per copy. *We pay the express.*

CONCRETE PUBLISHING CO.

501 Owen Bldg. DETROIT, MICH.



Hoosier Colonial Porch Columns

Sell for $3.50 to $6.00 Each

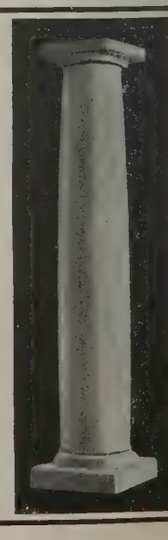
It takes TWO BUCKETS of cement, and FIVE BUCKETS of sand and one hour's time to make one of these beautiful COLONIAL COLUMNS. FIGURE IT OUT YOURSELF. Don't cost over a dollar, does it? And there's a big profit for you at $3.50 to $6.00 each. If made of white sand and white cement they look like cut stone or marble.

THE "HOOSIER" COLUMN MOLD

is the only mold making a one-piece column with top and base complete. Has no flutes or sections to cause imperfections. Height 54 and 60 inches; top 9½ inches square, base 11¾ inches square, diameter 9 inches. Will also make half round columns to fit up against the building at the ends of the porch. Capacity two to three columns per day. We also sell the

"LITTLE GIANT" BRICK MACHINE

Over 6000 in use. Rapidly displacing all others everywhere. Write for Catalogues N and get busy. See us at Chicago Cement Show, Booth 276



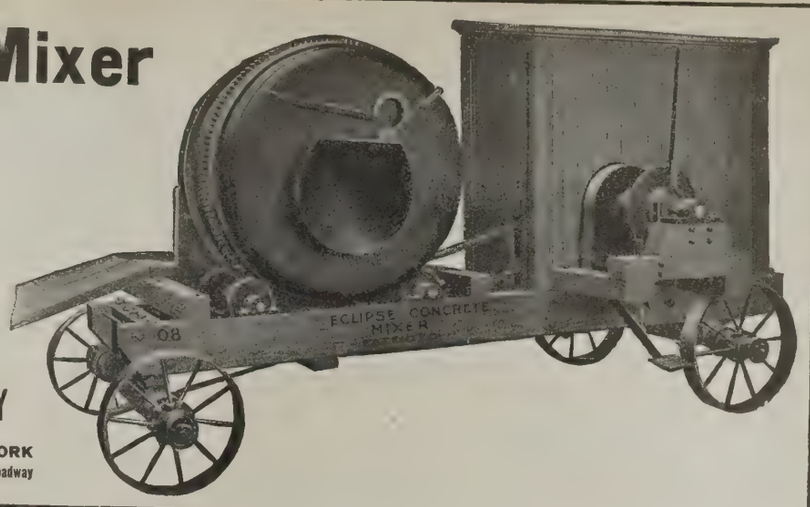
THE HOOSIER MFG. CO. Dept. B Goshen, Indiana

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Eclipse Concrete Mixer
WITH HOIST

Get two machines in one.
Can be operated together or separate—
Gasoline Engine or Steam Power.
Saves labor. Increases progress.
All sizes. Many styles.

Write for Catalogue No. 32 and letters from users



THE STANDARD SCALE AND SUPPLY COMPANY

CHICAGO 1345-1347 Wabash Ave. | PITTSBURG 243-245 Water St. | PHILADELPHIA 35 So. 4th St. | NEW YORK 136 W. Broadway

HOW ARE YOU?

Are you making any money in your Concrete business, or do you have trouble from want of information on best methods? If you need any advice on any Concrete job, write me, tell me what you are up against, as I have been working in concrete since 1873 and should know something about the business by this time, and most likely can help you. If I cannot, I will tell you so. My charges for water-proofing formula are $2.00, or for other information, unless for large work that requires more attention. Reasonable charges for large operations. Special information on constructing dams, water works wells, method of sinking large wells and foundations in soft earth or water, Iron reinforced Concrete construction, Terazzo floors and engineering difficulties, working concrete in freezing weather, under cut work, elastic moulds for making statuary, making moulds for garden vases and getting up the patterns.

I conduct a correspondence course in Concrete by mail for a limited number of pupils for $20.00, which includes my water-proofing formulas, coloring and compound for making blocks harder after made. Get your information from one who has done the actual WORK. You will save the price of a course on your first job. Address

G. O. SANDERS, CONCRETE ENGINEER AND CONTRACTOR
89 Gainsboro Street, BOSTON, MASS.

KEEP OUT DAMPNESS
PAINT YOUR CONCRETE BUILDINGS WITH

R. I. W. PAINT
"Remember It's Waterproof"

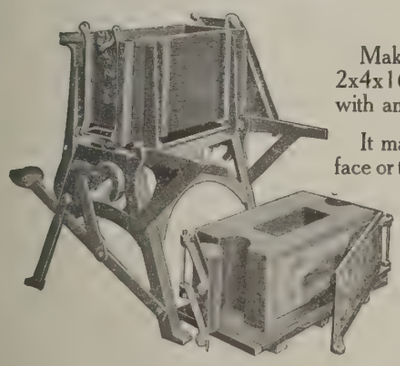
Sold in Barrels, $1.25 per gallon; 5 gallon cans at $1.35 per gallon, 2-gallon can $1.50 per gallon, all F. O. B. Chicago

PROOF AGAINST WATER, ACID, FUMES or ALKALI

Special Elastic Compound for Each Specific Purpose

THE GARDEN CITY SAND CO.
709-711 Chamber of Commerce, Chicago

An Emergency Machine And Well Prove What We Say



Makes any size block from 2x4x16 to 8x12x20 inches, with any design.

It makes face down, side face or two piece wall blocks.

It makes better blocks with less cement and no blocks are cracked or have chipped or broken edges and we will prove what we say.

We will ship the machine on a 15 days free trial and you can see with your own eyes whether it has all the merits we claim.

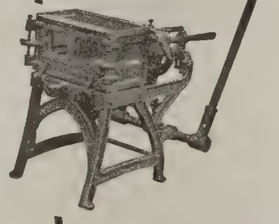
Send for a catalogue, it describes the machine in every detail; it shows all the face designs that go with it and it shows what is possible to do with this machine what it is possible to do with no other.

Send Tonight Without Fail

W. E. Dunn Mfg. Co.
4135 FILLMORE ST. CHICAGO, ILL.

Ideal Concrete Machinery and the Tycrete Process

Ideal Model 1 Block Machine



The SENSATION of the Cement Shows

Afford You Limitless Opportunity for Profit

The immense crowds that surged up and down the aisles of the New York and Chicago Cement Shows gazed longest and marveled most at the exhibit of **Ideal Machines** and the beautiful Tycrete Concrete stone which these had produced in an almost endless variety of finish and artistic coloring.

Architects, contractors, building supply dealers, leading business men, people who are planning homes of their own, and those who came from mere curiosity—all were amazed at the wonderful development of the industry as embodied in the Ideal exhibit, and awoke to these facts:



First The **Ideal Line of Concrete Machinery** has outdistanced all competing lines—it alone has kept abreast and ahead of the phenomenal development of the concrete industry.

Second: The **Tycrete Process**—the wonderful concentrated Compound and Colors by which dense, indestructible, waterproof Tycrete Blocks and Dimension Stone is produced in a variety of coloring, providing limitless possibilities of artistic expression—is bound to revolutionize this industry.

If you want to make the most money in the concrete business, get Ideal equipment. Send us your address today and let us send you full information about Ideal Concrete machinery and how you can secure this wonderful Tycrete process.

Ideal Power Tamper

Ideal Concrete Machinery Co.
421 Emerick St., South Bend, Ind.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

$UCCESSFUL DRAFTSMEN$

DRAW GOOD PLANS AND DRAW GOOD MONEY

Draftsmen Drawing $125-150 Monthly

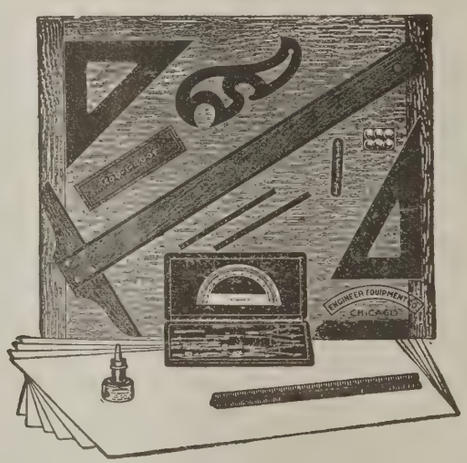
Are NOT MADE in Schoolrooms,
Are NOT MADE by reading books,
Are NOT MADE by making Copies,
Are NOT MADE at home drawing pictures, from printed book lessons.

LET ME TELL YOU:

It requires actual, practical, up-to-date DRAFTING-ROOM WORK to train YOU to gain the PRACTICAL EXPERIENCE that your employer will demand of you.

FREE

This $13.85 DRAWING OUTFIT and Free Position





Chief Draftsman



Chief Draftsman

As Chief Draftsman of Engineering firm I know exactly the Quality and Quantity of PRACTICAL training, knowledge and actual up-to-date experience (not school knowledge) you must have, in order to obtain a good position and advance to highest salary.

I give **INSTRUCTION UNTIL COMPETENT and PLACED in POSITION at above Salary.**

DON'T waste TIME and MONEY trying to learn from books or printed "STUFF"—you can only learn on PRACTICAL WORK which I furnish you. **Write me at once—TODAY.**

F. B. DOBE
Chief Draftsman, Div. 6,
Eng's Equip't Co. (Inc.,) Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"INTEGRITY"

The only foundation upon which the commercial institutions of today can hope for success

The "INTEGRITY" of our Wonderful Money Saving opportunities are unquestioned

AN INQUIRY WILL PROVE THE TRUTH OF OUR STATEMENTS. WRITE TODAY

LUMBER
ROOFING
HARDWARE

OUR STOCK includes practically everything under the sun. Millions of dollars worth of brand new high grade merchandise bought by us at various sales is offered to the public at prices usually less than the original cost of production. We offer an exceptional opportunity to those who buy now, so send us a trial order. This will convince you.

SAVE 30 TO 50% Get our prices on Lumber, Roofing, Tanks, Pipes, Plumbing and Heating Goods. Our catalog shows over 50,000 bargains, in almost everything you use or buy daily. You need this catalog.

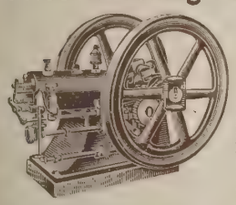
PLUMBING
HEATING
WATER SYSTEM

GASOLINE ENGINES

Equip Your Carpenter Shop with the Most Economical Power Known to Modern Science

The latest and most modern types ever placed before the buying public. Economical both in *price* and *consumption* of fuel. Will produce more *horse power* for *every gallon of gasoline used* than any other Engines in the market today. Brand new direct from factory.

Price Wrecking Bargain 8 and 12 H. P. ENGINE. **only $200**

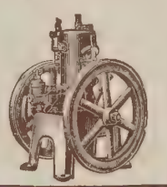


We are willing to have our Superior Heavy Duty Gasoline Engines compared with any on the market no matter what the price. Built with the greatest care and every mechanical detail is carefully provided for. Best Engine for all around work on the farm and in the factory. Most popular Engine we handle, powerful and reliable, made for heavy work and continuous service. The 8 horse power is large enough for the ordinary work on the farm, also for elevators, factories, etc. The 12 horse power we recommend for small threshers, silo fodder cutters, etc.

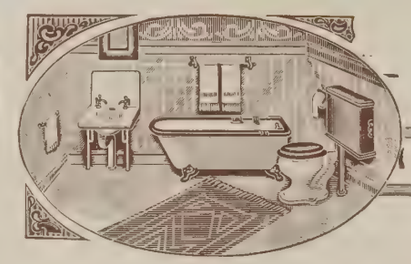
30 DAYS' FREE TRIAL AT OUR EXPENSE

Our Guarantee Protects You

2 and 4 H. P. Engine **$36.00**



PLUMBING & HEATING



Complete Bathroom Outfit As Illustrated Only **$37.50**

GUARANTEED

Price Wrecking Opportunities

To obtain high grade, brand new Plumbing Material at prices that mean a Positive Saving of at least One-half. We can equip the Home, Factory or any Public Building throughout with a Plumbing and Water System that we will guarantee to be as good as you can purchase anywhere in the land. Send for our "Plumbing Catalog," filled with valuable information, and authority on perfect sanitation, FREE UPON REQUEST.

MODERN HEATING SYSTEMS

In offering to the public our **"PERFECTION BOILER AND HEATING SYSTEM"**

We are confident that we have reached the ACME OF PERFECTION and have solved the question of Heating your Home or Factory for all time to come. Our Heating Systems are the result of tests, experiments and scientific research conducted by expert Heating Engineers and we guarantee them to



HEAT YOUR BUILDING

That is what you want and are paying for.

We operate our own factory and are thus able to save you the retailer's profit and quote prices that mean an enormous saving to you.

Send us a plan or diagram of your building and let us make you an estimate.

Fill out the Coupon below and send for our Heating Book; it will give you valuable information and SAVE YOU MONEY.



RAWHIDE ROOFING



The Greatest Bargain in the world. Fire, rain and weather proof. Not affected by heat or cold. Used in any climate. Made from pure asphalt. A strictly high-grade, lasting covering. **Recommended** by fire underwriters. **108 sq. ft. to a roll,** with large headed nails and cement for laps. Requires no coating. Sample free.

Send for Roofing Booklet

1 ply guar. 6 yrs., $1.22 per roll
2 " " 9 " 1.49 " "
3 " " 12 " 1.71 " "

At above prices, freight prepaid to Ill., Ind., Ia., Ohio, Wis. and Mich. Write for prices prepaid to other states.

STEEL ROOFING PER 100 FEET, $1.60



100,000 squares of New Steel Roofing which we are selling at the following prices, freight prepaid:

Flat $1.60
Corrugated, V Crimped or Standing Seam $1.85

At these prices we prepay freight to all points east of Colorado except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at pricesr anging from $3.00 per square up. Write today for free sample and Great Book on Roofing.

CEMENT BUILDING BLOCK MACHINE



$13.85 For a first-class, practical cement building block machine. Blocks 8x8x16 in. You can make whole, half and quarter blocks. Turns out 100 blocks a day. We can supply you complete equipment for making cement blocks and other concrete products. Write us.

SAVE 30 PER CENT IN NEW HARDWARE



Wilmette Design Inside Door Lock Sets; Lot No. 4-A-1608. 2000 sets as illustrated. Wrought steel, antique copper finish, plated front mortise locks 3¾x3½, one plated key, one pair knobs two escutcheons, packed complete with screws. Per set $0.47
Per dozen $5.20

Lot No. 4-A-1604. Wilmette Wrought Steel, Copper Finish Front Door Sets.
Complete, per set $1.40

Lot No. 4-A-699. Upright Rim Knob Locks, japanned, complete as illustrated and shown, Each ..... $0.10 Per dozen $1.10



Lot No. 4-A-706. Mortise Door Locks. Japanned, complete as shown. Each $0.25
Per dozen 2.75



Lot No. 4-A-719. Wrought Steel, ball tipped, loose pin butts, copper finish, complete with screws, 3x3, 16c, 3½x3½, 17c. 4x4, 21c per pair.



Lot No. 4-A-753. Sash Locks, copper finish. Each $0.05
Per dozen ..... .48



STRUCTURAL STEEL BARGAINS

Over 10,000 tons of plain and fabricated steel and Builders' Iron Work in stock for immediate delivery. We save you 20 to 40 per cent on Structural Steel work of every description, also Builders' Iron Work. Write for copy of our Great Book, "Structural Steel News." Send us a list of your wants for prices.

STRUCTURAL STEEL SHAPES

STEEL "I" BEAMS



Illustration shows "I" Beams which are made in standard sizes ranging from 3 to 24 inches high.

STEEL ANGLES

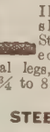
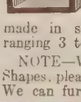


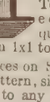
Illustration shows Angle Steel, made with equal and unequal legs, ranging from ¾x¾ to 8x8 inches.

STEEL CHANNELS



Cut shows Steel Channels which are made in standard sizes, ranging 3 to 15 in. high.

STEEL TEES



Cut shows Steel Tees made with equal and unequallegs, ranging from 1x1 to 1x4 inches.

NOTE—When writing for prices on Structural Steel Shapes, please state quantity, pattern, sizes and lengths We can furnish all shapes cut to any length desired.

FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:

I saw your advertisement in Feb., 1911, National Builder. I am interested in the following items: 833

_____

_____

_____

Do You Want Free Mammoth Catalog? _____ Do You Want Free "Book of Plans"? _____

Do You Want Free Roofing Book? _____ Do You Want Free Plumb. and Heating Book? _____

My Name _____

Town _____

R. F. D. _____ P. O. Box _____

County _____ State _____

FREE VALUABLE BOOKS FOR SHREWD BUYERS

MAIL COUPON AND MARK BOOKS YOU NEED

"PRICE WRECKING" CATALOG

A Book containing 1000 pages, profusely illustrated, of over **50,000 Bargains,** in almost everything needed for the farm, factory, field or office. A demonstration of what the Chicago House Wrecking Co. stands for as a bargain center. It's such a book as every buyer of merchandise must have in his or her possession. Cost $1.00 to produce but sent free upon receipt of coupon shown elsewhere on this page.



OUR BOOK OF PLANS

This is the handsomest **illustrated book of designs of over 100 Bungalows, Houses and Barns** ever produced. It contains the productions of Photos and is true to life in every way. Also a very **valuable book for carpenters, contractors or builders.** Sent to you absolutely free. Fill out coupon shown at the left.



ROOFING BOOK

The greatest book on roofing ever printed. Tells you how to lay all styles of roofing, quotes you money saving prices so that you can buy roofing and save 30 to 70 per cent. Write for copy today.



COLD WEATHER COMFORT

A practical treatise on Plumbing and Heating. Explains in detail how you can buy a complete Plumbing or Heating plant from us and easily save 50 per cent. Also quotes Greenhouse Heating plants at extremely low prices. Do not fail to send for copy at once.

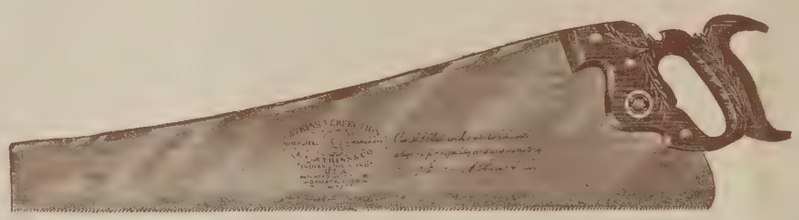


CHICAGO HOUSE WRECKING COMPANY 35TH & IRON STS. CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ATKINS SILVER STEEL SAWS

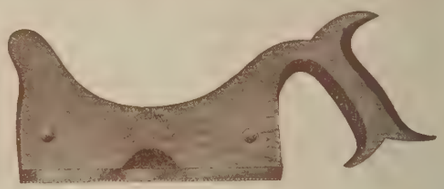
WE HAVE said a great deal about ATKINS SILVER STEEL HAND SAWS. We have told you how they are made and what splendid service they are giving others and what they will do for you. Now, we want to show you a few pictures taken from photographs of the Saws themselves, because we know you will be interested. We can't show you the whole line, for we make hundreds of different kinds of SILVER STEEL SAWS for all purposes.



But look at this Hand Saw. Ain't she a beauty? Is there not something distinctive and individual about it? Look at its graceful lines and the finish and the perfection hardwood handle. Does it not look like a Saw that would give results? This is our No. 53 and it comes in all sizes and points. There are a number of other patterns, styles and finishes, many of which are described in our Saw Sense Book.



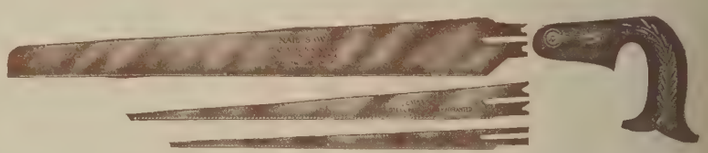
Here is one of our finest Back Saws. Does it not look as though it would do the business? The blade is of SILVER STEEL and will, therefore, run a long time without filing the little fine teeth. The back is of heavy stiff steel and clamps the blade like a vise. The handle is of applewood, easy grip pattern. We make several styles of Back and Mitre Saws.



This Stairbuilders' Saw is a mighty handy tool. The blade may be regulated so as to cut any depth, assuring absolute uniformity.



This is one of our most popular styles of Compass Saw. We call it our No. 2. The blade is of SILVER STEEL and is, therefore, very hard and tough, but not brittle and it is difficult to twist these blades out of shape. The handle is of carved and polished applewood.



This is our No. 3 Nest of Saws with Nail Cutting Blade. They are indispensable to every carpenter. The set consists of a Compass and Keyhole blade, together with a hardened steel metal cutting blade, all of which attach to an adjustable handle. The next time you need a Compass or a keyhole Saw, you had better pay a little more for the No. 3 Nest and thus secure the advantages of the Nail Cutting Blade.

Atkins Always Ahead

HOW TO BUY THEM

ATKINS SILVER STEEL SAWS are for sale by most first-class Hardware Dealers, but if your dealer does not sell them regularly, he will be glad to order for you from his wholesale house. If you have any difficulty in getting them in this way, please let us have your dealer's name and we will see that you are taken care of.

OUR FREE OFFER We are still compiling our list of carpenters and if you will send us ten cents to pay postage, we will forward with our compliments, a fine strong nail apron, together with our Saw Sense Book or Carpenter's Catalog, our monthly time book with scale of wages and some mighty interesting information in regard to High Grade Saws. Write to-day and secure this valuable package

E. C. ATKINS & CO., Inc. The Silver Steel Saw People **Indianapolis, Ind.**

MORE COPIES
PRINTED AND CIRCULATED THAN ANY BUILDING PAPER IN AMERICA.

THE NATIONAL BUILDER







PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

Amboy Minn
Feb 24 1911

Dear Sirs Please send me some of your saw filing hints and a catalog showing some of your products.
P.S.
I sent to Germany for one of the best saws they could get and when it came it had [illegible] Laws on it Then I laughed

S.O. Wiehl
Amboy Minn

AUGER BIT ESSENTIALS

The Sixth Feature which places



RUSSELL JENNINGS BITS

in a class by themselves, is the

CLEARANCES



It is the correctly formed clearances that enable the carpenter having a Russell Jennings bit to bore a smoother hole, bore it easier than with any other bit, and bore it more accurately as to size. The painstaking care put into the formation of clearances is returned a hundred fold to the user of our bits.

Our Standard auger bits and our quick-boring bits are put up in SETS of 32½ quarters, 13 bits, 4-16 to 16-16. A finely finished hardwood tool box or canvas roll is furnished with each set. The boxes are never sold separate from the bits.

OTHER SETS

22½ qrs.	11 bits
20½ qrs.	9 bits
18 qrs.	9 bits
17½ qrs.	7 bits

RUSSELL JENNINGS MFG. CO.

CHESTER, CONN., U. S. A.

21-29



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

FOR WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut at the factory into 4x4 ft. sheets, which are easily and quickly nailed to studding, ready for immediate application of wall paper, paint, burlap, or other decoration.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary, and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

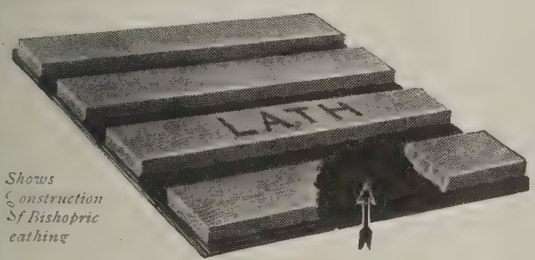
Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



Shows Construction of Bishopric Sheathing

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bisnopric Sheathing 1,000 square feet covers 1,000 square feet of space.

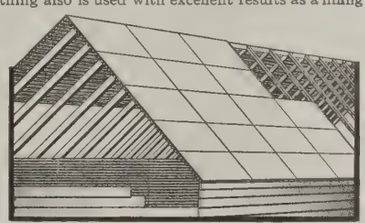
In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

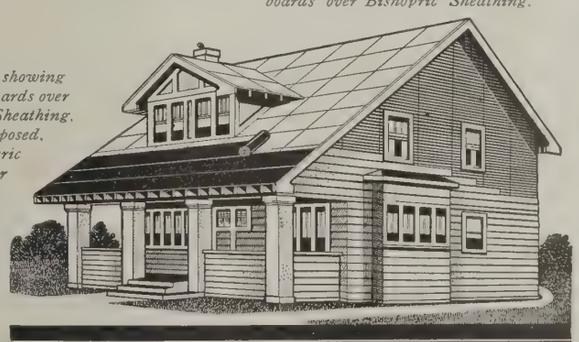
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

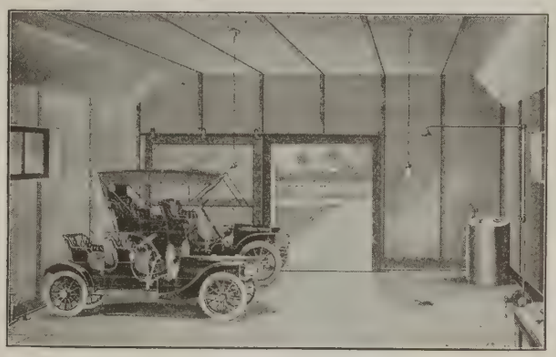
The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UTILITY WALL BOARD

A Fibrous Water-Proof Board Made in Convenient Widths and Lengths

To be Used Instead of Lath and Plaster in New Building or Repair Work



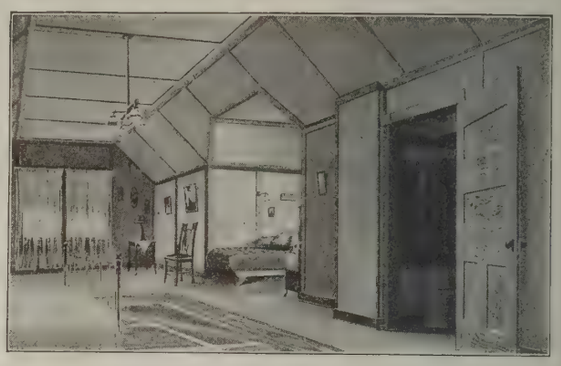
Make your Garage Warm by Lining with UTILITY Wall Board

Mr. Contractor

This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern building material.



This shows how an Attic looks after being finished with UTILITY Wall Board.

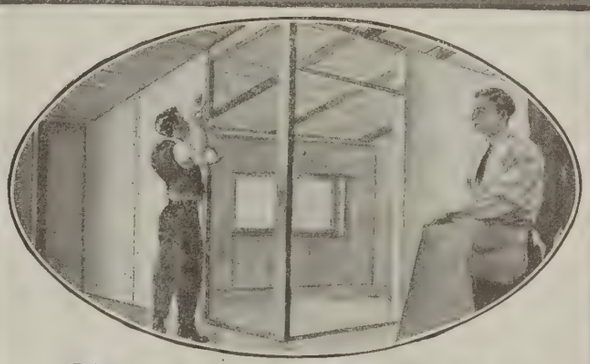
Utility Wall Board is better than lath and plaster. It saves the user a lot of money besides giving him a handsome, durable job. Utility Wall Board can be painted and decorated with the finest results. Utility Wall Board is being used in both small and large buildings. Everyone likes it.



Utility Wall Board can be applied by the carpenter—nailed right to the studs—easy and clean to handle—cuts with a saw—fits any space and can be put on in winter or summer—no waiting for plaster to dry—no cracked walls—no dirt—no ruined decorations—warm in winter and cool in summer

Write Now for FREE Sample and Prices

THE HEPPES COMPANY, 4502 Fillmore Street, Chicago, Ill.



Compo-Board

For Walls, Ceilings and Partitions

It is a modern wall lining. Moisture proof, fire resisting, warm in winter and cool in summer.

Better than lath and plaster in every way. More durable—will last as long as the building. Will not crack, crumble or fall off.

Compo-Board can be put on quickly and cleaply in any weather, and can be used in any climate.

Compo-Board is made of strips of thoroughly dried lumber, matched together and well glued. These strips are tnen covered on both sides with a specially prepared moisture proof paper, which is cemented on in intense heat and under heavy pressure.

Comes in strips four feet wide and one to 18 feet long, any length you want in even feet.

Compo-Board can be used in many different ways around the house, in the factory or office, in the cottage at the lake, and in the barn and chicken house.

SEND FOR SAMPLE AND BOOKLET

See what Compo-Board is and learn its many uses and advantages.

NORTHWESTERN COMPO-BOARD CO.

5776 Lyndale Ave. No. MINNEAPOLIS, MINN.

(The border of this advertisement is a cross section view of Compo Board.)

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

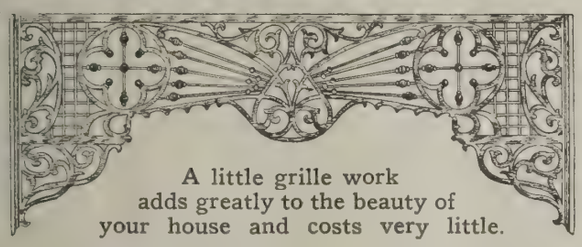
CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

CHICAGO GRILLE WORKS

1892 1911

WHY NOT?



A little grille work adds greatly to the beauty of your house and costs very little.

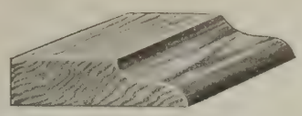
Try the **manufacturer** with your next order of Grille Work Colonnades, Consoles and Interior Columns. You may be agreeably surprised with prices and promptness in shipment. **Why not** send us your next order? We have thousands of well pleased customers; if you are not one of them, **why not** write today for our **Catalog No. Nineteen** and find out what we have to offer you in the way of interior decoration? Every dollar spent with us adds five to the value of your home.

828-838 Wells Street, Chicago, Ill.

Write for Our New Catalog—Mailed Free

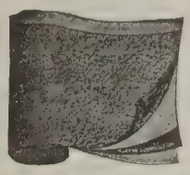


WINDOWS—42c and up



WINDOW BEAD—Best Yellow Pine, 27c per 100 lin. ft.

Quality Guaranteed



ROOFINGS—64c and up

Prompt Shipment Guaranteed



STAIR NEWELS $1.50 and up



DOORS—80c and up

INVESTIGATE

before you buy

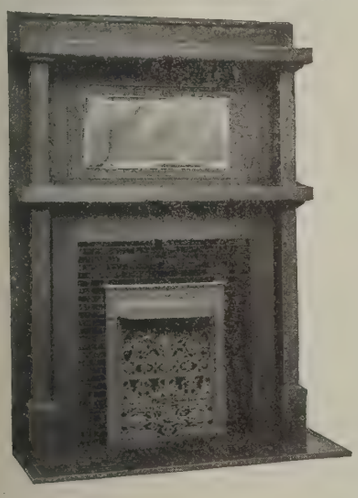
and you will find we can save you lots of money on anything in the line of **HIGH GRADE** sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

Our New Catalog Mailed Free Will Convince



PORCH NEWELS 42c and up

The Huber Builders Material Co.
39-43 Vine St. CINCINNATI, O.



$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

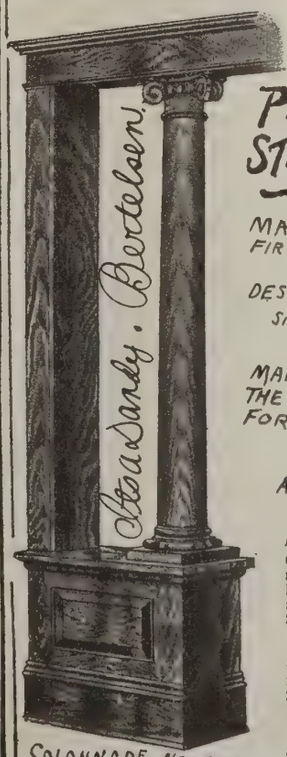
are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

$8.50 FOR THIS COLONNADE



COLONNADE NO. 1-2

A VERY LOW PRICE FOR THIS STRICKING NEW COLONNADE

MATERIALS AND WORKMANSHIP FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUDED
MADE FOR 5 3/4-INCH JAMBS
MADE IN OAK OR YELLOW PINE, IN THE WHITE, HAND SMOOTHED, READY FOR FINISHING.

PRICES
ANY HEIGHT NOT OVER 9 FEET.

Style No. 1-2 EACH **$8.50**
Columns are 6 inches in diameter, tapering to receive 5-inch compo. cap, pedestals are 20 inches high over all and the width is 24 inches over all, and when set in to receive casings extension from jamb is 18 inches. Top shelf is 10 in. wide.

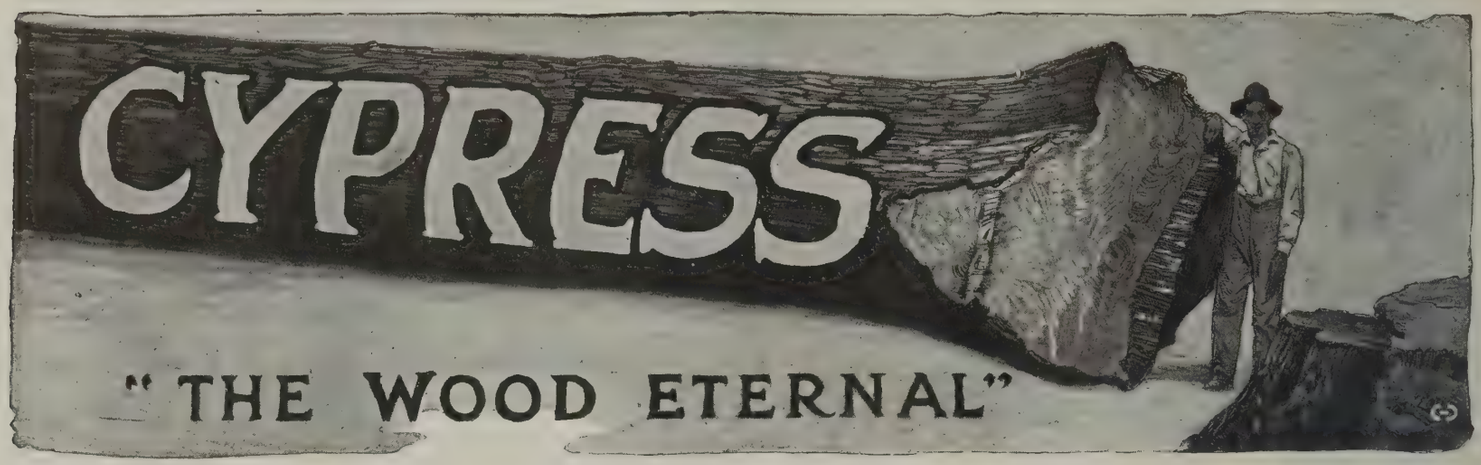
Style No. 2-2 EACH **$9.00**
Same measurements as above, only pedestals are 30 inches wide over all and when set in to receive casings extension from jamb is 24 inches.

SEND YOUR ORDER NOW, DONT LET IT GET AWAY FROM YOU.

BERTELSEN ADJUSTABLE GRILLE CO. 619 S. CLINTON ST. CHICAGO.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BOOST YOUR OWN REPUTATION, MR. CONTRACTOR, BY TELLING YOUR CUSTOMERS—"PUT A STOP TO DEPRECIATION—BUILD WITH CYPRESS *AT FIRST*"



IS THE "LIFE-SAVER" of an HONEST CONTRACTOR'S REPUTATION

Here is a letter just received from a builder who **knows** by experience. Probably you feel the same way. Why not **CUT OUT TROUBLE?**

——— — ——— **Contractor and Builder,** — ——— **Street,**

PITTSBURG, PA., Mar. 22, 1911.

Southern Cypress Manufacturers' Association, New Orleans, La.

Gentlemen: Please send me information about Cypress lumber. Have about a dozen frame houses, from two to 16 years old, which I never get through repairing. Window frames, sash, siding, sills, etc., become rotten in a few years, and *the contractor gets a bad name* (as if it was his fault!)

Yours respectfully, ——— ———

This is a bona fide letter—"hot off the bat." The facts are all too true. HE WILL BE A CYPRESS MAN FOREVER. HOW ABOUT **YOU?**

We say it again—that by honest and intelligent advice on **woods** we are not only saving losses to people who are going to **build anyhow**—but we are also

CAUSING MORE PEOPLE TO BUILD

This is going to be of more and more benefit to **you** month by month. It is **up to you** to intelligently take advantage of this by **learning for yourself** that **CYPRESS** is not only the ONE BEST OUT-DOOR WOOD for the owner—but also the ONE BEST WOOD FOR **YOU.** Cypress **"makes good."** That helps your reputation. Cypress is easy to work—that's **good for your tools.**









We are giving away complete working plans and specifications for THIS SHINGLE HOUSE. Many thousands of people ALL OVER THE U. S. are writing for them. THEY WILL HAVE TO GET **YOU** TO DO THE WORK.

THEY WILL INSIST on CYPRESS.

It will be MONEY IN YOUR POCKET TO HELP THEM GET JUST WHAT THEY WANT.

CYPRESS

is the "comer" in YOUR territory.

LISTEN FOR IT

Why not FIND OUT what CYPRESS can do for YOU, NOW? WRITE US—ASK YOUR OWN QUESTIONS—about your own needs, big or little. You can rely on detailed and reliable **CYPRESS** information if you address our "BUILDERS' HELPS DEPT." We will recommend **CYPRESS ONLY FOR USES WHERE IT IS THE BEST WOOD TO USE.**

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

We are *producing* CYPRESS—*and talking it—but not retailing it.* BUY IT NEAR HOME. *ASK your lumber man if he sells CYPRESS; if he does not, ask him WHY. Then WRITE US. We will tell you where you CAN get CYPRESS.*



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

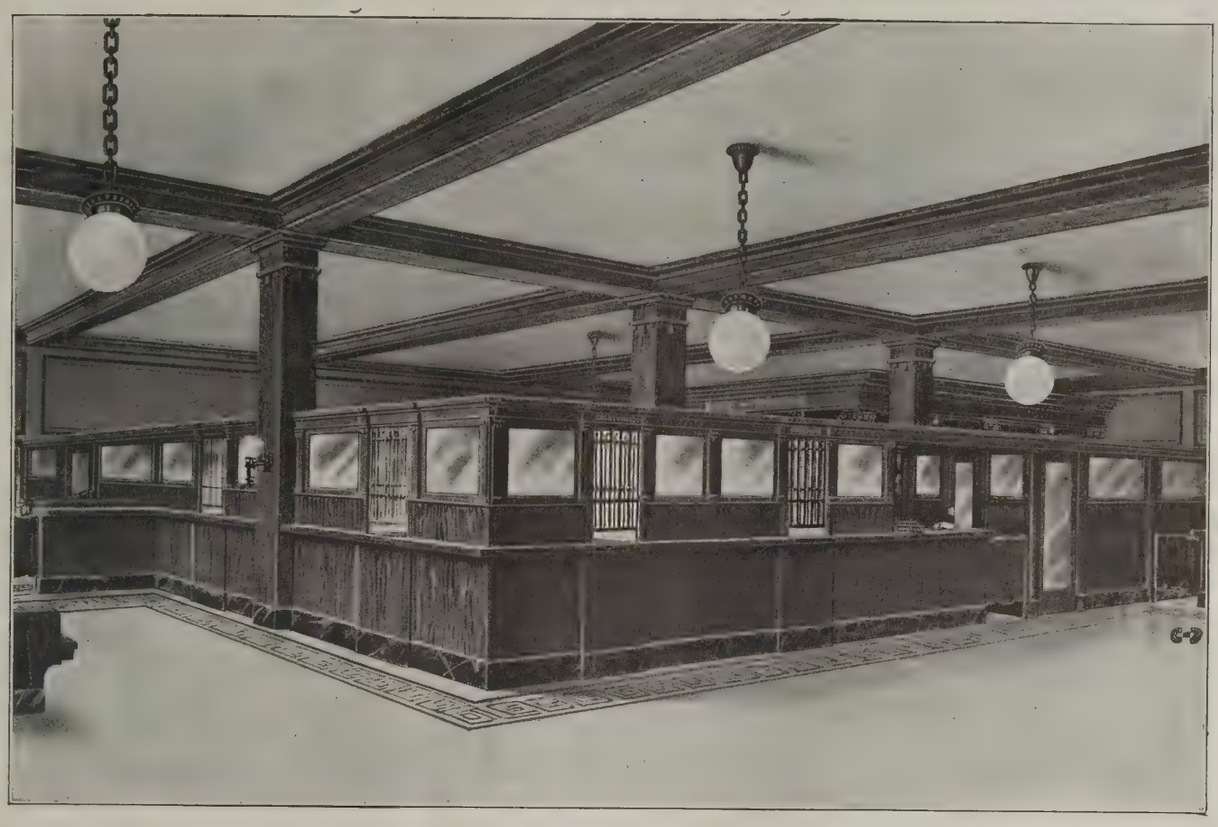
One of the best things a Contractor can do for himself is to be known as an authority on

RED GUM

(*AMERICA'S FINEST HARDWOOD*)

Here is a Photograph of the Beautiful New Bank of Whiting, Indiana. RED GUM Trim Throughout

"RED GUM is now an ARTISTIC NECESSITY"



It is our only high-class Native Cabinet Wood of *Real Distinction*

The above was designed and executed by the Bank Department of the Mosler Safe Co. (E. Jackson Casse, Directing Engineer), Chicago.

LEAD YOUR FIELD by recommending RED GUM Trim for all Interiors from Cottage to Skyscraper. And as a base for **all White Enamel Work,** *"there's only one wood"* and it's

SAP GUM

GET PRICES ON THESE WOODS—IT WILL PAY YOU

"Clinch Your Reputation for Leadership by Recommending (and Using) GUM"

Builders desiring to see samples of ***Red and Sap Gum,*** *both rough and finished, or who want prompt quotations on selected* ***Red and Sap Gum,*** *should* ***write at once*** *to any or all of the following firms:*

HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
CARRIER LUMBER & MFG. COMPANY . . . . . Sardis, Mississippi
BAKER LUMBER CO. . . . . Turrell, Arkansas
ANDERSON-TULLY CO. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., St. Louis, Missouri

AT ITS PRESENT PRICE ***RED GUM*** *IS THE MOST REMARKABLE PURCHASE IN THE ENTIRE HARDWOOD FIELD*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

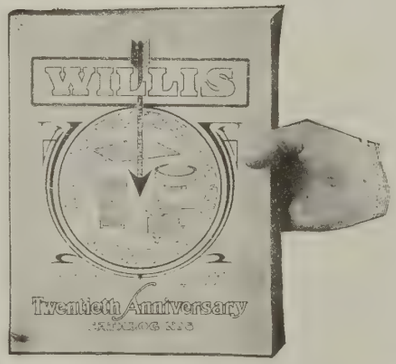
The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

WRITE TODAY FOR THIS CATALOG



We have just published our new *No. Six Catalog of Architectural Sheet Metal Building Material* containing 180 pages of helpful information to *Every Contractor* and *Builder* and it is *FREE*, postpaid, to any interested person.

It is the most complete catalog of its kind ever issued and we want to place it with all those who are interested in Cornices, Skylights, Steel Ceilings, Store Fronts, Ventilators, etc. Our facilities enable us to serve all customers promptly and our twenty years of experience in this one line insures you of the Very Best Value for Your Money.

WRITE US TODAY

WILLIS MANFG. CO., GALESBURG, ILLINOIS

Originators of the Famous Willis Hip Shingle

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instruction for laying
SAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.

Genasco

the Trinidad-Lake-Asphalt Roofing

Consider Genasco from the three vital standpoints:

1. **What it *does***
2. **What it *costs***
3. **What it *saves***

1. Genasco waterproofs your roof to last. Trinidad Lake Asphalt, used in making Genasco, is Nature's everlasting waterproofer that has resisted the influences of weather-changes for centuries. It carries into Genasco these same weather-resisting qualities, and makes it defy rain, snow, wind, sun, cold, and heat; and it makes it *permanently* waterproof.

2. Genasco costs about the same in the beginning as the so-called "asphalt composition" or the "special process" roofings which would be wonderfully good imitations of Genasco if they didn't crack, break, and go to pieces. But they can't stand the real test—the weather. They haven't the lasting life which *natural* asphalt gives.

Genasco is economical because it resists and lasts.

3. The saving in Genasco Roofing is plain. You do away with leaky roofs and the expense of repairing them; you prevent costly damage to rooms and furniture, and you save the cost of re-roofing. Genasco first-cost is last-cost.

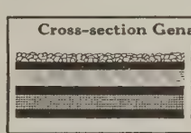
Get Genasco Roofing—either mineral or smooth surface. Guaranteed, of course.

The Kant-leak Kleet for roofing seams prevents nail-leaks, does away with dauby cement, and gives a fine finish to the roof.
Ask your dealer for Genasco with Kant-leak Kleets packed in the roll. Write us for samples and the Good Roof Guide Book.

GENASCO — THE STANDARD OF EXCELLENCE — TRADE MARK

THE BARBER ASPHALT PAVING COMPANY
Largest producers of asphalt, and largest manufacturers of ready roofing in the world
PHILADELPHIA
New York San Francisco Chicago

Cross-section Genasco Model Roofing





Vulcanite
Standard for 60 Years

Here's a roofing that has passed every test that *proves* good roofing—that has been made and sold on merit for sixty years.

Think of the experience behind it. Consider the number of highest awards it has received at expositions. Study the points that make it so good.

Made from the highest priced mineral compound known and the purest felt obtainable, in our own mills where we can watch the manufacture from start to finish. We use no paper or cheap filler—just the pick of materials that make roofing durable.

VULCANITE roofing will not freeze or crack—climatic conditions have no effect whatever. It's the most extensively used roofing in the world today because—there are reasons.



VULCANITE CRYSTAL SPAR SIDING

A new building material that has made good for use on Bungalows, Summer Cottages, Residences, etc. Fire and water-proof. Easy to apply, never cracks and saves painting and building paper. Used with clap-boards, this siding makes a substantial and well appearing building, besides effecting an all-around economy. Packed in rolls, 40 feet 6 inches long by 32 inches wide.

Send For Samples

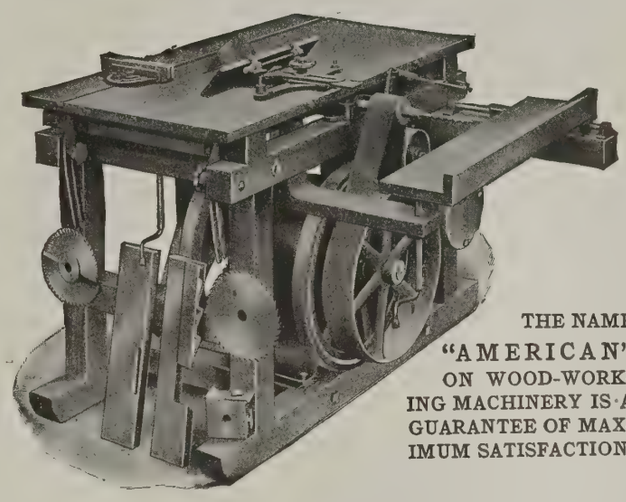
To enable the carpenter, builder and contractor to be his own judge and jury of VULCANITE Roofing and VULCANITE Crystal Spar Siding we will send liberal samples free upon request. We merely ask you to examine it—to test them in competition with other brands—and to read our literature. Send today.

Patent Vulcanite Roofing Co., 1240 S. Campbell Ave., CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE "AMERICAN" PORTABLE SAW BENCH

WILL PAY FOR ITSELF ON ONE JOB



THE NAME "AMERICAN" ON WOOD-WORKING MACHINERY IS A GUARANTEE OF MAXIMUM SATISFACTION.

Think what it would mean to you to have right on the job an **"AMERICAN"** Portable Saw Bench, which combines the functions of a

Rip Saw	**Cut-off Saw**	**Mitre Saw**
Dado Machine	**Rabbeting Machine**	**Jointer**
Boring Machine	**Gaining Machine**	**Grooving Machine**
Matcher	**Moulder**	

And all with self-contained power—either gasoline engine or electric motor, as ordered—ready for work at a moment's notice.

If you'll figure the time and labor this machine will save you, you'll understand how **an "American" Portable Saw Bench will pay for itself on one job.** After that, **the money it saves you is clear profit.**

As to capacity, the "AMERICAN" in 1-inch lumber is good for 75 to 125 lineal feet per minute; in 2-inch, 25 to 50 feet per minute. It rips 3-inch stock easily and can be used on 4-inch.

Remember, this is no cheap machine—no make-shift—**but a high-class tool built, like all "American" machines, to do the most work at the least cost and with the fewest possible repairs.**

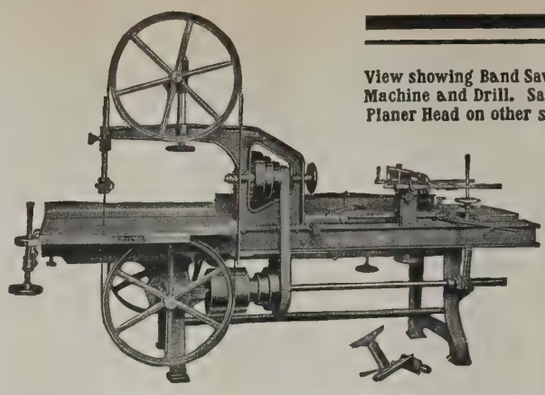
Write us for a complete descriptive folder.

AMERICAN SAW MILL MACHINERY CO.

Woodworking Machinery of All Kinds

80 Laight St.
HACKETTSTOWN
NEW JERSEY

650 Terminal Bldg.
NEW YORK CITY
NEW YORK



View showing Band Saw, Lathe, Boring Machine and Drill. Saw Mandrel and Planer Head on other side.

The "Buffalo" Crain Combination Woodworker

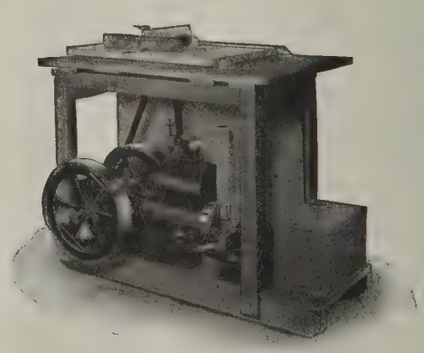
Has **Lathe** 40″ between centers; **Band Saw** taking 12″ under the guide; **Saw Mandrel** taking saws up to 12″ diameter; **Planer Head,** 5″ or 10″ **drill, boring machine, sizer, shaper, tenoner.** Three men can work at it at one time and perform a **Dozen Different Operations.** It is the latest invention and without comparison the simplest, strongest and most efficient machine made at the price. Low power cost; only 4 H. P. required at full load. No extra attachments needed. The facilities for adjusting every working part to suit the work in hand are unequalled.

Send for Complete Description and Prices. **Booklet 1785.**

Buffalo Forge Company
Buffalo, N.Y.

$165.00

For this Portable Saw Rig Complete 9 Machines in One.



Will rip 2" and cross cut 3" lumber. Write for descriptive folder.

C.H.&E. Manufacturing Co., Inc.

319 Mineral St. Milwaukee, Wis.

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THE GRIMM WOODWORKER IS A WONDER WORKER

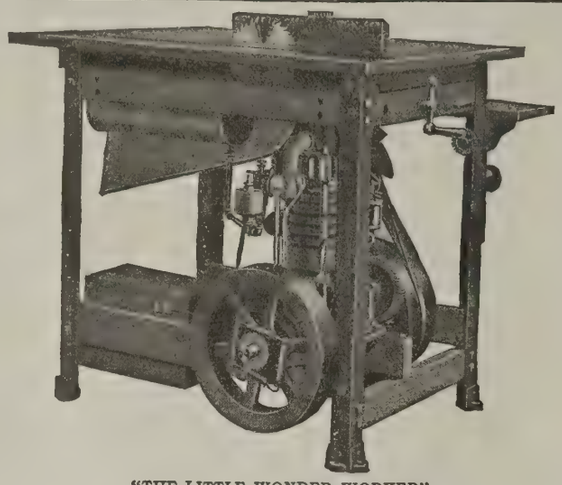
A Practical, Portable Planing Mill that Will Save You Time, Labor and Money

The Grimm Woodworker

Will Save You Time. No waiting for the planing mill to deliver your work.

The Grimm Woodworker

Saves you Labor. Does the work of five men.



"THE LITTLE WONDER WORKER"

The Grimm Woodworker

Saves you Money. Puts the profits of the planing mill in your pocket and its saving of time and labor means money to you.

The Grimm Woodworker

Will do all the mill work needed in the construction of any building.

CUSTOMERS WRITE OUR ADS

720 Clinton Ave. North, ROCHESTER, N. Y., Dec. 10, 1910.

GRIMM MFG. CO.:

Gentlemen—The Combination Woodworker which you sold me a short time ago, I am very much pleased with. It is the best wood-working machine of its kind I ever saw. If I knew I could not get another machine like it, I would not sell it for triple its value. Wishing you all success, I remain, yours truly,

(Signed) GEORGE WEGMAN.

¶

Nine Machines in One

Rip Saw Cross Cut Saw
Dado Head Jointer Sander
Moulding Knives
Emery Wheels Jig Saw
Boring Attachment

Send for Booklet and Trial Offer

GRIMM MFG. CO., 42 Erie Street, Buffalo, N. Y.

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*

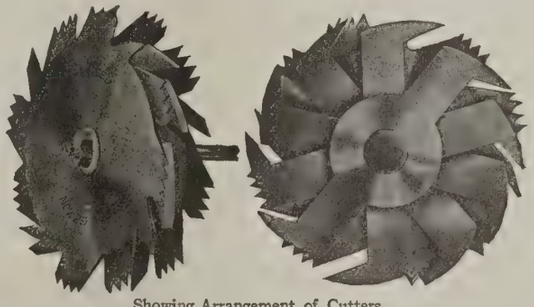


PARKS' BALL BEARING MACHINE COMPANY

KNOWLTON AND FERGUS STREETS **CINCINNATI, O.** Canadian Agts., Bournival & Co. St. Barnabe North, P. Q.

HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



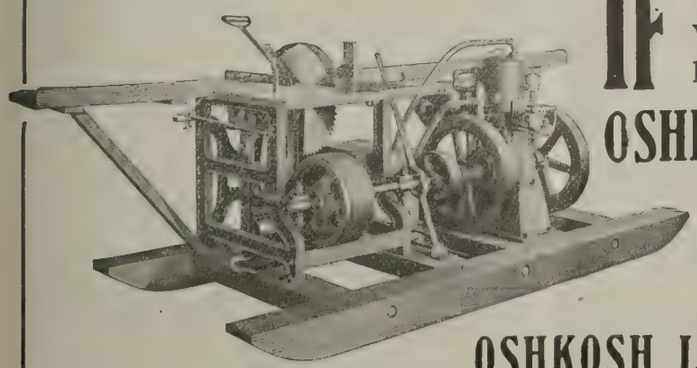
Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N. Y.**

THE RIG WITH A GUARANTEE



IF You want a Saw Rig of Quality and Service that will stand up against the heaviest and hardest kind of contractors' work, investigate the

OSHKOSH PORTABLE SAW RIGS

Equipped with such patent devices as a combination rip and swing cut-off-saw, adjustable arbor for jointing, dadoing, etc., miter device, sliding scale, safety saw-guard, friction clutch and complete equipment.

TEAR OFF COUPON AND MAIL TODAY.

TEAR OFF HERE

Kindly send to my address below complete catalog and prices of the Oshkosh Portable Saw Rigs.

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Street.....

Town.....

State.....

OSHKOSH LOGGING TOOL CO.

414 South Main Street, OSHKOSH, WISCONSIN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



TAYLOR PORTABLE STEEL DERRICK

For Builders, Roofers, Plasterers, Stone Masons, and with special equipment for unloading railroad gondola cars.

Constructed entirely of malleable and steel, roller bearing, circle swing, Hoists clear side wall and lands on eighteen-inch trucks. Adjustable capacity and speed.

One man operates both cranks and can hoist 1500 pounds

Price $40.00

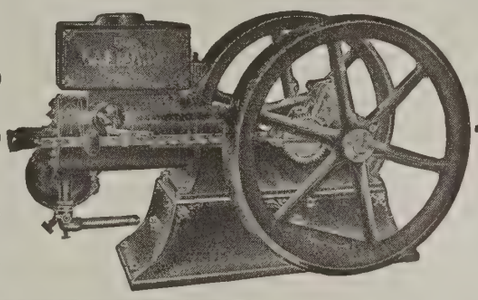


JOHN L. TAYLOR

1034 W. Lake Street, - CHICAGO, ILL.

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5 H. P. $119.50



1¾-28 H. P.

30 Days Free Trial

Built for Service

CONTRACTORS AND BUILDERS ATTENTION

Galloway Engines are made in all sizes from 1¾ to 28 H. P. They run on gasoline, naphtha kerosene or distillate. We are furnishing complete mixing rigs and our price means a big saving of money to you—$50 to $300, depending on the engine you buy. You have the privilege of trying the outfit 30 days. If it is in any way unsatisfactory we refund your money with interest and pay freight both ways.

The Galloway Gasoline Engine

SIMPLEST ENGINE BUILT

Only four things to do:

Turn on the switch, turn on the oil, turn on the gasoline, give the flywheel a start and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs for operating planers—matchers, lathes, saws and concrete mixers.

The Galloway has been classed as a standard, high grade engine for fifteen years. Over 4,000 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember, the bore and stroke count, and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake test.

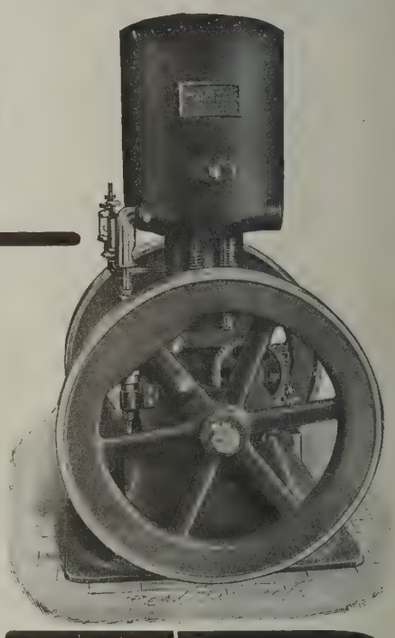
On the larger sizes, if it is not entirely convenient for you to pay all cash, we will take your note for the balance at the regular rate of interest for six months.

The price given is for the five-horse power only, but we make these engines in seven sizes.

Ask for free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure. Write today.

The William Galloway Company, 1695 Galloway WATERLOO, IOWA

The NOVO Engine



The NOVO gasoline engine in four sizes from 1¼ to 6 H. P. is especially adapted for use on portable and stationary machinery of every kind. It is **very light in weight, absolutely self-contained,** gasoline being in the base and the water contained in tank around the cylinder, which is guaranteed not to burst from freezing. The **upright form** and **low height** for vertical engine, and **small size of base,** adapts it for use on any machine requiring a self-contained power.

We should be pleased to furnish manufacturers or users of portable machines of any kind with full information, weights, and sizes of our different engines.

We make **three sizes** of **gasoline hoists** for builders' use.

THE HILDRETH MFG. CO.

C. E. BEMENT, Secretary and Manager

150 Willow St. LANSING, MICHIGAN



Barnes Hand and Foot Power Machinery

COMPLETE OUTFIT FOR

Carpenters and Builders

IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Warranted to be well made; will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

Price $15.00



We Make Sixty Styles of Knives

SEND FOR NEW CATALOGUE

W. F. & JOHN BARNES CO.

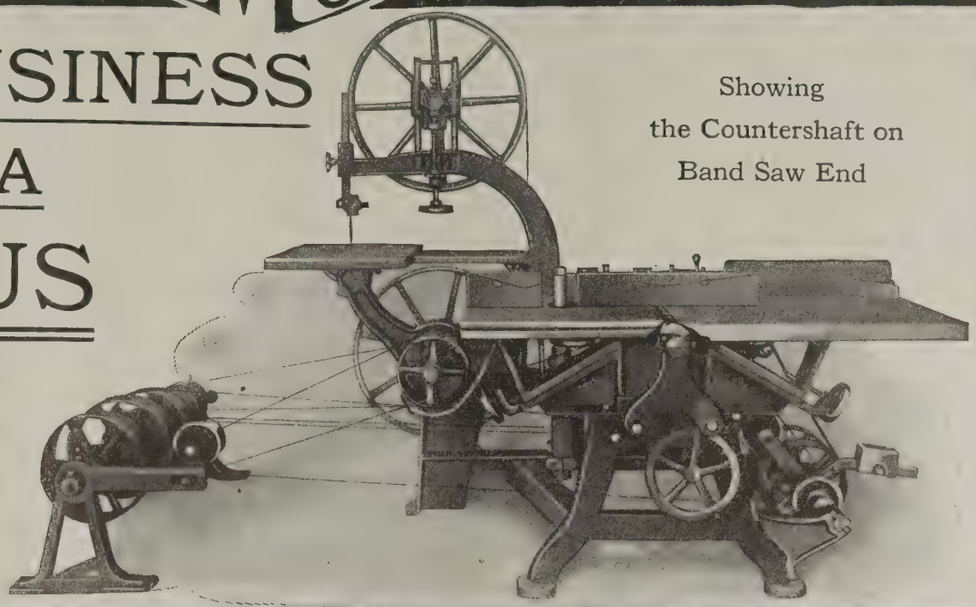
436 Ruby Street, Rockford, Illinois

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UNIVERSAL FAMOUS WOODWORKER

YOUR BUSINESS NEEDS A FAMOUS No. 14

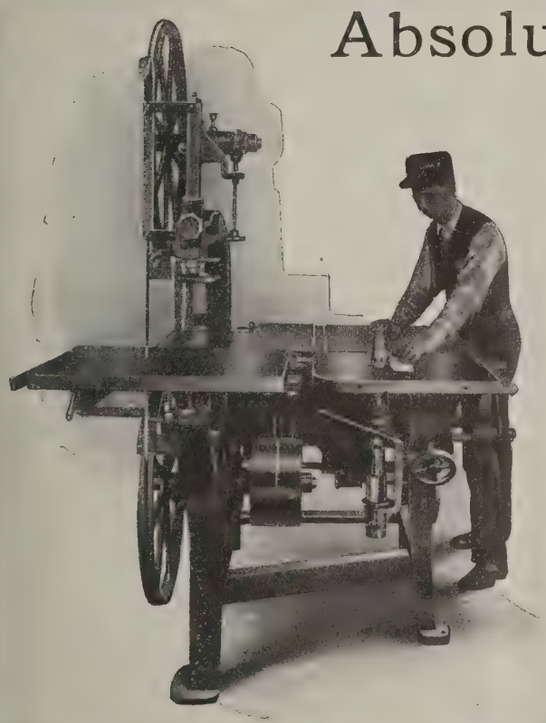
Sixteen Complete Woodworking Machines In One



Showing the Countershaft on Band Saw End

1 27" Band Saw,
2 12" Jointer
3 Saw Table, with raising and lowering arbor
4 Single Spindle Shaper
5 Boring Attachment, arranged on special boring spindle.
6 Pony Planer
7 Tongue and Pole Rounder
8 Hollow Chisel Mortiser
9 Single End Tenoner
10 Drum Sander
11 Disc Sander
12 Knife Grinder
13 Emery Grinder
14 Band Re-Saw
15 Spoke Tenoner, Rim Borer and Wheel Equalizer
16 Adjustable Felloe Rounder

Absolute Simplicity in Operation



Single Spindle Shaper

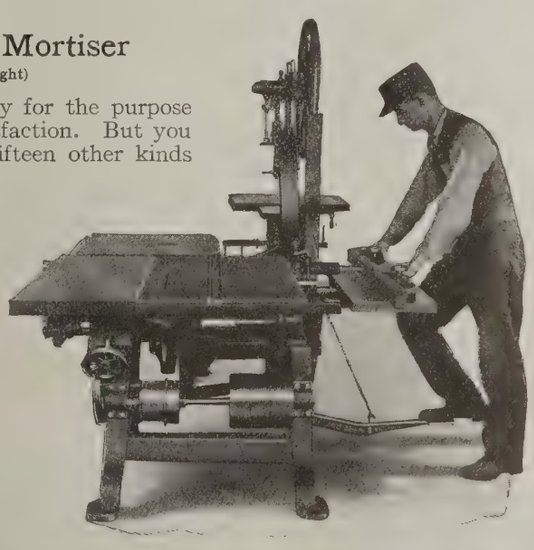
(Illustration at left)

Just as easy, just as rapid, just as durable, just as economical as a machine that does nothing else.

Hollow Chisel Mortiser

(Illustration at right)

A machine built expressly for the purpose could not give greater satisfaction. But you can use the FAMOUS for fifteen other kinds of work besides.



Every carpenter, contractor and builder needs a FAMOUS Universal Woodworker — **and can easily afford one.** Better than paying out your profits to planing mills—better than installing a number of machines —better for your business in every way.

Write today for full particulars of the machine, of our free trial offer, and prices and terms to suit you.

The Sidney Tool Co. Sidney, Ohio.

TORONTO
The A. R. Williams Machinery Co.
Front Street

MONTREAL
Williams & Wilson
320-328 St. James St.

WINNIPEG
The A. R. Williams Machinery Co.
260 Princess Street

VANCOUVER
The A. R. Williams Machinery Co.
57-61 Alexander Street

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE NATIONAL BUILDER

FRED. T. HODGSON, Editor

Chas. A. Muller, Jr. } Associate Editors
Wm. C. A. Stevenson }

Porter-Hodgson Co., Publishers, 542-550 South Dearborn St., Chicago

FRED. A. HODGSON, President — FRED. D. PORTER, Secretary and Treasurer — GEO. A. FARGHER, V. Pres. and Adv. Mgr.

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RELIABLE ADVERTISERS

THE NATIONAL BUILDER seeks the advertising of reliable houses only, and asks that prompt notice be given by any reader who has cause for complaint against an advertiser, that the matter may be investigated, and the advertisement discontinued should the advertiser be proved untrustworthy.

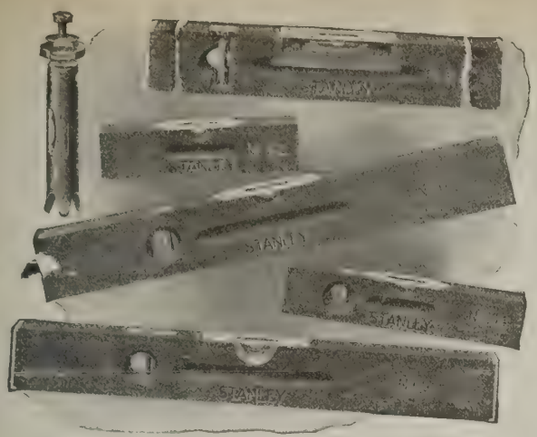
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Stanley Tools

STANLEY PLUMBS and LEVELS, both adjustable and non-adjustable, are made of thoroughly seasoned and selected stock, and have many valuable improvements recently added which will appeal to the workman. Made in all styles for **Carpenters, Masons, Plumbers, Machinists, Millwrights,** etc.

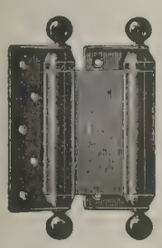
The name **STANLEY** appears on every tool we manufacture, and is a guarantee that for quality of workmanship and material they have no equal.

STANDARD THE WORLD OVER

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

Bommer Spring Hinges are Quality Goods



But cost no more than the inferior kinds

The Springs Never Go Lame

This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge



Reputations are made by consistently giving your customer the best spring hinges and avoiding imitations or substitutes

Bommer Spring Hinges are sold by all Hardware Dealers

HAVE YOU POWER BORING MACHINES?



Quadruple Bit Price $5.00
Can not be used in a hand brace

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

Mortised at one Punch with the

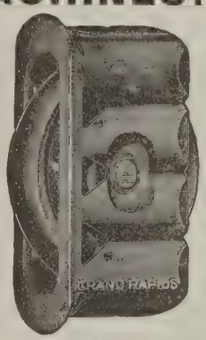
Quadruple Bit

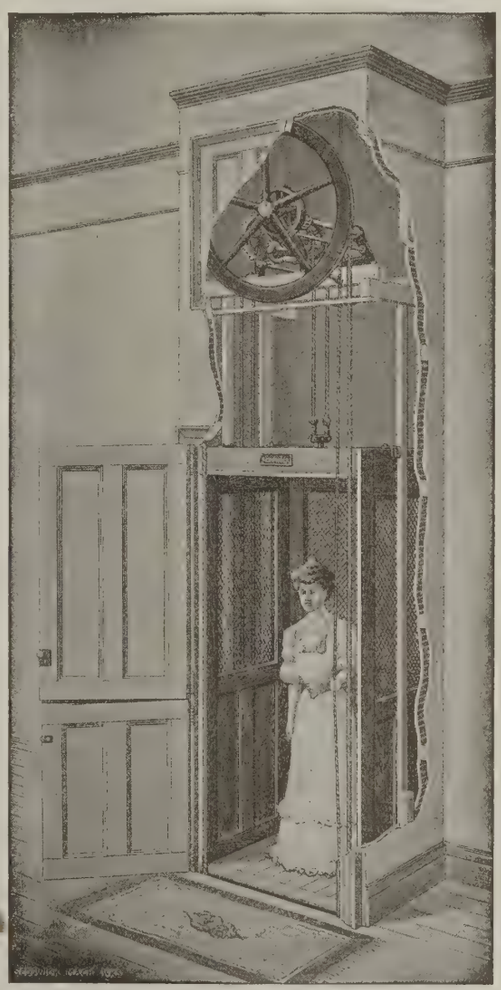
or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money

Write For Free Samples

Grand Rapids Hardware Co., 118 Pearl St. GRAND RAPID MICH.



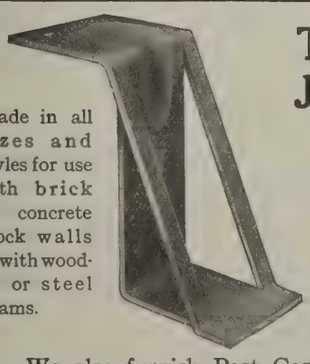


Hand Power Elevators and Dumb Waiters for all purposes

Cut shows the Improved Sedgwick Hand-Power Invalid Elevator Outfit.

Catalogue upon request

Sedgwick Machine Works
130 Liberty St.
New York



TRUS-CON JOIST HANGERS

Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

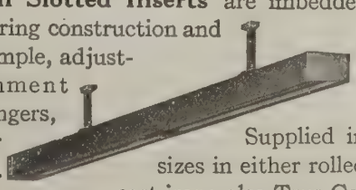
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

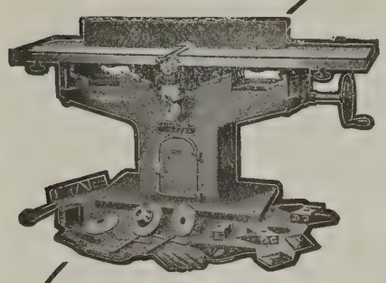
Trus-Con Slotted Inserts are imbedded in the concrete during construction and furnish a simple, adjustable attachment for shaft hangers, sprinkler systems, etc.



Supplied in various sizes in either rolled steel or cast iron; also Trus-Con Socket Inserts to receive threaded bolts.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



No. 62 Universal Woodworker

16 MACHINES IN ONE

Other makes may combine eight or ten machines, but our

No. 62 UNIVERSAL WOODWORKER

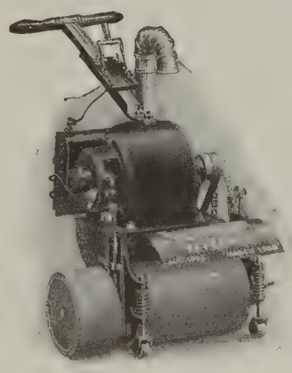
is the only one made combining all of the following in one machine:

1. Hand Planer
2. Rip Saw
3. Cross-Cut Saw
4. Panel Raiser
5. Rabbeting Machine
6. Routing Machine
7. Hollow Chisel Mortiser
8. Molder
9. Borer
10. Tenoner
11. Shaper
12. Circular Molder
13. Sander
14. Emery Grinder
15. Floorer
16. Gainer

A WHOLE WOODSHOP IN ITSELF

Let us tell you all about this machine in our large illustrated circular

J. A. FAY & EGAN CO., 327-347 West Front Street, Cincinnati, Ohio



Made in three sizes:
8x18, 8x15, and 8x12 in. Roller
Edge Roller easily adjusted to either side

Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

The **Schlueter** will remove all joints or warped edges, and oil, wax, lime stains, or the "muck" from skate wheels, in a most satisfactory manner.

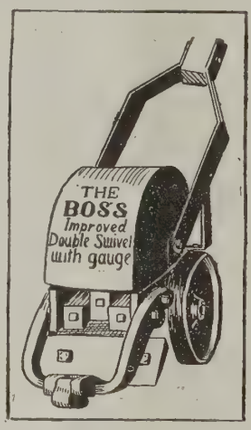
Earning Capacity, $20.00 to $35.00 per Day

Send for prices and Free Trial Proposition

M. L. SCHLUETER

101 N. Canal St., CHICAGO, ILL.
1001 Flatiron Bldg. NEW YORK.

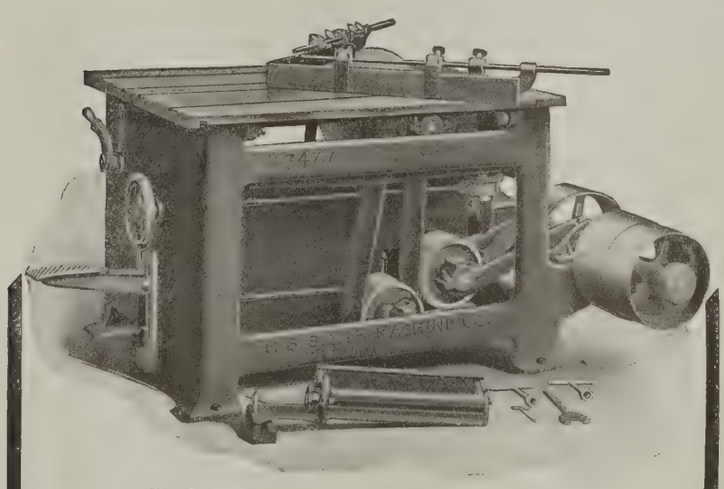
Acme Floor Surfacing, Laying & Finishing Co. Not Inc.



The Boss Improved Floor Scraper

Has double swivel allowing the knife to be set in any position. Gauge can be set for any thickness of shaving and keeps knife from making depressions in floor. Gives knife double support. The pear-shaped wheel which is in the gauge is attached to the gauge in front so that when the scraper is let down to take shaving, it lets the knife down gradually, and prevents the knife from making a deep cut. With this gauge and wheel attachment, the knife will leave no mark. Impossible to do poor work. Adjustment simple—positive. Gauge can be removed instantly. Sanding attachment. Prices very low. Write for descriptive circular.

GEORGE J. KEPPLINGER
DWIGHT, ILLINOIS
Adv. Dept. B.



No. 347. Combination Saw and Dado Machine.

Looking for a Modern Saw Bench?

The above cut represents our new Combination Saw and Dado Machine.

The **Frame** is quite substantial, with closed front.

The **Ways** adjust for depth of cut, and

The **Carriage** moves on rollers having ball-bearings.

The **Saw Mandrel** runs in self-oiling boxes, and is brought into the work by a foot treadle, thus leaving both hands free to handle the work.

For further particulars concerning above and other machines, address

H. B. Smith Machine Co., Smithville, N. J., U.S.A.

New York Chicago Atlanta Shreveport



MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

No. 8 "UNION" COMBINATION SAW



A well built, light power machine, at a low cost, has a wide range for work, will rip stuff up to 3½ in. thick, also cut off, miter, and with attachments, bore, edge-mould, groove, dado, etc.

The No. 8 Union Saw may be easily connected to electric motor or gasoline engine and complete outfit mounted on skids to move from one job to another.

SEND FOR CATALOG A

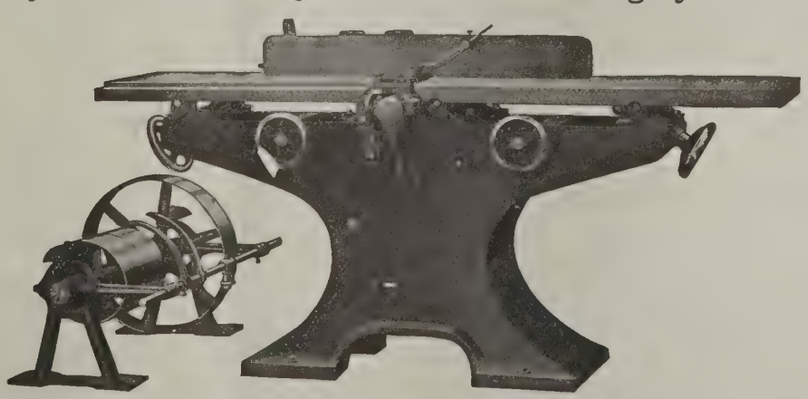
Describing our complete line of Foot, Hand and Light Power Wood-Working Machinery.

The Seneca Falls Mfg. Co., 629 WATER STREET SENECA FALLS, N. Y., *U. S. A.*

(182)

PROTECT YOUR FINGERS
by using a CRESCENT Jointer with Safety Head

The knives in CRESCENT Safety Heads are made of high speed steel which will hold an edge longer and turn out better finished and more work than can be done on a common jointer with ordinary knives. You may crowd the machine to the limit and the quality of work will be just the same as though you hadn't crowded it a bit.



The price of these splendid machines is very reasonable considering the very high quality of the machines and the enormous amount of accurate work they are capable of turning out.

Send for catalog giving complete description. It tells about our elegant line of Band Saws, Saw Tables, Jointers, Borers, Shapers, Planers, Planer and Matchers, Pole Rounders, Disk Grinders, Variety Woodworkers.

THE CRESCENT MACHINE COMPANY 10 MAIN STREET LEETONIA, OHIO, U. S. A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

As Sure as 2 and 2 Is 4

The DAISY MFG. Co. South Bend, Ind.

Gentlemen: Please send me the "Daisy" Floor Scraper Booklet free.

Name .....

City .....

State .....

Occupation .....

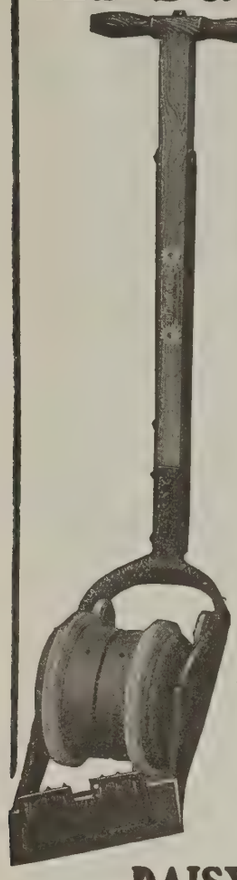
A Shearing Cut Gets Best Results in Floor Scraping

Why does a mechanic when scraping a floor by hand use the Shearing Cut? Because he obtains smoothest and quickest work so. When you whittle a piece of wood you use a Shearing Cut.

A Shearing Cut is ALWAYS made with the

"DAISY" FLOOR SCRAPER

With One Ten-Inch Blade Single Shearing Cut is Made
With Two Five-Inch Blades Double Shearing Cut is Made



The "Daisy"

CUTS EITHER WITH OR ACROSS THE GRAIN
CUTS RIGHT UP TO BASE BOARD AND INTO EVERY CORNER
IS EASIER ON THE OPERATOR AS IT REQUIRES ONLY A SLIGHT LIFT TO GET BEST WORK
WILL DO MORE WORK THAN ANY OTHER IN SAME LENGTH OF TIME
WILL DO PERFECT STRAIGHT EDGED WORK AND WILL PLEASE YOU
CLAMPS ARE INSTANTLY FASTENED
FILING DEVICE FILES BLADES TO RIGHT BEVEL
EDGE-TURNING DEVICE IS A WONDER

UNSOLICITED TESTIMONIALS

FRED L. WALTERS
CARPENTER AND BUILDER
Jobbing Given Prompt Attention
Estimates Furnished

Gillette, N. J., Oct. 11th, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
The flooring has arrived and we have scraped it with your machine and I find it does all you claim for it. Inclosed you will find check as per agreement.
Thanking you for your kindness in allowing me to try this machine and for extending the time for trial, I am. Yours respectfully,
FRED L. WALTERS.

KUTSCH BROTHERS
CARPENTERS AND CONTRACTORS
Jobbing and Repairing
Promptly Attended to
No. 2043 Washington Street

Dubuque, Iowa, Sept. 1st, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
Immediately after using the Scraper we have found it to be satisfactory and superior to any we have seen in use.
We herewith inclose draft in full for same.
Yours truly,
KUTSCH BROTHERS
Per J. P. K.

Belle Fourche, S. Dak., Aug. 4, 1910.
THE DAISY MFG. CO., South Bend, Ind.
Gentlemen:—
After giving the three Floor Scrapers a trial we have decided that the "Daisy" is the one we want. Inclosed find draft in full for same.
Very respectfully,
NELSON & GOLDING



Ten Days Free Trial Offer

We will ship a "DAISY" Outfit to any responsible contractor who intends purchasing a floor scraper for a ten days free trial. Test it with others, if you do not find it best return it. The trial will not cost you a penny.

DAISY MFG. CO., SOUTH BEND, IND.

"Nothing but the Highest Praise for THE TRIPLE "A" MACHINE"



Surfacing Floors

(by contract)

pays when you have the proper equipment.

We can't do all the floor surfacing in the country, but we're willing to furnish the machines and give others a chance.

Any carpenter can successfully operate **The Triple "A" Spring Driven Floor Smoother**—It's easy—the motor spring furnishes power.

This Letter is Self Explanatory

Flint, Mich., 11-23-1910.

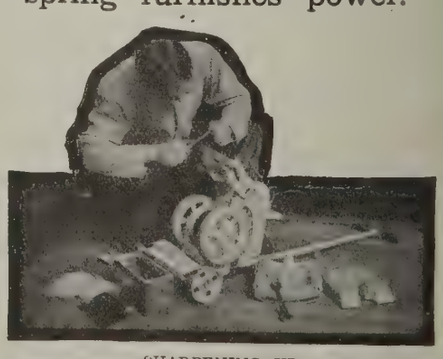
Triple "A" Machine Co.,
Chicago, Ill.

Gentlemen:—

I take pleasure in writing you regarding the workmanship of your mechanics in scraping the floors of the Flint P. Smith Building, this city.

I have tried out three different floor scraping machines and am satisfied that the Triple "A" was the best. Owing to the work which your men and machines were able to do, I can have nothing but the highest praise for the Triple "A" Machine.

Yours truly,
W. E. WOOD.



SHARPENING UP

Make it your business to see this machine in operation

Triple "A" Machine Co.

110 South Clark Street, CHICAGO

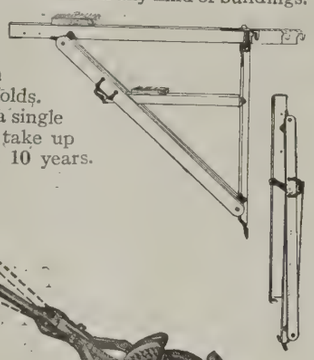
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Latest WEBER Work Savers

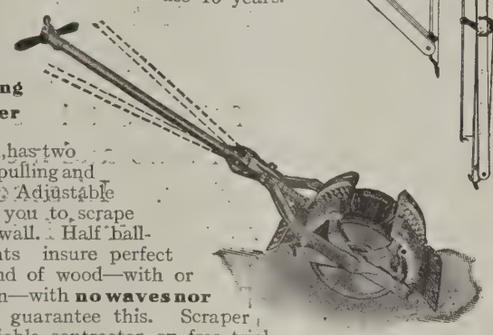
SAVE time and you make money. Crude tools delay work and turn out "botch" jobs. My devices are right up to the minute—mechanically correct—and you can't afford to be a day without them. Read every word of this ad; then send for complete catalog and prices. I've been a successful contractor for 25 years, and I absolutely **know** I can save you money at every turn of the road.

Double Scaffold Bracket

is the only one that can be adjusted for use on any kind of buildings. Will not swing sideways and has two scaffold boards which make it ideal for putting up cornices. Weighs only 22 lbs., but is much stronger than the old, heavy scaffolds. Can be folded without loosening a single bolt. When folded, 24 brackets take up space only 3 x 4 x 5 feet. In use 10 years.



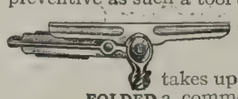
WEBER Double-Acting Floor Scraper



improved model, has two knives—one for pulling and one for pushing. Adjustable handle enables you to scrape right up to the wall. Half ball-and-socket joints insure perfect work on any kind of wood—with or against the grain—with **no waves nor chattering.** I guarantee this. Scraper ent to any reliable contractor on free trial.

Folding Saw Vise

holds the saw with rigid unyielding grip and is as nearly noise-preventive as such a tool can be made. Can be thumb-screwed to any plank or bench in an instant. When folded, it takes up no more room than a common hammer. Saves many an aching arm from using dull saws and should be in every kit.



FOLDED



OPEN

Cabinet Scraper and Sander

affords a firm grip and can be controlled with ease in the tightest corners. Knife is fastened with a clamp, not with holes or slots, and can be used till but a half inch remains. Scraper can be quickly reversed and used for sandpapering and polishing. Weight 22 oz. Handiest tool ever made for the purpose.



Sharpening Device

for floor scrapers holds the file at the correct level for an even, true edge on Weber and other floor scraper knives. With this tool, anyone can do excellent work in a short time without previous experience. Well worth investigation.



SEND FOR CATALOGUE

JOHN F. WEBER, Pres. :: WEBER MFG. CO.

661 71st Avenue, WEST ALLIS, WIS.

A TIME AND MONEY SAVER

THAT'S WHAT ACTUAL USERS SAY

Read these Recent Letters

Marshalltown, Ia., Mar. 3, 1911.
Jos. Miotke,
Dear Sir:—

One year ago I purchased an Acme Floor Scraping Outfit and in regard to same can say that it has paid for itself many times, besides the hard labor it has saved. To-day I scraped 3½ squares of oak flooring in five hours in a first-class condition.

I have 2,000 sq. ft. of hardwood flooring to scrape at present and wish you would send me another burnisher, also your extra weight attachment.

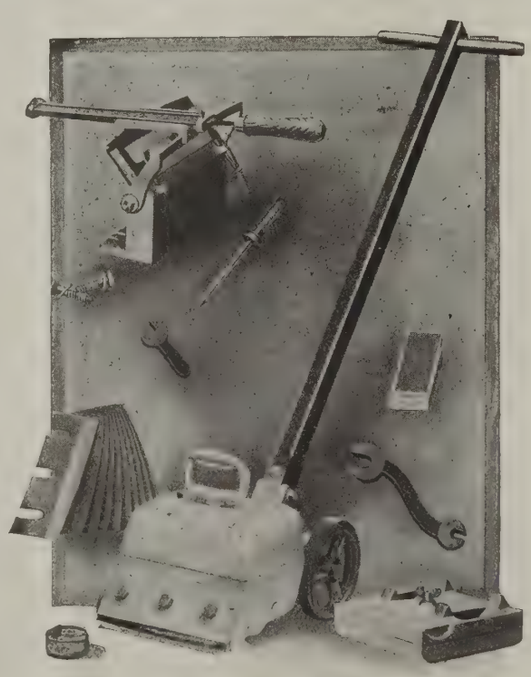
Trusting you will give this prompt attention, I remain,

Yours truly,
W. E. LANGER

Cincinnati, O., Mar. 1, 1911.
Jos. Miotke,
Dear Sir:—

Send at once by express one doz. blades for the Acme Floor Scraping Outfit which I purchased from you about a year ago. We are well pleased with the machines for we find them to be a great time and money saver, and think it is the best floor scraping equipment on the market.

Yours truly
FITE & FITE.



Read this Free Offer

I will send the ***ACME FLOOR SCRAPING OUTFIT*** to any carpenter or contractor on one week's free trial basis. I will permit the party receiving the outfit to work with the same for a week, and if it does not prove entirely satisfactory the machines are to be returned to me at my expense.

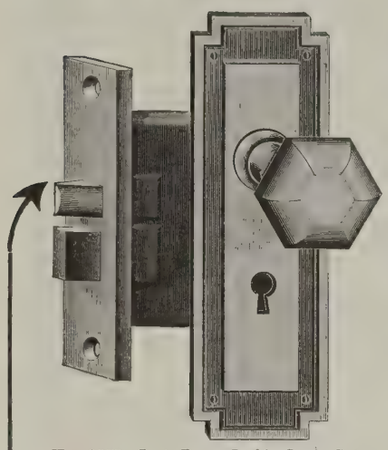
Isn't this a fair offer? Don't you think it is worth your while to investigate? Thousands of carpenters are saving thousands of dollars daily by using the ACME FLOOR SCRAPING OUTFIT, so it's up to you if you want to share in this saving.

The time for you to investigate is now. Drop me a line to-day and get my booklet and full particulars which I will send to you by return mail.

JOSEPH MIOTKE, 249 Lake Street, MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

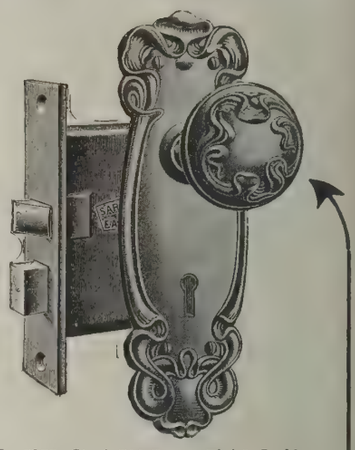
You Need Our New Illustrated Catalog of Builders' Hardware



No. 9253—Cast Brass Inside Lock Set; Dull Brass finish, per set, $3.35

¶ It contains 60 designs of Lock Sets, including Cylinder Store Door Sets, Union and Cylinder front door sets, and inside lock sets in cast bronze metal, wrought bronze metal, and wrought steel in the latest finishes.

¶ There are over 1500 illustrations in this catalog, including Lock Sets, Sash Locks, Sash Lifts, Cupboard Turns, Butts, Barn Door Hangers, Carpenter Tools, etc., and is so arranged that it will be a simple matter to select a bill of hardware for a job.



No. 5855—Steel, Old Copper Finish, Inside Lock Set; per set, 43c

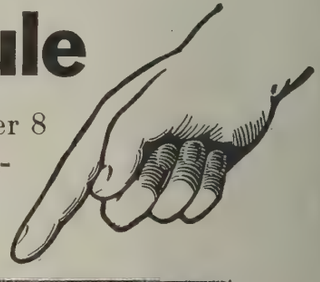
¶ We want every contractor and carpenter to have one of these catalogs in his office. Will be mailed FREE on request. It will save you a lot of time and money. It will give you the latest designs to select from, and the lowest prices. In sending for this catalog please state whether you are a Contractor, Carpenter or Material Man.

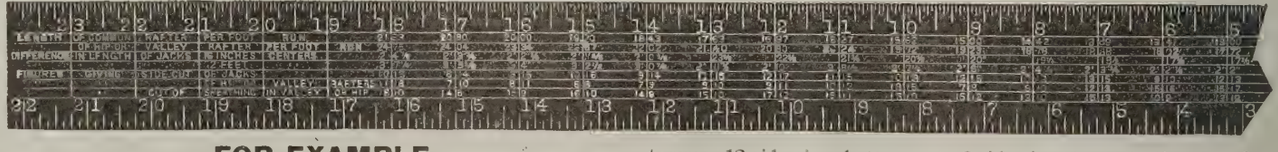
REHM HARDWARE COMPANY
1503 Blue Island Avenue - - CHICAGO, ILL.

Nicholls' Rafter Framing Rule

FULLY EXPLAINED

If your roof raises 8 inches to the foot, look under 8 and you will find your figures for length of common rafter, hip or valley rafter per foot run, length of first jack rafter and the difference in the length of others spaced 16 and 2 ft. centers, also their cuts.





FOR EXAMPLE

If your roof raises 8 inches to the foot, or, as it is called, third pitch, under 8 on the first line are the figures 14.42; this is the length of common rafter per one foot run; if the building is 16 feet wide, half the width of building would be the run of common rafter; in this case it would be 8; multiply

14.42 by 8
8

115.36

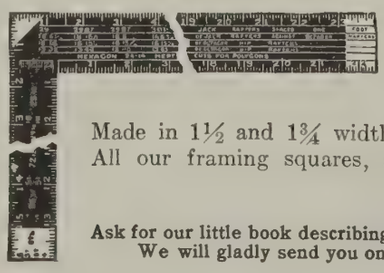
you have 115.36 inches, or 9 feet 7⅜ inches. To obtain the bottom and top cuts of common rafters, use the figures 12 on body and 8 on tongue; 12 side gives bottom cut; 8 side gives top cut; the same figures give bottom and top cuts for jack.

On the second line under 8 are the figures 18.78; multiply these figures by 8, which is the run of common rafter and gives lengths of hip or valley rafter.

18.78
8

This gives 150.24 or 12 feet 6¼ inches. This is the correct length of hip or valley rafter.

On the fifth line under 8 are the figures 10 and 12; by placing square on stock to be cut at these figures, 10 on body, 12 on tongue, and marking on 12 side, this gives side cut of jacks against hip or valley rafter.



Our No. 100A has the octagon roof framing rule on back of square as per small cut, giving all lengths and cuts of rafters for same. This square sells for **POLISHED STEEL $2.25 OXIDIZED COPPER $2.50 NICKEL PLATED $3.00**

Made in 1½ and 1¾ width tongue. Ask your dealer for these, but if he will not supply you we will prepay express. All our framing squares, also Nos. 100-1-2 and 3 standard squares have **HARDENED CORNERS.**

White portion of cut shows part hardened

Ask for our little book describing our framing rule. We will gladly send you one upon request.

NICHOLLS MFG. CO., Ottumwa, Iowa

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Big Sales—
Big Profits—
And Satisfaction To Your Trade



Plant of B. F. Goodrich Co., Akron, O., covered with J-M Asbestos Roofing

That, Mr. Dealer, is what our tremendous advertising campaign on J-M Asbestos Roofing means to you if you wish to take advantage of it.

In over eighty publications, covering every town in the United States and Canada, and reaching over 27,750,000 readers, we are running strong advertisements giving good, logical, believable reasons why J-M Asbestos Roofing is the best.

In publications reaching the architects, manufacturers, farmers, mine owners, owners of dwellings, etc., all over this entire country, J-M Asbestos Roofing is being powerfully featured. Over 300,000 of these readers are interested in the roofing of big manufacturing plants.

We are telling these people that

J-M ASBESTOS ROOFING



Is the only fireproof ready roofing, the only one that never needs painting, and is not affected by gases, chemical fumes, etc., and many other points which cannot be said of other ready roofings.

Will you couple your name with our fame and let us help you to your share of the profits to be made in your locality?

We will furnish you with handsomely lithographed metal signs, also with beautifully printed booklets, folders, catalogs and samples to give away.

To dealers promising to use them, we will furnish electrotypes of advertisements for use in local papers which will turn the local roofing trade their way.

We will also refer inquiries to dealers who represent us.

And—We don't ask you to carry a large stock, only enough to meet the first demand our advertising creates.

Don't hesitate. Write us for full details of our proposition today.

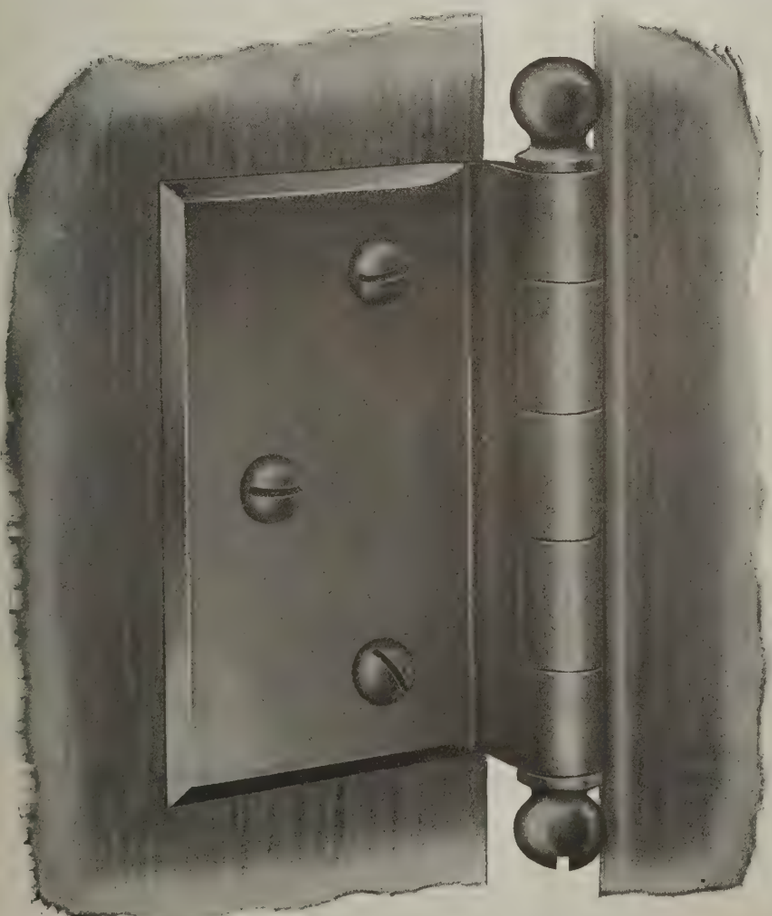
H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, Etc.

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1269



No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

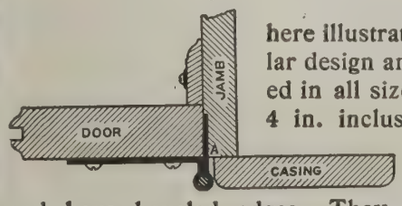
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

These are exclusive "NATIONAL" features.

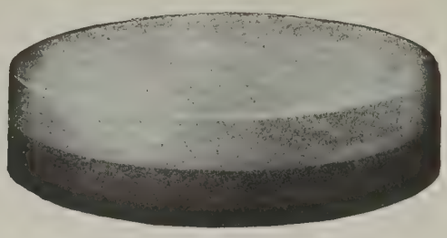
Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



There Is a Decided Satisfaction in Knowing That

Carborundum Sharpening Stones

Are always ready for use—never filled or gummy but always clean, free and fast cutting.
Carborundum is the greatest sharpening agent known. There is nothing harder or sharper.
Its minute crystals are brittle enough to break slightly after a time and turn up new cutting edges—that is why a Carborundum stone never glazes.

The Carborundum Round Combination Bench Stone No. 107 is a wonder-worker.
Just the right shape for that rotary motion required in sharpening chisels and plane bits. Price each, $1.00.
No. 108, oblong shape, in quartered oak box, $1.50.
No. 146, Carborundum Pocket Stone in leather case, 35c.

ASK YOUR DEALER OR SEND DIRECT TO

THE CARBORUNDUM COMPANY, - Niagara Falls, N. Y.

Whatever your customers may demand in

Enamel, Varnish, Stains, Floor Paints and Ready Mixed Paints

"Alcolac" Will Supply

"ALCOLAC" ENAMEL—elastic, hard and smooth—insures a sanitary, porcelain-like finish on wood, iron, stone, tin and other materials.

"ALCOLAC" VARNISH STAINS for finishing and refinishing woodwork and furniture are unequalled. Cover scratches and mars. Produce beautiful finish washable with soap and hot or cold water.

"ALCOLAC" FLOOR PAINT protects as well as covers. Dries hard and resists moisture. A most inexperienced person can apply it.

"ALCOLAC" READY MIXED PAINTS are made of pure chemicals thruout—Linseed oil, Japan driers, lead carbonate, zinc oxide and pure tinting colors. Finishes with a hard glossy surface proof against gases, sea fogs, salt air and atmospheric changes—the enemies of all ordinary paints.

Our discounts are liberal—your profits good.

Write for our Contract Proposition. Beautiful Celluloid Signs with every order
Handsome Sterling Silver Mounted Fountain Pen with every $25.00 order

Alcolac Mfg. Co., :: Long Island City, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

$150.00 Cash For the 41 Best Answers

WE want to know *what you think*— in your own words —just as you would talk to a man or woman about a job

We say — Johnson's Wood Dye is the best wood dye to be bought —it's the easiest to use.

We claim Johnson's Under-Lac to be far superior to any kind of varnish or shellac.

Now what we want to do is this—we want to furnish *you*—the man who knows a whole lot about woodwork and finishing—some of our Wood Dye and some of our Under-Lac to try out yourself and we want you to tell us in your own words—we don't care anything about fine writing—just *why you would recommend it.* To the 41 painters who send us the best reasons—in not over 150 words for using Johnson's Wood Dye and Johnson's Under-Lac to finish or refinish woodwork, floors or furniture, we will send our checks for one hundred and fifty dollars ($150.00) cash in the following amounts:

Best answer $25.00, next 5 best answers $10.00 each. Next 10 best answers $5.00 each, next 25 best answers $1.00 each, making a total of $150.00 for the 41 best answers.

Here's a chance to make a good Cash profit in less than one hour's time.

Take the coupon printed below to your paint dealer and get from him—without charge—no obligations of any kind—samples of Johnson's Wood Dye and Under-Lac to make a thorough test on some piece of woodwork or furniture.

Johnson's Wood Dye

is not a mere stain. It is a genuine, deep-seated dye that penetrates the wood, giving a rich, permanent color that will not raise the grain in the slightest. We make Johnson's Wood Dye in fourteen standard shades. These are the shades and stock numbers.

No. 126 Light Oak	*No. 128 Light Mahogany*	*No. 121 Moss Green*
No. 123 Dark Oak	*No. 129 Dark Mahogany*	*No. 122 Forest Green*
No. 125 Mission Oak	*No. 130 Weathered Oak*	*No. 172 Flemish Oak*
No. 140 Manila Oak	*No. 131 Brown Weathered Oak*	*No. 178 Brown Flemish Oak*
No. 110 Bog Oak	*No. 132 Green Weathered Oak*	

Half Gallons—$1.50 Each

Johnson's Under-Lac

is a spirit varnish. It will not chip, mar or scratch. Better than any kind of shellac or varnish. Can be easily applied, does not raise the grain, is not thick and sticky like varnish and *dries in half an hour.* Gallons $2.50.

You try these goods. It will take you not more than half an hour spare time. Then give us your personal opinion. Write down your reasons. All you need do is to jot down, in pencil, if you like—Reason 1, Reason 2, Reason 3, and so on.

The 41 painters who give us the best reasons in not over 150 words—for using Johnson's Wood Dye and Johnson's Under-Lac for finishing and re-finishing woodwork, floors and furniture will receive our checks for a total of one hundred and fifty dollars ($150.00). *Do this today. Get the Wood Dye and Under-Lac at your dealer's* **FREE**—*no charge or obligation to you.*

Your answer giving reasons must be mailed to us not later than June 1st. Checks for $150.00 will be mailed June 15, 1911. Don't pass up this chance to make some extra money. A *nice contract* couldn't be better, for this is *clear profit and short work.*

S. C. Johnson & Son, Dept. NB-4, Racine, Wisconsin

"The Wood Finishing Authorities"

USE THIS COUPON

Good for 3 trial samples of Johnson's Wood Dye and Under-Lac—also Instruction Book, "The Proper Treatment for Floors, Woodwork and Furniture,"—*at your dealers.*

Your Name_____ Address_____

Paint Dealer's Name_____

If your dealer hasn't these samples, mail coupon to us with dealer's name—we'll see that you are supplied.

S. C. Johnson & Son, Dept. NB-4, Racine, Wisconsin, "The Wood Finishing Authorities"

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HESS Sent on Approval FURNACE

You can buy our furnace direct from our factory AT THE FACTORY PRICE, and test it 60 days in winter weather. If not pleased, return it at our expense for freight both ways, and pay us nothing.

This offer, and lots of good furnace information, will be found in our free 48-page booklet. Ask us for one. A postal card will do.

Hess, 907 Tacoma Building, Chicago

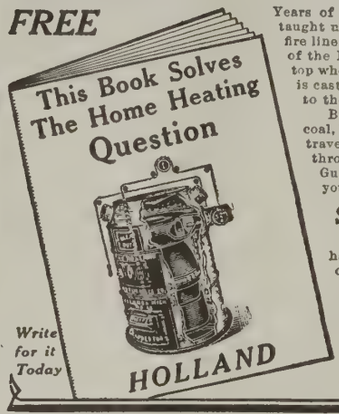
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Let us send you this Home Heating Book, with other booklets and prices first—Now's the time to investigate—Think it over. We will save you first cost and lasting economy and reduce your fuel bills ⅓ to ⅔. Find out about the experience of thousands of satisfied owners of Hollands—Double Grate Surface—Patented Corbel Air-admitting Double Firepot, burning fuel from sides and top, nature's way, for greatest even heat. Consumes gas, soot and clinkers with least smoke. No explosions. Book tells all improved tested points, convenience and satisfaction of the Holland. Unlike others. Less joints. No bolts. Simpler and easier and cleaner to run. Ideal damper arrangement. Consumes less fuel. Gives longest service from construction and double materials used where strains are greatest. Save money with

Holland Gas and Soot Consuming Furnace

FREE



Years of experience in the heating business has taught us that the strain in any furnace is from the fire line up and that is why the combustion chamber of the Holland Furnace is over an inch thick at the top where our patented radiator is placed. Radiator is cast in one piece and altogether from the base to the top, our furnace has but five joints.

Burns any fuel—soft coal—slack screens—hard coal, lignite, or wood with least waste. Smoke travels twice as far, no heat wasted. Equal heat all through the house in all pipes. Special Double Guarantee. Book has many other points to tell you.

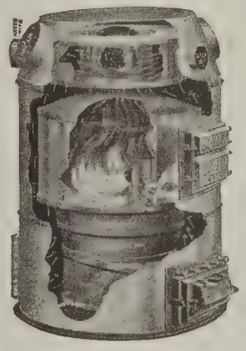
Save ½ to ⅔ on Fuel

Our fuel-saving claims for the Holland have been proven by thousands of satisfied owners. You be the judge. Just send name on postal for our Big Catalog—Free with other Home Heating Booklets and prices. Who's your dealer?

Holland Furnace Co., Dept. 14 Holland, Mich.

BOVEE FURNACES at MANUFACTURER'S PRICES

SAVES 50 PER CENT OF COST; 40 PER CENT OF FUEL



Most Durable, Most Economical Furnace Sold

Has a Perfect Ventilating System for Every Part of the Building

RESIDENCE HEATING PLANT

Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 20-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

Special Price, $65

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54-in. Furnace, 32-in. Fire Pot, 40-in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

Bovee Grinder & Furnace Works, 60 8th St., Waterloo, Ia.

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Von Gerichten Art Glass Co.
Designers and Workers in Decorative Glass
Quality not Quantity

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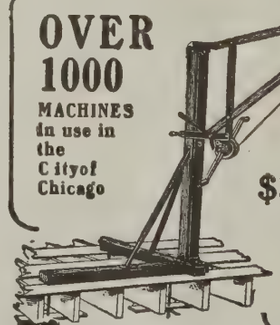
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Von Gerichten Art Glass Co.

550-558 S. High St.
Columbus, O., U. S. A.

Workers in Art Glass and Mosaics. Catalogue free

OVER 1000 MACHINES in use in the City of Chicago



The Only Practical Circle Swing Hand Power Derrick

For hoisting timber, joists, flooring, door and window frames, stone, concrete blocks, iron girders, etc. Fully equipped, ready for use

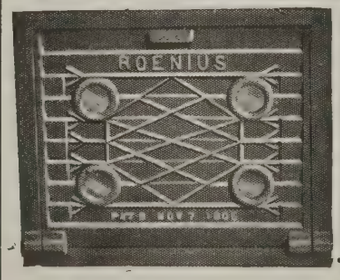
$35.00 F. O. B. CHICAGO

Band Brake $1.00 Extra

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NEW YORK OFFICE, 103 Park Ave.

Canadian Manufacturers and Selling Agents
IDEAL CONCRETE MCHY. CO., LTD., 211 King St., LONDON, ONT., CANADA



WRITE FOR CIRCULAR N AND PRICES NOW

Roenius Wood and Coal CHUTES

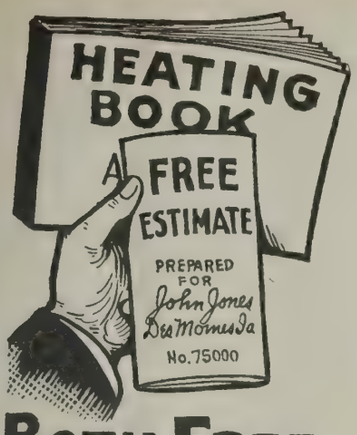
Roenius Chutes have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed. Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked. Ask your dealer for the Roenius—or write us.



GRAND RAPIDS FOUNDRY CO.
MANUFACTURERS
Grand Rapids, Wisconsin



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BOTH FREE

Mr. Contractor:

Here's My Heating Idea that Will Make Money for You



MY plan is the simplest for you to make money on. It eliminates all preparatory work on your part, as I do this for you. It takes the risk of the plant's success off your hands, as I take the responsibility in my guaranty bond. It enables you to make both a good commission and profit on the erection.

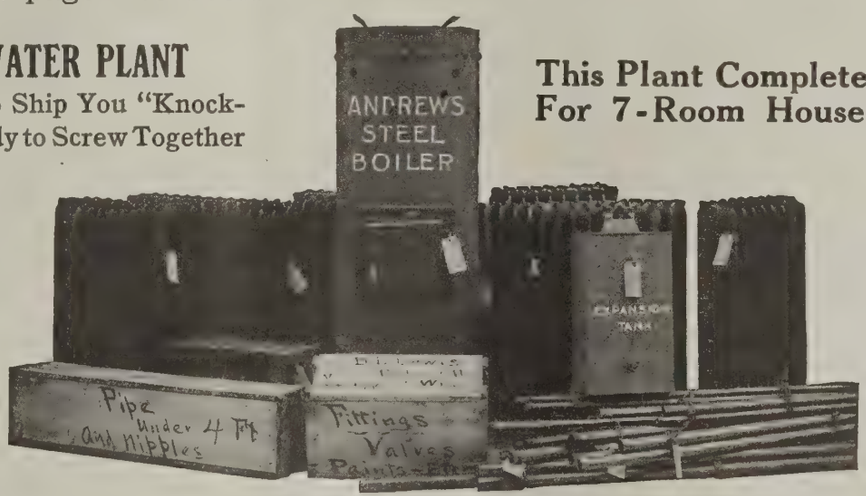
My plants are made, complete, in my factory and sent "knock down," freight prepaid, all ready to screw together. My steel boiler is much more economical of fuel, heats quicker, easier to clean and more durable. My regurgitating safety valve increases the heating power of piping and radiators. The directions with each plant are so complete and yet so simple that any carpenter's helper can easily do the work.

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This Plant Complete For 7-Room House $239.00



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Just send us architect's plans or a rough diagram of each floor of the house to be heated—show size of rooms, windows, height of ceilings and construction of house and our engineers will furnish a free estimate of the complete job delivered at your station. No work for you and no obligation if you don't get the order.

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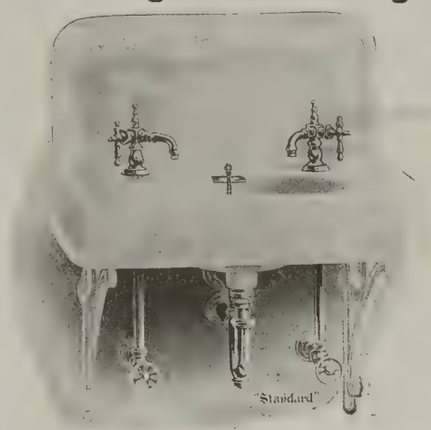
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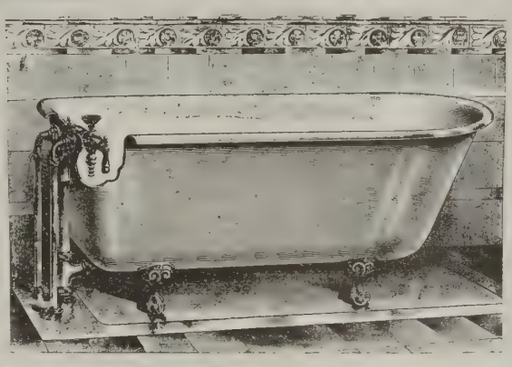
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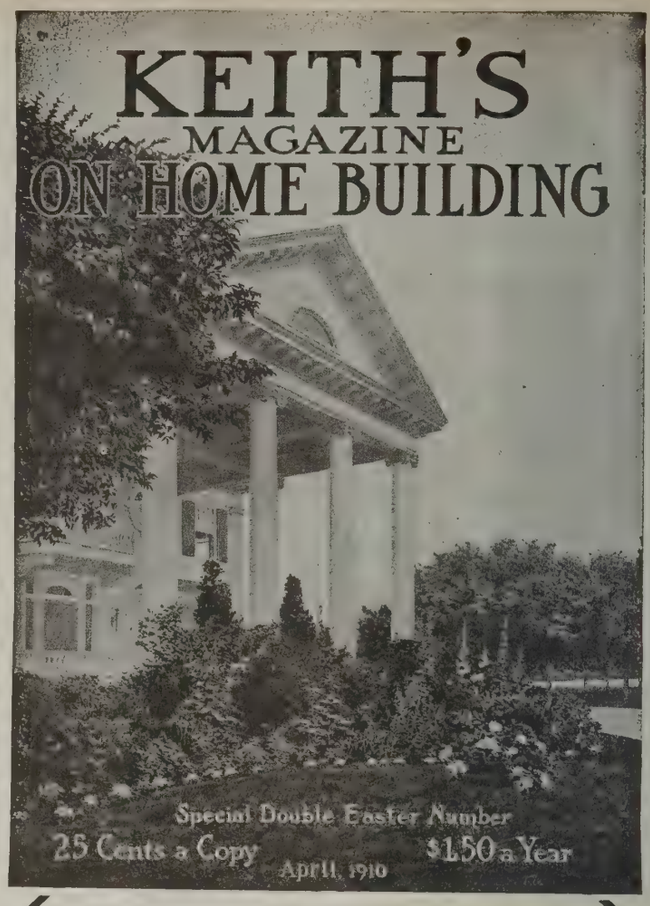
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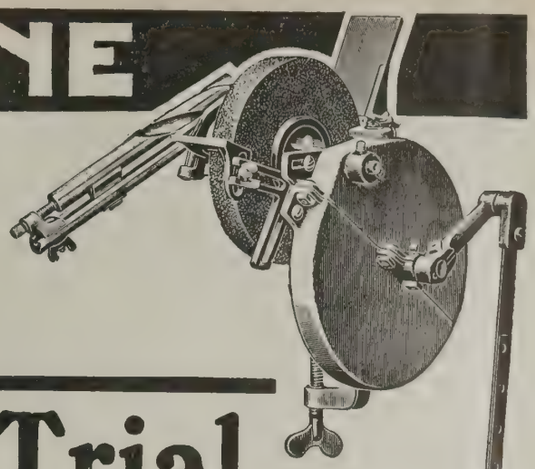
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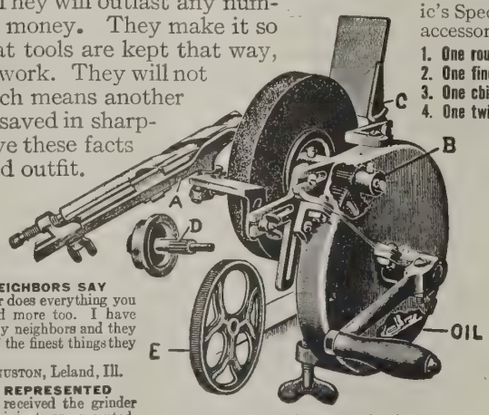
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1. One rough genuine Carborundum wheel
2. One fine genuine Carborundum wheel
3. One chisel grinding attachment
4. One twist drill attachment
5. One polishing spindle
6. One buffer
7. One polisher
8. One oil stone
9. One Carborundum hone in leather case
10. One Carborundum scythe stone
11. One foot power attachment

This outfit supplies every grinding, buffing and polishing need. The chisel and twist drill attachments make it easy for inexperienced persons to sharpen drills and chisels correctly.



A. Twist drill attachment to give drills proper angle and clearance.
B. Bronze Bearings
C. Chisel sharpening attachment
D. Spur cut from solid steel
E. Large spur machine-cut oil bath

Built Like a High Grade Lathe

The Luther Mechanic's Special, forming the basis of this Special shop and factory outfit, is built for a life-time of service—has steel and malleable construction, dust-proof, bronze bearings, machine cut spur gears, bearings run in oil bath—speed 2,500 revolutions per minute. Carborundum wheels guaranteed 5 years.

Read what others say

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I received the Carborundum Grinder and am highly satisfied with it. I consider it the best and most practical all-purpose machine so far manufactured.

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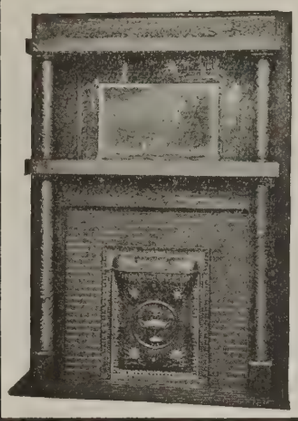
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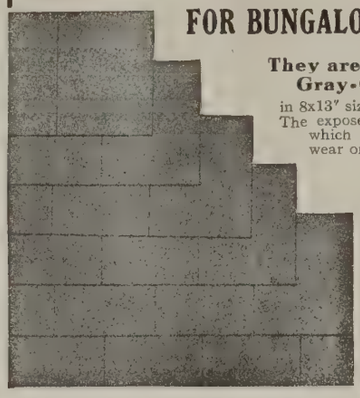
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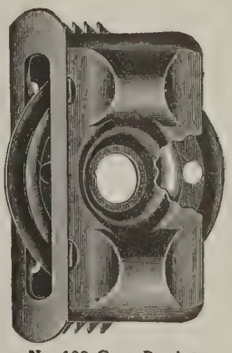
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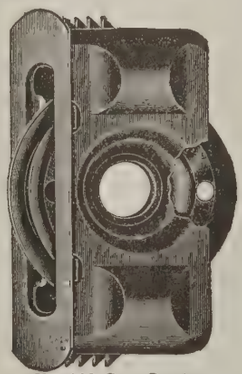


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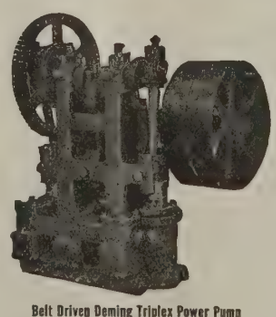
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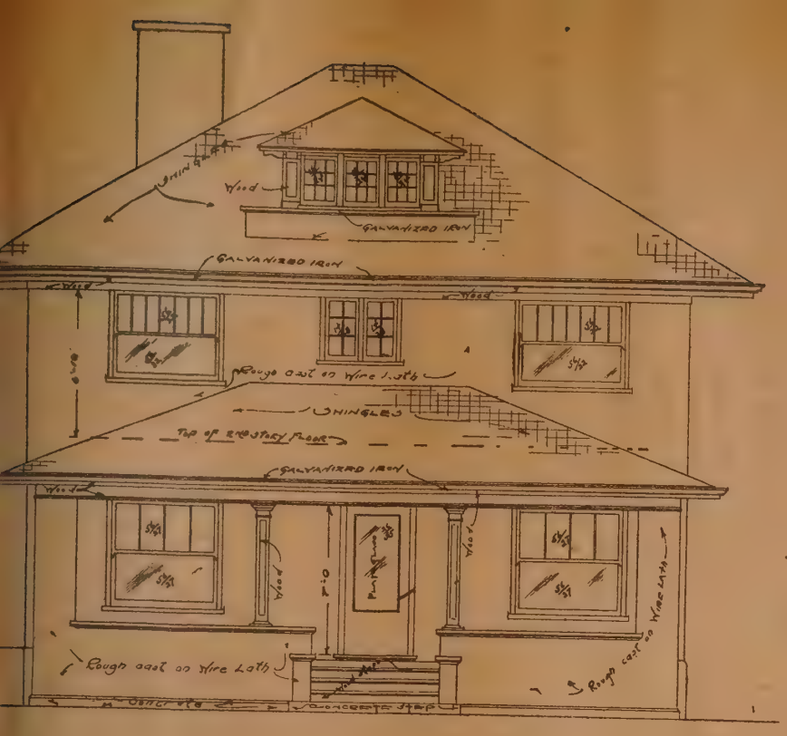
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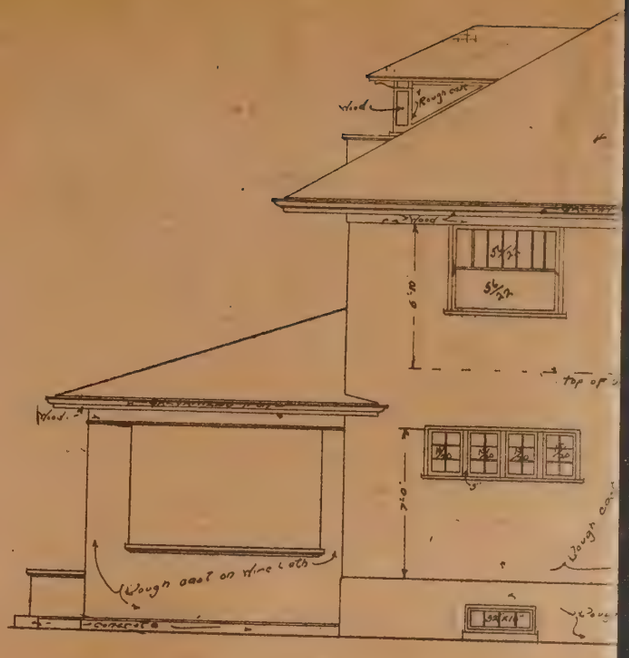
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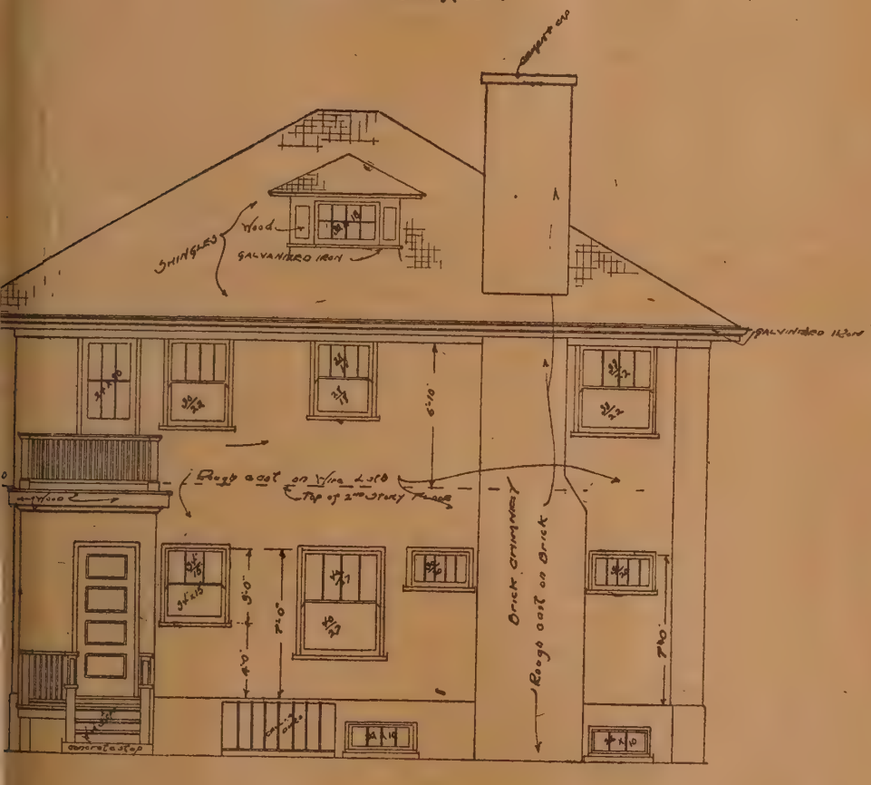
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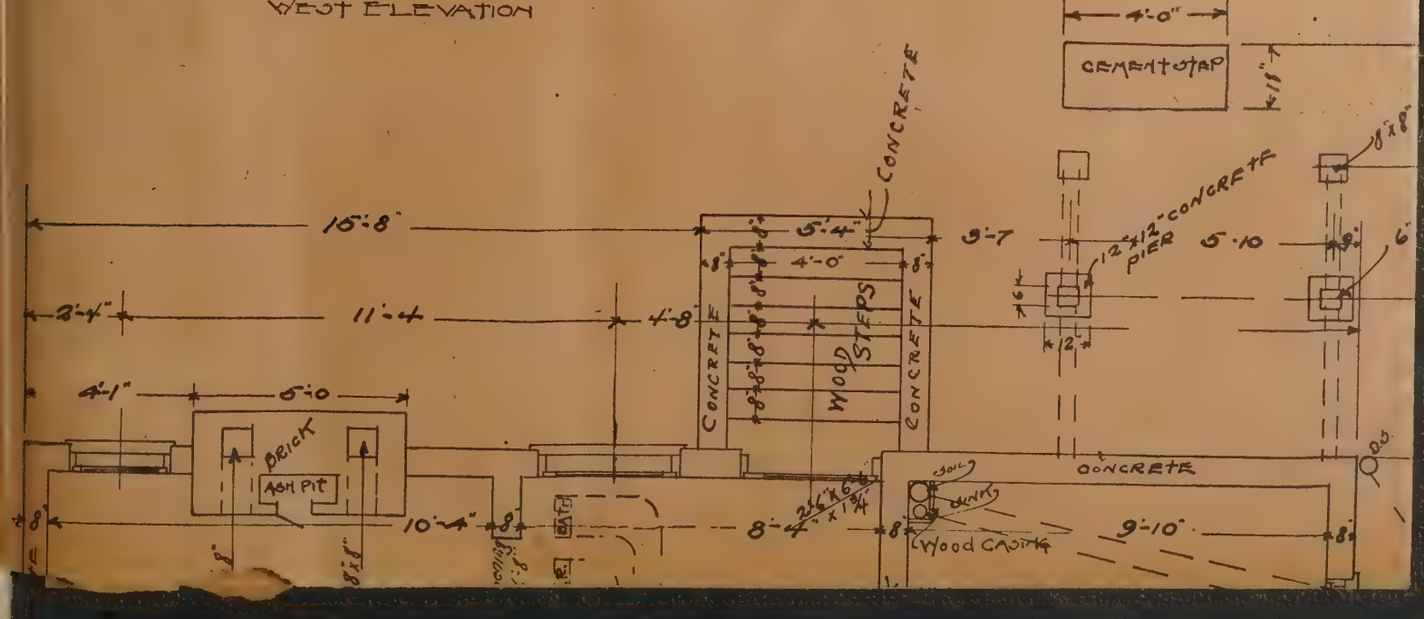
EAST ELEVATION



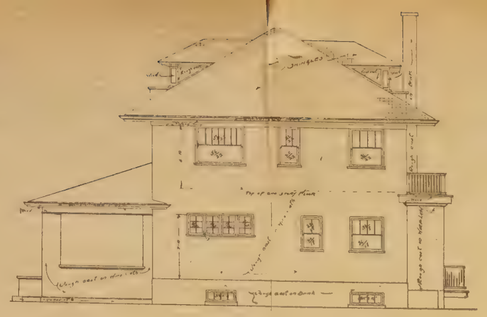
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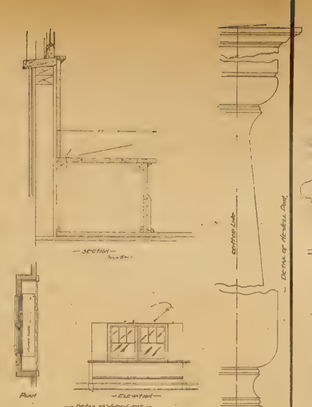
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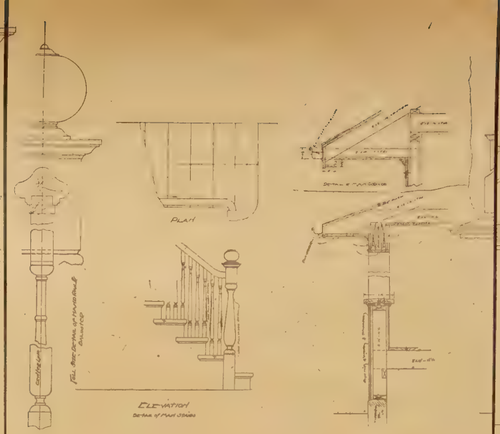


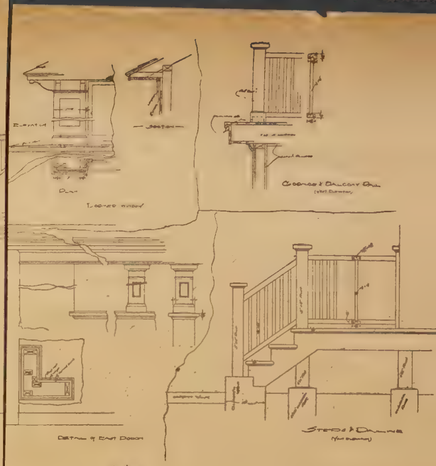

EAST ELEVATION


NORTH ELEVATION


SOUTH ELEVATION








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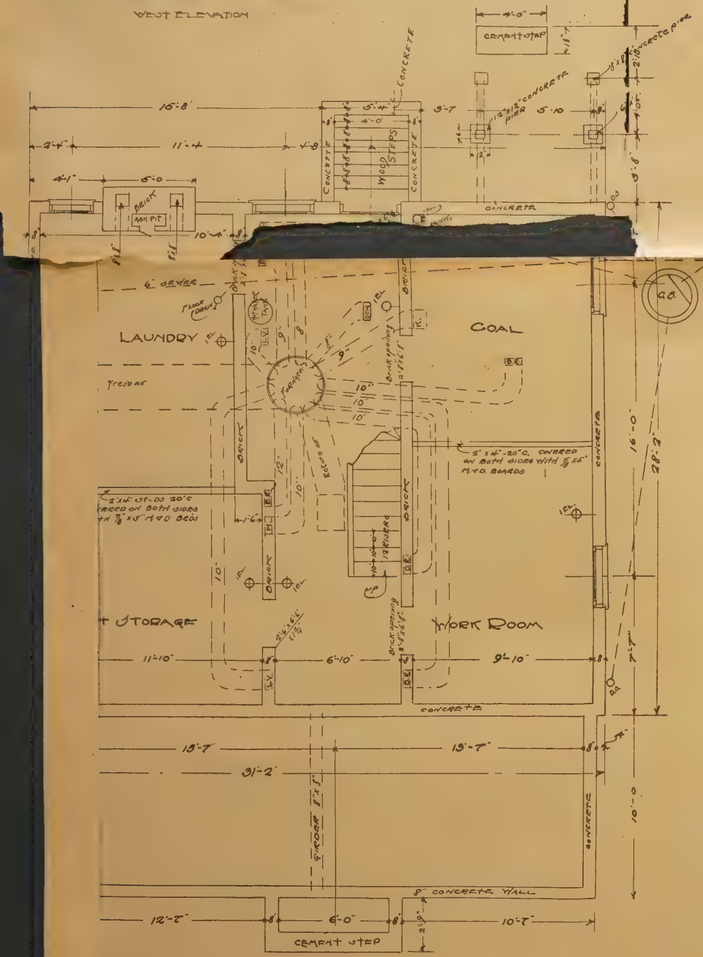
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APRIL, 1911

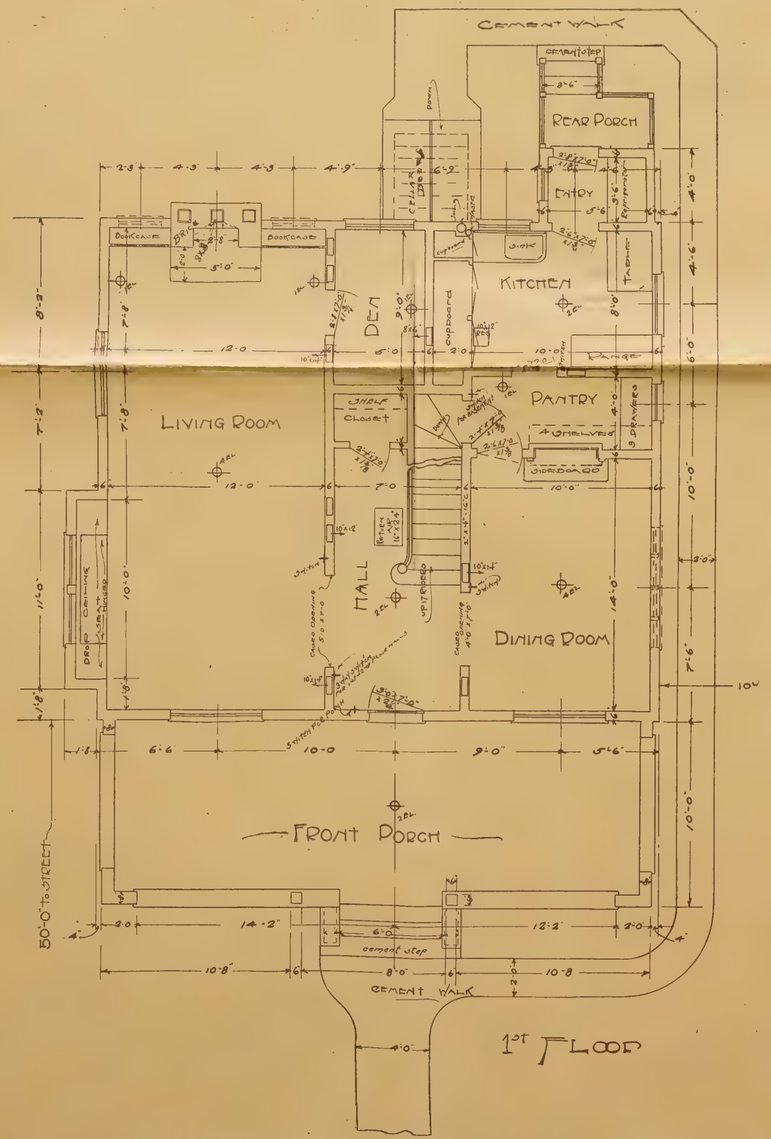
NATIONAL BUILDER DESIGN No. 340, THE NORTHWIN ROUGHCAST HOUSE

SCALE FOR FLOOR PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 8 FEET.

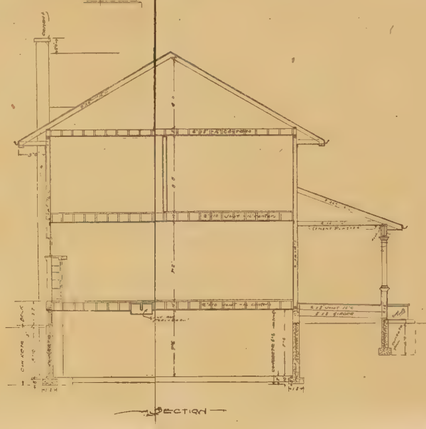
FOR ESTIMATE, SEE PAGE 29

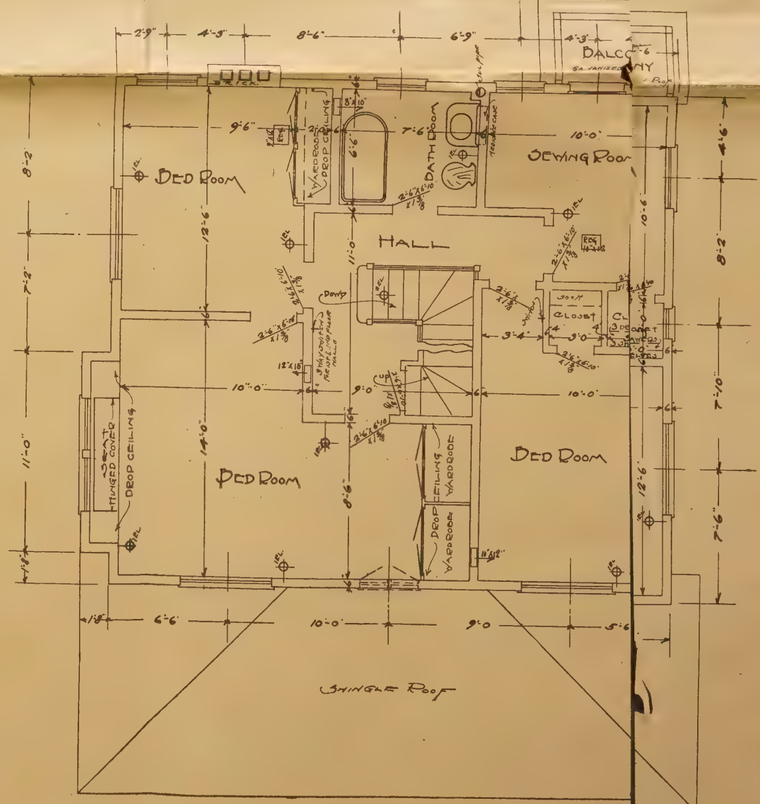


BASEMENT

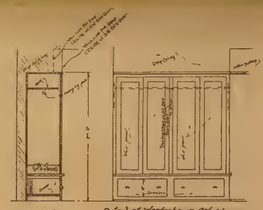


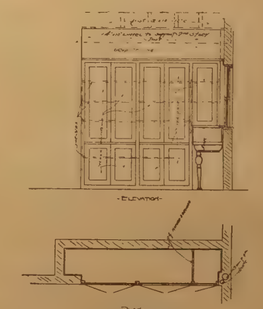
1ST FLOOR


SECTION



2ND FLOOR


Section Detail of Wardrobe in 2nd Story


Elevation

Plan
Detail of Kitchen Cupboard

THE NATIONAL BUILDER

Vol. 52 CHICAGO, APRIL, 1911 No. 4



THE NORTHWIN ROUGHCAST HOUSE, for T. G. Windes, Jr., Winnetka, Ill.

NATIONAL BUILDER DESIGN No. 340

Alfred F. Pashley, Architect, Chicago

For Floor Plans, Elevations and Details, See Supplement of this Number. Estimated, Cost $41,24.00

THE NORTHWIN ROUGH CAST HOUSE

The house shown on our supplement sheet for April is a pleasing example of Colonial design, built at Winnetka, Ill., Alfred F. Pashley, architect, of Chicago.

In the basement, space is provided for a Furnace Room, Laundry, Workshop, and Stores. On the first floor a spacious Living Room has a fireplace at one end, on both sides of which are bookcases built in. Opening off the Living Room and well within range of the fireplace is a Den, secure in its isolation for rest, study and quiet. Across the central Entrance Hall are the Dining Room and Kitchen, the latter in particularly good arrangement with the Pantry and rear entrance. Three Bed Rooms and a Sewing Room, each with a separate closet, and a Bath Room, completes the second floor. The attic is devoted to storage room, although there is ample space for additional rooms.

The foundation is brick and the superstructure of frame with rough cast above the grade. When properly applied, this material is durable and adds greatly to the warmth of the house, while its appearance is pleasing. From its location in the suburbs, away from the dust and smoke of the city, the brightness and freshness of the finish should remain a long time, while the incombustible sides reduces the fire risk. The upper sash of the windows is divided into narrow vertical panes. Stained shingles on the hip roof, relieved by dormers, will harmonize with the soft tone of the walls.

ESTIMATE OF THE NORTHWIN

By I. P. HICKS

EXCAVATING AND MASONRY.

230 yds. excavating, 35c	$ 80.50
1,000 cu. ft. concrete walls and ftgs., 25c	250.00
9,000 brick laid in wall, $12	108.00
300 yards rough cast plaster, 70c	210.00
54 yards cement plaster, porch ceiling, 40c	21.60
18 lineal ft. chimney breast, $2.50	45.00
21 lineal ft. triple flue chimney, $2.00	42.00
100 yards cement floor in basement, 60c	60.00
Total excavating and masonry	$817.10

LUMBER BILL.

	Feet.
1 8x8x10 ft. girder	53
4 2x4x12 ft.; 8 2x4x16 ft. basement	117
38 2x10x12 ft. first floor joists	760
15 2x10x16 ft. first floor joists	400
14 2x10x10 ft. first floor joists	233
16 2x8x16 ft. porch joists	320
38 2x10x12 ft. second floor joists	760
15 2x10x16 ft. second floor joists	400
14 2x10x10 ft. second floor joists	233
16 2x6x16 ft. porch ceiling	256

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4 2x10x16 ft. for porch	107
4 2x10x10 ft. for porch	67
8 2x6x16 ft. for rear porch	128
36 2x8x12 ft. attic joists	576
32 2x8x10 ft. attic joists	167
30 2x6x16 ft. plates	480
122 2x4x18 ft. outside studding	1,464
120 2x4x18 ft. partition studding	1,440
60 2x4x16 ft. plates	640
46 2x6x20 ft. rafters	920
24 2x4x16 ft. dormers	256
23 2x4x12 ft. collar beams	184
25 2x4x14 ft. porch rafters	233
20 2x2x18 ft. furring	120
30 1x4x12 ft. bridging	120
30 1x6x12 ft. braces	180
12 2x6x16 ft. for porch frame work	168
Total ft. framing lumber	10,782
10,782 ft. framing lumber at $27	$291.11
2,700 ft. sheathing, outside walls, $27	72.90
2,100 ft. sheathing, rough floors, $27	56.70
2,000 ft. 1x6 roof sheathing, $26	52.00
19¾ m. clear R. C. or cypress shingles, $4.50	88.87
2,350 ft. ⅞x2¼ face qr. sawed, Y. P. flooring, $45	105.75
415 ft. 1x4x10 ft. cypress flooring, porch, $45	18.67
400 ft. ⅝x4x10 ft. Y. P. ceiling, $32	12.80
820 ft. ⅝x4x12 to 16 ft. Y. P. ceiling, $32	26.24
350 lineal ft. 1x8x16 ft. fir finish, $40	9.32
180 lineal ft. 1x6x16 ft. fir finish, $40	3.60
250 lineal ft. 1x4x16 ft. fir finish, $40	3.32
100 lineal ft. 1x12x16 ft. fir finish, $40	4.00
80 lineal ft. 1x10x16 ft. fir finish, $40	2.68
24 lineal ft. ⅛x12x12 ft. fir finish, $40	1.20
400 ft. 1x6x12 to 10 ft., No. 1 flooring, basement, $30	12.00
1,070 ft. 1x6x12 to 16 ft., No. 2 flooring, attic, $29	31.03
10 2x10x12 ft. Y. P. select, cellar steps	6.00
150 ft. 1x12x12 ft. Y. P. finish, shelves, etc., $45	6.75
Total lumber bill	$804.94

MILL WORK.

4 cellar window frames, 32x10, 3 lt., $1.75	$ 7.00
1 cellar window frame, 22x10, 3 lt	1.75
1 cellar window frame, 26x10, 3 lt	1.75
4 cellar sash, 32x10, 3 lt., $1.00	4.00
1 cellar sash, 22x10, 3 lt	1.00
1 cellar sash, 26x10, 3 lt	1.00
1 front door frame, 3 ft. 0 in. x 7 ft. 0 in	2.50
1 rear door frame, 2 ft. 8 in. x 7 ft. 0 in	2.25
2 set jambs, C. O., 5 ft. 0 in. x 7 ft. 0 in., 90c	1.80
1 set jambs, dr., 2 ft. 8 in. x 7 ft. 0 in., 80c	.80
3 set jambs, dr., 2 ft. 6 in. x 7 ft. 0 in., 80c	2.40
2 set jambs, dr., 2 ft. 4 in. x 7 ft. 0 in., 70c	1.40
9 set jambs, dr., 2 ft. 6 in. x 6 ft. 10 in., 70c	6.30
2 plank frames, 2 ft. 6 in. x 6 ft. 6 in., $1.20	2.40
1 front dr., 3 ft. 0 in. x 7 ft. 0 in	18.00
1 rear O. S. dr., 2 ft. 8 in. x 7 ft. 0 in	4.50
1 5 panel dr., 2 ft. 8 in. x 7 ft. 0 in., 1¾	4.00
3 5 panel dr., 2 ft. 6 in. x 7 ft. 0 in., 1¾, $4	12.00
2 5 panel dr., 2 ft. 4 in. x 7 ft. 0 in., 1¾, $4	8.00
9 5 panel dr., 2 ft. 6 in. x 6 ft. 10 in., 1⅜, $3	27.00
2 5 panel dr., 2 ft. 6 in. x 6 ft. 6 in., 1⅜, $2	4.00
3 window frames, 56x27, $3	9.00
4 window frames, 56x22, $3	12.00
1 twin frame, 30x21	4.50
1 twin frame, 30x20	4.50
1 window frame, 30x22	2.25
1 window frame, 28x18	2.00
1 window frame, 38x22	2.25
1 window frame, 36x22	2.25
1 window frame, 20x22	2.00
1 window frame, 36x18	2.00
1 window frame, 20x18	2.00
1 twin frame, 14x28, divided	4.00
1 quadruple sash frame, 18x20	6.00
1 frame, 34x15	2.00
1 frame, 40x27	2.00
2 sash frames, 30x20, $1.75	3.50
1 dormer sash, 32x18	2.00
1 triple sash dormer frame, 16x24	4.50
1 sash door frame	2.25
3 windows, 56x27, top sash divided, $11	33.00
4 windows, 56x22, top sash divided, $9	36.00
2 windows, 30x21, top sash divided, $2.80	5.60
2 windows, 30x20, top sash divided, $2	4.00
1 window, 30x22, top sash divided	2.20
1 window, 28x18, top sash divided	2.00
1 window, 38x22, top sash divided	3.00
1 window, 36x22, top sash divided	3.00
1 window, 20x22, top sash divided	1.70
1 window, 36x18, top sash divided	2.50
1 window, 20x18, top sash divided	1.50
2 windows, 14x28, top sash divided	1.70
4 sash, 18x20, top sash divided	4.00
1 window, 34x15, top sash divided	2.20
1 window, 40x27, top sash divided	3.60
2 sash, 30x20, divided	2.40
1 dormer sash, 32x18	2.15
3 sash, 16x24	1.50
1 sash door, glass 24x34, div	3.00
800 ft, red gum casing, 2½c	20.00
800 ft. band mold R. gum, 1¼c	10.00
120 ft. window stool, R. gum, 2c	2.40
120 ft. apron, red gum, 2c	2.40
320 ft. door stops, 14 ft. red gum, 1¼c	4.00
420 ft. window stops, 14 ft. red gum, 1c	4.20
600 ft. red gum base, 4c	24.00
600 ft. floor mold, ½c	3.00
400 ft. picture mold, 1½c	6.00
2 bookcases, complete with shelves and doors, $20 each	40.00
Dining room cupboard, complete with doors, drawers, shelves and mirror	25.00
Kitchen cupboard, complete with doors, shelves, etc	30.00
Medicine case	5.00
Window seat	9.00
Main stairs	50.00
Attic stairs	18.00
50 ft. porch rail, 12c	6.00
300 ft. cove mold, 1c outside	3.00
300 ft. crown mold, 2c	6.00
100 ft. quarter round, ½c	.50
8 dormer brackets, 40c	3.20
2 porch columns, $4	8.00
6 porch newels, 40c	2.40
26 ft. top porch rail, 6c	1.56
26 ft. bottom porch rail, 6c	1.56
100 balusters, 1¼x1¼x24 in., 4c	4.00
Total mill work	$589.12

CARPENTER LABOR.

10,782 ft. framing lumber, $10	$107.82
6,800 ft. sheathing, $9	61.20
19¾ M. shingles, $2.25	44.44
2,350 ft. finish floor, $2	47.00
Smoothing 2,000 ft., $1.50	30.00
400 ft. porch floor, $1.50	6.00
400 ft. porch ceiling, $1.50	6.00
250 ft. cornice, 15c	37.50
Work on porches	20.00

FINISHING.

6 cellar windows, $1.25	$ 7.50
2 cellar doors, inside, $2	4.00
1 outside cellar door	2.00
2 hatchway doors	4.50
1 front door	4.50
1 rear door	3.50
2 cased openings, $2	4.00
1 double acting door	4.00
14 inside doors, $3	42.00
32 windows, $2	64.00
Setting frames	10.00
600 ft. base, 5c	30.00
Front stairs	32.00
Attic stairs	12.00
Cellar stairs, outside	3.00
Cellar stairs, inside	6.00
400 ft. picture mold, 1¼c	5.00
Book cases	20.00

Dining room cupboard	12.50
Kitchen cupboard	15.00
Medicine case	2.50
Window seat	4.00
Incidentals, 10%	65.19
Total carpenter labor	$717.15

RECAPITULATION.

Excavating and masonry	$817.10
Lumber bill	804.94
Mill work	589.12
Carpenter labor	717.15
Nails and hardware	60.00
Tin work	58.00
Plastering, 775 yards at 27c	209.85
Electric wiring	52.00
Plumbing	275.00
Heating, furnace	150.00
Painting	195.00
Incidentals, 5%	196.40
Total estimate	$4,124.56

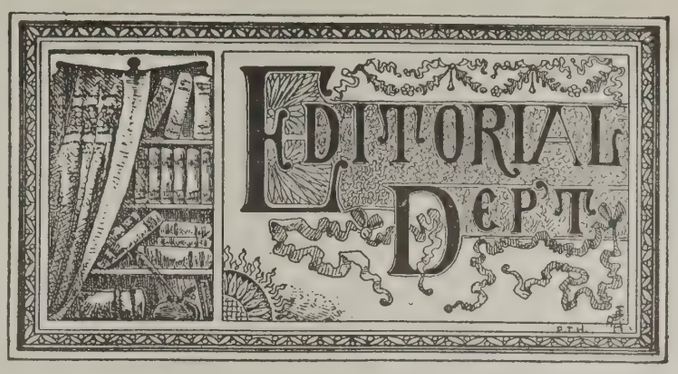
QUALITY OF BRICKS

THREE main points with reference to bricks have to be taken into account. 1. The power of resistance under pressure; 2, the appearance of the fracture, which should present an even texture, and a fine and brilliant grain, without cavities in the interior, and neither ribbony nor stony; 3, the exterior, which should be smooth and regular, the angles and edges sharp and straight. When the size of the bricks is equal throughout the mass it is a proof that the brick earth has been well prepared and the bricks generally well made. A brick, when struck, should give forth a clear, ringing sound. Good bricks are generally of a dark reddish-brown color, and sometimes they show vitrified spots on the surface; it is not well, however, to depend too much on this last fact, for it is often only an indication of the amount of heat to which the brick has been subjected, while the clay of which the brick is made may be impure and ill prepared. Bad bricks are readily recognized by their reddish-yellow color, but still more by the dull sound which they emit when struck; their grain being soft they crumble easily, and absorb water with avidity. A good brick should not absorb more than about one-fifteenth of its own weight of water; it should appear, and in reality be, dry. A brick that does not take up any water at all is too much burnt; the mortar adheres to it imperfectly, but it is a good conductor of heat. Such bricks may be used in damp soil and for pavements. When a brick left in water either scales or swells it is of bad quality and contains caustic lime. A brick which, being made red-hot, and then having water poured on it, does not crack, is of extraordinary and rare quality, and those which have borne the effect of moisture and dryness during two or three winters without scaling or cracking are excellent. In order to try if bricks will bear the effect of frost, let one be boiled for half an hour in a solution of sulphate of soda, saturated cold, and then suspended by a string over the vessel in which it has been boiled. In twenty-four hours the surface of the brick will be covered with small crystals; the brick is then to be immersed again in the solution until the crystals disappear, and again suspended, repeating this operation for five days, the crystals reforming after each immersion. If after this treatment a number of particles of the brick are found at the bottom of the vessel containing the solution, the bricks are incapable of supporting the effects of frost.

A COLOSSAL STATUE

WHAT may become one of the most famous statues in the world stands above Eagle's Nest, across the river from Oregon, Ill. It has been in process of making three years and is now near completion. It is constructed of concrete. The Indian figure, which is forty-eight feet high, stands facing the south, looking down the river. The head and profile and folded arms appear perfect in detail as they are outlined against the sky and forest from many viewpoints around the country.

The claim of the statue to fame lies in three things: First, any one may read its message. Second, the statue's great size, forty-eight feet, without counting either the artificial base or the natural rock foundation 250 feet high on which it is placed, puts it on a scale with the Goddess of Liberty in New York harbor and the great statue of "The Pilgrim" on the New England coast.



Brick is still king!

* * *

Late statistics inform us that more money was spent in 1910 for bricks, than was spent for all other building materials put together during the same year.

* * *

A material that holds its own for from five, to then thousand years, without being discarded, is not to be despised, particularly when it is used in larger quantities today than ever before. Will steel, Portland cement, or other material, excepting stone, hold as prominent a place in the building world, after another thousand years have come and gone?

* * *

A brick is a simple thing, and has been known as a "brick only." from time immemorial—it is a good thing, and when a man is dubbed a "brick," we all know the expression is intended to convey the idea that he is a "good fellow." Now, if it had been said, the fellow was a "clay product," you would not have understood what was intended; it would have reminded one of the colored man, who was told to pick up "that agricultural implement"—meaning a spade! The gentleman of African descent, was bewildered—and no wonder, for the term was new and unknown to him. Let us stick to the good old fashion "brick." It is the better word—more appropriate, than the new fangled "clay-product," and homelike. How many men—good men too—who handle brick often, and are regularly employed in the building trades, such as painters, plumbers, plasterers, carpenters and others, who cannot tell the exact size of a brick? Thousands of men who are working, and who have worked among bricks and brick buildings, for years, cannot tell you the standard size of a brick offhand when asked. Every tradesman in building construction, should know the exact dimensions of a brick, and give them immediately on being asked; can you tell at once?

* * *

A change in the style of interior finish is generally, and surely taking place. The change is tending towards a betterment of taste and chaste simplicity. The standards aimed at, which seem to be the objective points are those created by Chippendale, Hepplewhite, Shereton and other Georgian and colonial designers. We have in our mind a very handsome old colonial house, in New England, the home of a dear, wealthy, middle aged lady, who has lately renovated the building, leaving the outside as nearly as possible, as when first built, but the whole interior, with the exception of the hall and stairway, have been so changed that very little of the finishings as first put in, are in evidence. The drawing room and parlor are finished in strict Chippendale style, the furniture being all made of Spanish mahogany in the building, by the workmen who made the repairs and changes, all under the supervision of a competent Boston architect. The hall, as far as possible, and a large open reception room to the right, are finished in the style of Hepplewhite, and are really beyond reproach, both as to proportion and harmony, and in color and balance. But the beauty room, from the standpoint of the writer, is the dining room, which is to the rear of the drawing-room, and is fitted up in a solid Shereton style, the lambrequins, over-mantels and overdoors, are all richly moulded with fine colonial mouldings—all hand made, and, as one lady exclaimed, when she was introduced into the room, "Oh, my! it is an exquisite dream from fairy land!" The whole house—inside and out—is a combination of beauty, good taste and convenience.

* * *

We hope this new departure in domestic architecture will continue, and seize on the artistic good sense of the people. It will prove elevating in the extreme, and will tend greatly towards the cultivation of a broader refinement in matters of home building.

The various cabinet-makers throughout the country are certainly doing their share towards fostering a better taste in the way of artistic furniture and fittings, for much of the work now being placed on the market, is being built on the lines of the Georgian, or colonial practice, and much of the furniture made fifteen or twenty years ago, is finding its way into the upper attic or to the secondhand shops. THE NATIONAL BUILDER will not lag behind in this new movement, but will from time to time publish such items, and illustrate such designs as may be thought to be useful to those who are called upon to work on the lines suggested in the foregoing.

* * *

By the death of John Mervin Carrère F. A. I. A., of the firm of Carrère & Hastings, America, has lost another of her best architectural exponents, and a man who had endeared himself to every person who came in contact with him, either professionally or socially. Since the violent death of the late Stanford White, Mr. Carrère has been much in evidence, in artistic circles. It is rather strange that two of our greatest artists should be taken from us at an eardy age, and by untimely deaths. Mr. Carrère was thrown from a taxicab, which collided with a street car on Madison avenue, New York City, on Feb. 12th, 1911, striking his head on the pavement and rendering him unconscious—from which he never recovered. He died in the Presbyterian Hospital, New York, on March 1st—regretted by all who knew him personally.

* * *

The report of the progress of the work at Panama during December shows that during the month there was completed 1,488,880 cubic yards of excavation for plant, a total for the month of 2,603,206 cubic yards. As compared with the preceding month, there was an increase of 5,060 cubic yards in the amount of concrete laid, the daily average for the 26 working days being 2,085 cubic yards.

* * *

We note that, by a very large majority, the House has chosen San Francisco as the exposition city to celebrate the completion of the Panama canal in 1915. Although we consider that these great fairs have been too frequent in the past few years, and have been dominated too much by the spirit of commercialism, we congratulate San Francisco on its selection, and express the hope that the authorities will make the event what is should be—a great educational influence.



CEMENT STUCCO COTTAGE

THIS house designed and built by D. E. Wiseman, San Francisco, Cal., is one of exceptional beauty. It is built on a slope overlooking the Pacific Ocean. The exterior is pure white cement stucco, the casements and other exterior wood trim being stained a dark brown to give contrast to the whole. The roof is flat with eaves widely extending.

The steps leading from the side is a good arrangement, as it prevents a glaring appearance which would result if led directly from the front up to the main entrance.

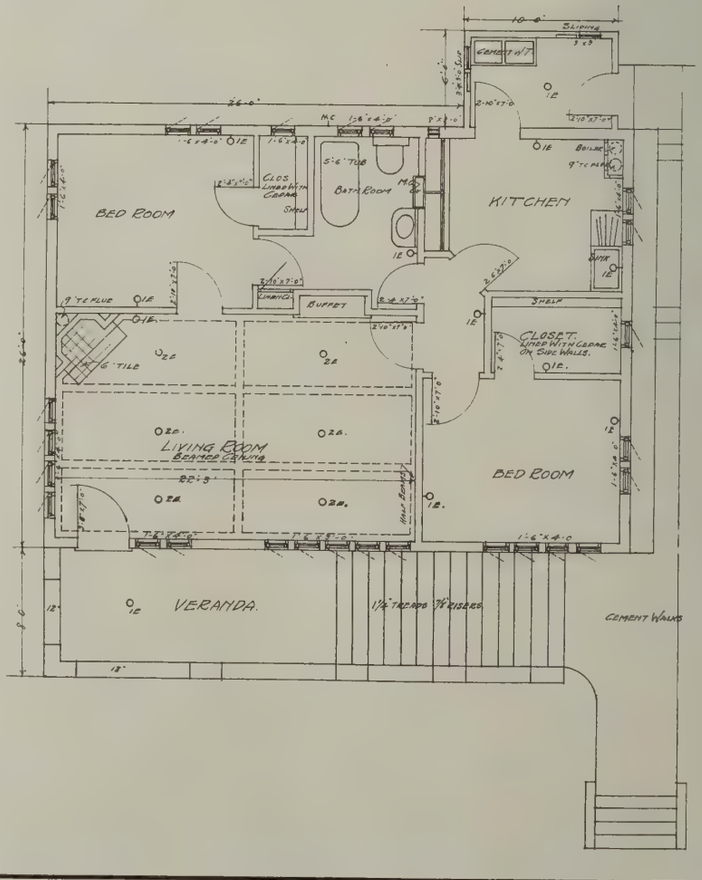
The space from the ground up to the first floor gives ample basement room, although no rooms are finished therein.

The veranda is commodious, being about 7 ft. x 17 ft., partially roofed and with one side closed with glass to prevent the direct draft of ocean breezes.

All windows are long and narrow and of the casement type, opening outwardly.

The floor plan shows a design for home comfort exclusively. All rooms are large and well lighted. The living room has a beam ceiling and a large fireplace across one corner. The closets are lined with cedar to make them moth-proof.

The approximate cost of this cottage is $2,500



"In one benighted region of a certain state in the Southwest," says a Chicago lawyer, "they cherish some peculiar notions touching the duties of a juror.

"One day a case was being tried, when suddenly the justice exclaimed:

" 'How is this? There are only eleven jurymen in the box. Where is the twelfth?'

"The foreman rose and addressed the court respectfully as follows:

" 'May it please your honor, the twelfth juror had to go away on important business, but he has left his verdict with me.' "—Case and Comment.

BUILDING WITH TERRA COTTA HOLLOW TILE

By WM. J. TEAGUE

TERRA cotta hollow tile has been used as a building material in the larger cities for several years, and as a fire-proof material it has proved itself so superior that its use is rapidly spreading. Many tiles are now being used in smaller towns, and even country places, where local builders are not familiar with handling them.

Any competent bricklayer can lay tile, but when building a complete structure many problems present themselves that do not occur in brickwork. The tile used for the walls are scored with dovetailed groves about 3-16 inch deep. Those used for floors are marked with shallow groves which make them better for plastering against.

When starting to build with them it will be found that the tile vary in thickness and height, while some are winding or otherwise distorted. This is disturbing to some bricklayers, but if care is used by the corner men to select the straight tile the walls can be kept straight; the variation in the height of a course can be partly overcome in the next course, and while the important thing is to have face of wall straight, it is better if each course is kept somewhat in level.

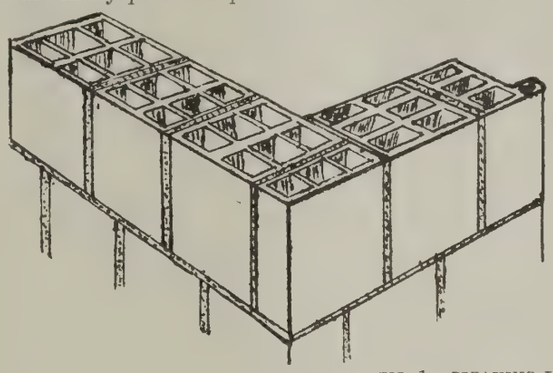


FIG. 1. BREAKING JOINTS IN 12-IN. WALL.

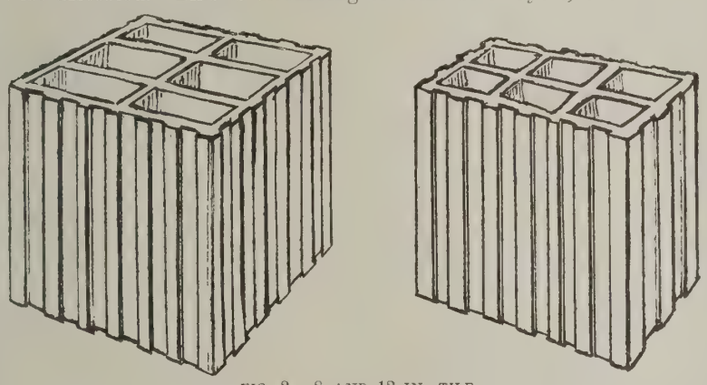


FIG. 2. 8 AND 12-IN. TILE.

The easiest and most natural way to lay tile would seem to be on the side with the holes horizontal, but in practice, the easiest and best way is on end with the holes vertical. In the first place the walls are much stronger when the tile are laid on end, the ends also, are straight, while the sides are a little full, making it almost impossible to use some of them on the side. The tile do not absorb the moisture from the mortar so readily when laid on the side, which avoids a great inconvenience when it is necessary to run to story height.

The only mortar that can be used is cement mortar. This must be made rich enough to be a little sticky—about 2½ of sand to 1 of cement, with the addition of a little lime if thought best.

The spreading of mortar on the narrow walls and partitions of the tile is one of the first difficulties that presents itself. To do this without losing a quantity, takes a little practice, but it is only necessary to spread mortar on the edges that run in line with wall and not the cross partitions, which seldom coincide with those above or below. The upright joint is put on the tile to be laid, and by resting it on the mortar board the mortar that falls off can be saved.

For 10 and 12 inch walls there are made corner blocks 15 inches long, for the purpose of breaking joints. Sometimes these are not provided, it is then best to start corners with a 6 inch tile on each course, as illustrated in Fig. 1. This will save breaking tile.

The 12 inch tile contain six holes as illustrated in Fig 2. The right way to lay them is with the three holes across the wall. In this way your wall will have four partitions of the tile as bearing walls with a corresponding increase in strength, and if an 8 or 6 inch tile is used as a closure, the partitions will be above the partitions in the 12 inch wall.

Piers are often built of tile and filled with reinforced concrete. When building for this purpose after every two or three courses, the inside mortar joints should be cleaned off. If this is neglected the holes will become choked with mortar at some of the joints making it almost impossible to insert the reinforcing rods. For this same reason the holes in piers and straight walls that have to be reinforced should be directly above each other where it is possible. Piers of large dimensions can be built with 2 inch tile and filled with reinforced concrete. The pressure of the wet concrete, however, will have to be provided for by braces.

It is not necessary to provide lintels to go across small openings in tile buildings, the tile itself with good cement mortar will be sufficient; sometimes spans of 6 or 8 feet have been built in this way without even cracking. The best way to make lintels for wide openings or in foundation walls is to build across a form or window frame that has been braced with 2 inch tile, a course in line with outside of wall and one with inside of wall as illustrated in Fig. 3. Fill the space with reinforced concrete and you will have an

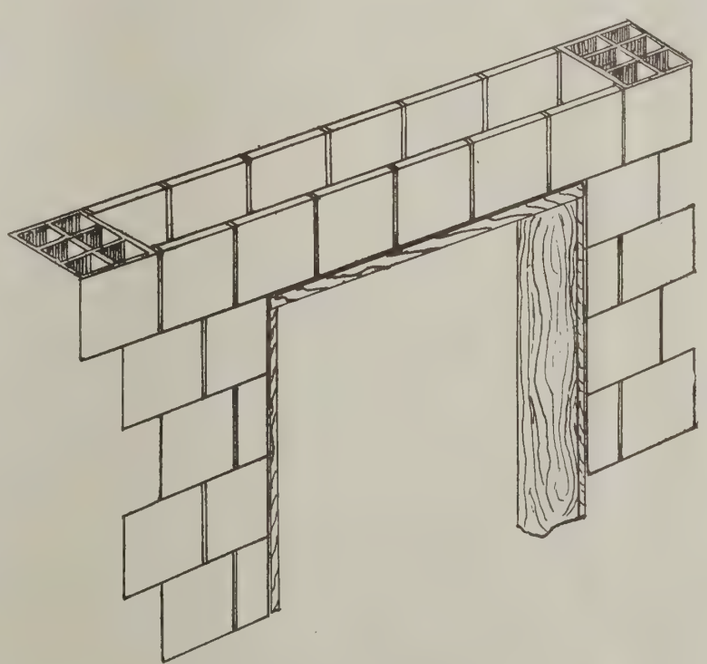


FIG. 3. METHOD OF BUILDING LINTEL.

8x12 concrete lintel. Some provision should be made for pressure by bracing.

This lintel is much better than a plan given by a Corrugated Iron Bar Company, in which tile the same width as the walls was shown laid end on end with the holes horizontal and made long enough to cross the opening. These were filled with reinforced concrete. The trouble with this method is that the concrete cannot be forced in the holes when laid flat across the opening, and if made standing on end it would take a power hoist to lift in place.

Much time is lost in building with tile if the attempt is made to cut to exact story height.

Tile are difficult to cut down from the end and some other way should be found to get as near as it is necessary to height. All sizes are sent with several wire cut tile. If these are kept back they sometimes become useful to get to height desired.

Most of the other difficulties that occur can be worked out by any good bricklayer or stonemason, to the satisfaction of owner and architect.

USUAL PRACTICE IN BRICK WORK

THE usual method of leaving a brick wall which is to be continued at some future time is to tooth the same, which consists in leaving each header projecting 2¼ inches beyond the stretching courses above and below to allow the new work to be bonded to the old as shown in Fig. 2.

The usual practice in joining new cross walls to old main walls is to cut out a number of rectangular recesses in the main walls equal in width to the width of the cross walls, three courses in height, and half a brick in depth, a space of three courses being left between the sinkings (as shown in Fig. 1); the new cross wall is then bonded into the recesses with cement mortar to avoid any settlement. It is necessary that the sinkings should not be less than 9 inches apart, as in the cutting the portion between is likely to become shaken and cracked.

FIG. 1.

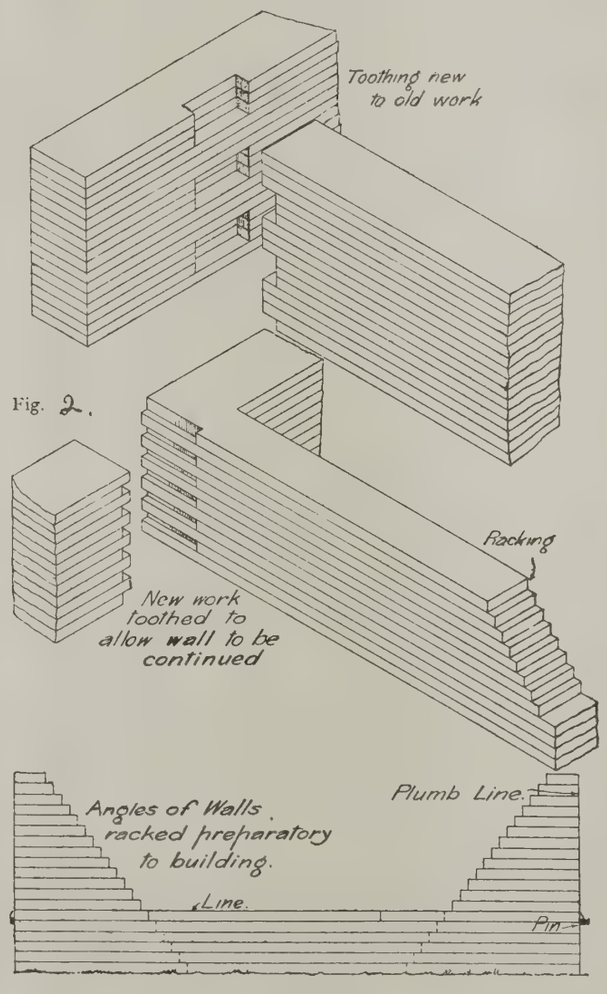


FIG. 3.

Racking is the term applied to the method of arranging the edge of a brick wall, part of which is unavoidably delayed while the remainder is carried up. The unfinished edge must not be built vertically or simply toothed, but should be set back 2¼ inches at each course, to reduce the possibility and the unsightliness of defects caused by any settlement that may take place in the most recently built portion of the wall.

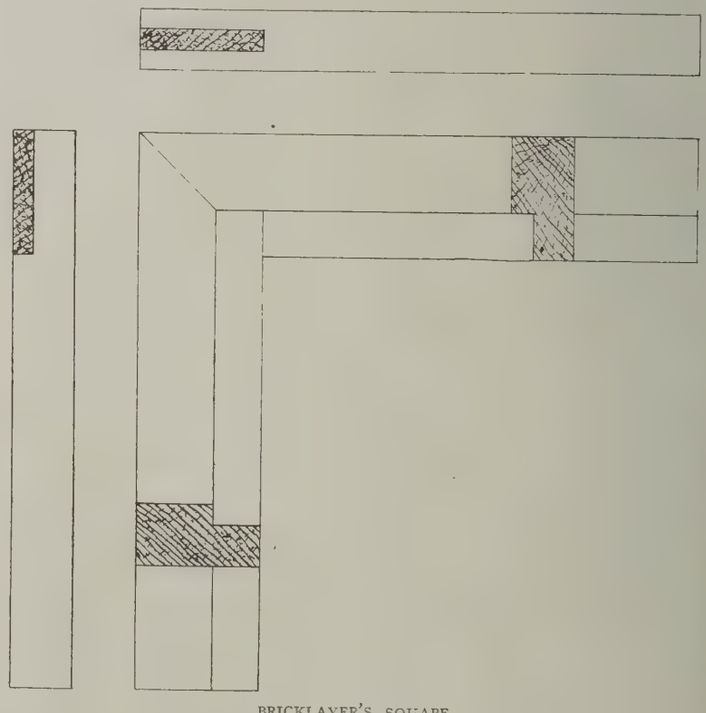
Also where new walls are erected the usual method of procedure is to build what is technically termed a corner, that is, the angles or the extremities of the walls, to a height of two or three feet, the angle bricks being carefully plumbed on both faces. The base of the corner is extended along the wall, and is racked back as the work is carried up, as shown in Fig. 3. The intermediate portion of the wall is then built between the two corners, the bricks in the courses being kept level and straight by building their upper edges to a line strained between the two corners.

A BRICKLAYER'S SQUARE

EDITOR NATIONAL BUILDER: I am sending you a plan of a square that I think saves considerable time when building a chimney, and one desires letting the top courses project out. It is used for squaring the corner bricks.

I do not claim to be the inventor, but have not seen the square used very frequently, nor have ever seen it advertised.

The plan is about one-third size. It can be made any size to suit the requirements. W. A. W.



BRICKLAYER'S SQUARE.

A writer in the "Zeitschrift fur Vermessungswesen" states that the slide-rule was invented 300 years ago, and calls attention to the fact that Gunter, shortly after the production of his logarithm tables in 1620, had logarithmic schemes engraved on wooden rules, and performed the operations of multiplication and division by subtracting the logarithms by means of dividers. In 1627, Wingate facilitated this operation by engraving the scales on separate rules sliding in one another, and in 1657, or over 250 years ago, Partridge brought out a slide-rule very similar to that used today.

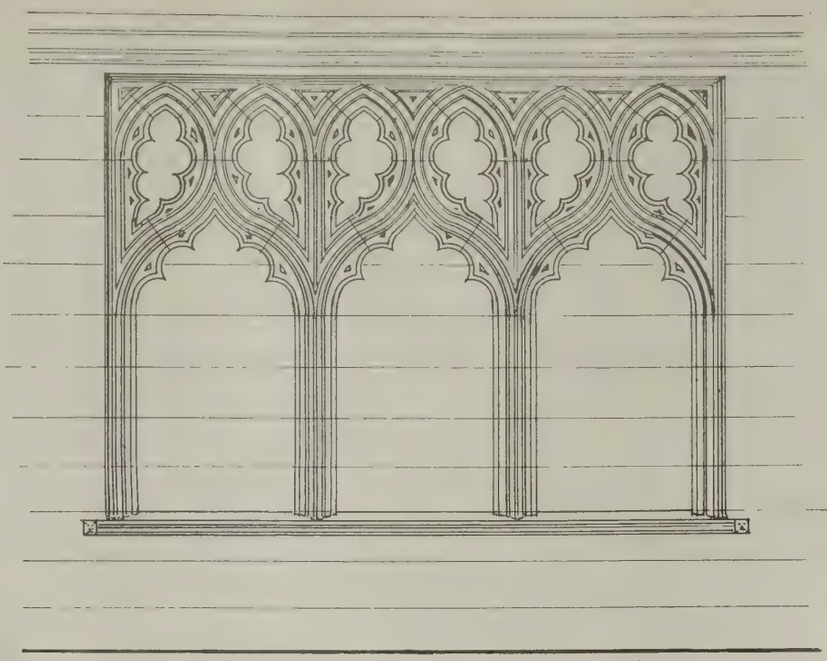


FIG 1

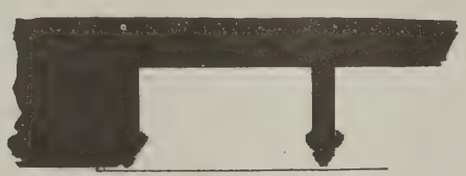


FIG 2

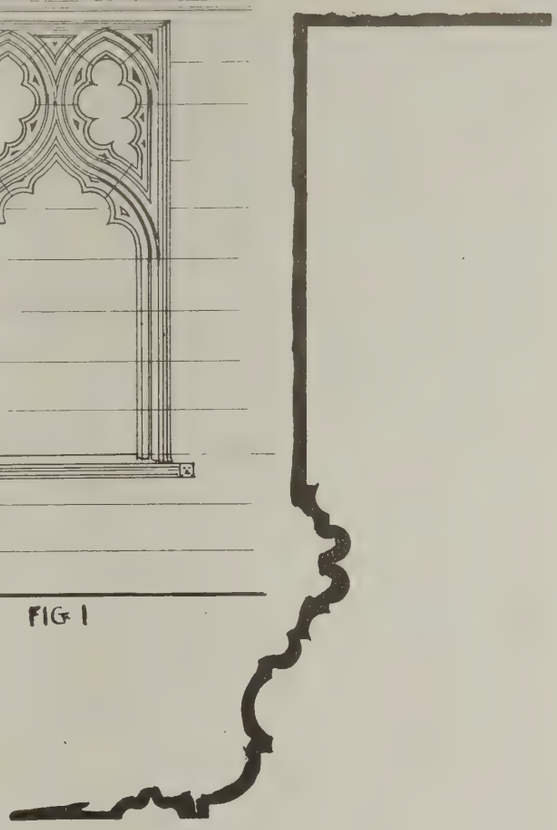


FIG 4



FIG 6

FIG 5

FIG 3

SEDELIA IN THE PAISLEY ABBEY, SCOTLAND

Drawn From Measurement—By John Y. Dunlop

THE sedelia, which are the seats for the high priests, built in masonry, is generally built on the south wall of the chancel.

Fig. 1 shows the front elevation with three seats, and is said to be the only one of that number in existence.

The lines of the tracery, which is of the decorated style, are very rich.

The general appearance is simple, caused by the graceful grouping of the various circles, and magnificent by the varying

size of the circles and the richness of the geometrical tracery. Figs. 4, 5 and 6 show the section of the jamb, lintel, and the front edge of the seat.

In each of those hollow moulding are very prevalent, these being special characteristics of the style.

This old monastery, of which the charter was confirmed in 1172, is of most beautiful proportions.

The walls of some part upon which there are many curious pieces of sculpture, are in a ruinous condition, and only about ten feet in height. On the south side near the east, where the high altar stood, are the graceful and highly decorated remains of the sedelia, Fig. 3.

The whole edifice of the once famous monastery, which stands as usual, with ancient churches, east and west, was 265 feet in length.

It would be most interesting to know who was the architect that designed in such beautiful proportions and symmetry, both internally and externally, the church of the old Paisley monastery.

BUILDINGS OF ADOBE BRICK

ADOBE is pronounced as if it were spelt doby, and adobe bricks are made of soil selected for the purpose, generally a mixture of clay and sand, and they are dried by the heat of the sun. These bricks can be, and frequently are, used for building through all the west half of the United States. The reason adobe is suited to this region is because there is never rain and moist atmosphere enough to dissolve, or in any manner affect their durability, though Northern California is an exception, for there the fall rains are occasionally so prolonged that this material is unsafe, and some houses built with it have fallen, or rather melted and sunk into the original mortar.

With the Mexicans, adobe is a favorite material; they build stables, dwellings, and churches with it, and there are adobe houses in Santa Fé and El Pasco erected fifty years ago, which are apparently as firm as when first put up. All the forts of the old fur traders, such as Bent's, Lupton, St. Vrain, and the like were adobe, and although they were vacated many years ago and dismantled, having no kind of protection on the top of the walls, the rains have made but little impression upon them. But it is usually considered necessary that the top of an adobe wall have a cover of wood, or of stone, or of burned brick. At Salt Lake the old Temple was adobe, and also the high wall around Temple square, while other structures and dwellings, many quite costly were of the same material. At present, however, all the business blocks are of burned brick, not perhaps because such are more durable, but because a great obstacle is presented in rain storms coming unexpectedly while the adobe is drying or are laid in the wall, since if a rain is heavy the whole is likely to go to ruin; therefore, they who are able and who are in a hurry cannot afford to run risks.

Still, adobe is the poor man's material, and a house once built of it is lasting, and it is comfortable in the extreme; for, as the bricks are laid in mortar of the same material, the wall becomes as firm as if of one unbroken mass; indeed, it is more solid than a wall of burned brick. The rooms are warm in winter and cool in summer, and the fierce and terrible winds blowing for days together are unfelt and unheard. When an adobe brick is thoroughly dried, which in summer requires about a week, it is hard and heavy, and it rings under a trowel almost like a burned brick. If put in water it will return to its original mud in about thirty minutes; but while in a wall, and having been thoroughly dried, the ordinary rain of the country may beat on it all day and make no great impression. However, those who live in adobe houses are always willing to have the rain stop, unless there is a porch or other projection.

The Salt Lake people devised a plan of plastering the outside with lime mortar, but it was not until they had made many experiments; for adobe plastering, though good for the inside, is worthless outside, as it washes quickly away, and lime mortar will not stick; but when shingle nails are driven into the wall 6 inches apart, then the mortar sticks, making an excellent stucco, and being painted or whitewashed the finish is beautiful; there is no more trouble, and the wall may be considered as indestructible as anything on earth. It is likely that an adobe building, well constructed and protected, will last thousands of years, for the material becomes so hard that no part of it wears away or crumbles. In New Mexico the women perform the duty of repairing the walls every spring by plastering over such parts as have suffered injury from beating rains or other causes, and the work is slight, for it is only required to mix the soil with water and lay it on in mortar.

One might at first suppose an adobe house extremely cheap, made as it is of a materal that costs nothing, and which is under one's feet; but this is not exactly the case, for the labor is so hard and the process is so long that those not accustomed to working in adobe are apt to get discouraged, or they may work so rapidly that the walls break down before they are dry, or a sudden rain may spoil many bricks ready for use; hence it has resulted that adobe ceases to be popular, especially with eastern men, and they forego all the benefits on account of the difficulties which they have not the patience to overcome.

It is indispensable that lumber shall be on hand to keep adobe brick from getting wet. It is true that months may pass when no rain falls, and during which they will become thoroughly dry; but there is a risk, and it is probably true that no pursuit carried on by day labor can be continued if there are risks. Only capital can afford to run risks, if they are profitable. When several thousand adobe brick are laid out in a yard to dry they become strong enough in a couple of days to be ranked one on top of another, so as to admit the air and yet to occupy a small space; but boards must be ready to cover them in case of rain. This is said of such bricks as are of the size of burned brick, but experience has proved that a larger size is more profitable, and such are usually made. These will require four days to dry so that they can be moved, and it follows that the expense of covering small ones which occupy greater space is nearly balanced by the risk and time involved in making larger ones, and the difficulties are about equal.

HARDWOOD FLOORING

HAVE you ever glanced down the columns of your local paper you have, you must have noticed how owners, investors and under the caption of "Residence Property for Sale"? If real estate dealers feature the most important parts of the construction. If oak flooring is used, they always draw particular attention to that fact. There are good reasons why they do this. Oak flooring is a most important factor when it comes to renting or selling a residence, as there is no other part of the construction that helps more to beautify a home, as its colors are soft, rich and cheerful and tones up a home just as much as furniture. It gives an air of refinement and elegance to a home, whether it be in a humble cottage or a mansion.

AN ECONOMICAL USE OF OAK FLOORING.

The standard thickness of oak flooring are 13/16 and 3/8 inch thicknesses. The 13/16 inch thickness makes the most substantial floor, and usually is about 35 per cent more expensive than 3/8 inch. The 3/8 inch oak flooring can be laid over old floors very economically, taking the place of carpets, without in any way interfering with the woodwork of a room. When laid it has the appearance of heavy flooring, and not even an expert could detect its thickness. The highest quality of clear quartered oak flooring 3/8 in. x 2 in. wide can be bought, laid and polished for half the cost of fair quality of carpet, which proves that carpets are an expensive luxury, as compared with oak flooring.

ADAPTABILITY OF VARIOUS GRADES.

The following is a general outline of the uses that are generally made of the various grades of oak flooring:

Clear quarter-sawed or first grade.—For high class residences, hotels, apartment houses and club houses.

Sappy clear quartered or second grade.—An economical substitute where a dark finish is desired. This grade is as durable a floor as the clear grade.

Clear plain sawed or first grade.—For high class residences, hotels, apartment houses, churches and club houses.

Select plain sawed or second grade.—For medium-priced residences, hotels and apartments, schools, office buildings and stores.

No. 1 common or third grade.—For dwellings, tenements, stores, high class factories and manufacturers' buildings.

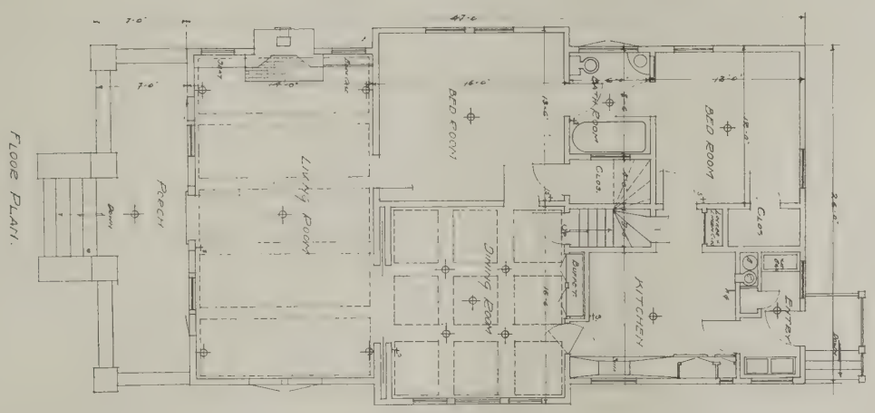
Factory or fourth grade.—For warehouses, factories and cheap tenements.

"Say, when are you going to pay me that money you owe me?"

"My dear fellow, I'm not a prophet."—Lippincott's.

BUNGALOW, OAKLAND, CAL.





THIS house, designed and built by Price Bros., Oakland, Cal., appears to be an unusually valuable one for the reason that it gives practically an eight-room house and for a cost of about $3,000 in Oakland, where it has recently been built. With the three upstairs rooms and bathroom not finished, as indicated in the drawings, it would cost about $500 less.

The exterior is of the handsome bungalow type with good and pleasing relief produced by the various courses of siding, first the lap siding to the bottom of window sills, then shingles and last the vertical siding with battens in the gables.

The front dormer helps form one of the second-floor rooms, and the rear dormer is left open for a sun balcony.

The tapered window casings add an artistic effect that is very popular at present.

The porch columns and trimmings, as well as the large outside chimney are clinker brick with a large fireplace in the living-room, made of Carnegie tile. This living-room is very roomy, extending across the entire front. This living-room and dining-room have beam ceilings, a bungalow essential.

The two bed-rooms on the first floor are each directly accessable to the bath-room, and each have large closets.

The kitchen is most conveniently arranged with cupboards, sink and shelving, as well as a cooling cabinet.

The entire floor plan shows a very careful study of home requirements.

For the investment it would seem that this design is difficult to excel.

FLOOR SCRAPERS

WE have reached the age in building where the floor scraper is as essential a part of the builder's tool equipment as the plumb bob and the level almost. We have gotten away from the old method of building a plain floor and covering it over with carpets, and the disposition today where a good house is built, no matter whether it is a cottage or a mansion, is a hardwood floor, and it is necessary to finish this floor off by scraping it. One of the things that has delayed the coming of the hardwood floor has been the indisposition on the part of carpenters to lay and finish them, and often this indisposition is traceable directly to the lack of being equipped with tools for scraping and finishing.

The carpenter that goes without this equipment is simply standing in his own light. He should have something of the kind, have the best that is offered if he can get it, and his work will justify it, but have something anyway. It is not the easiest thing in the world to decide which is the best floor scraper offered and which may be best for each individual builder. There are probably some that give better service than others, and there are probably many which would give better service if they were better handled and cared for. This is a matter for each man to figure out for himself after thoroughly investigating all the offerings.

HOW TO DRAW A STORE FRONT

By CHAS. CLOUKEY

THE store front is an important branch of carpenter work which any good carpenter can lay out and put through with satisfaction and profit, if he is able to understand the requirements or rather the desires of the owner.

It is not often that the ordinary tradesman has to get out the store fronts for new work of much pretension, as such construction is usually included in the general contract and let along with the other mill work. But there are so many cases where the taking out of the old style fronts nad putting the mod-

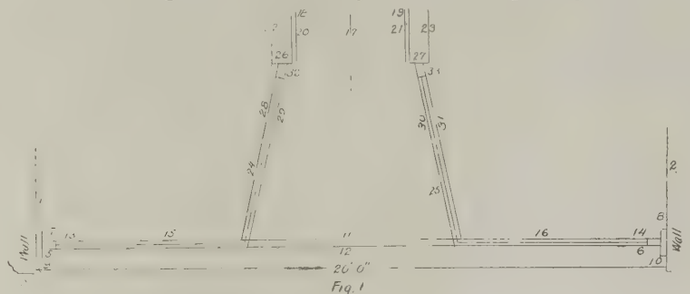


Fig. 1

ern show window fronts constitutes a separate job, that many carpenters take hold and figure this kind of work, although they attempt nothing in the regular contracting line.

To be able to make a good scale drawing of a proposed store front, showing up the several desirable features clearly so that the owner catches the idea of every part and can see just about how it will look when completed, will often mean the securing of the contract, all other things being equal.

But just how to go about making the necessary drawings when the essential figures are given is a puzzling problem for many a carpenter who has no very wide experience as a draftsman. So let us see what we would do if we got the following specifications to work into a plan and elevation for a common sized front.

Whole opening, 20 by 14 feet.

Front and recess glass to be polished plate, 72x86 inches, mitered.

Door 3 ft. 6 in. by 7 ft. 6 in., 2¼ in. thick, with plate glass, one light.

Paneled base below sash sill, 24 in. from bottom of front to bottom of plate.

Floor of recess to have 1½ in. fall.

Transom bar to be about 8 in. wide and transom to be divided into three lights.

Transom to be full width of front over the front plates.

The above specifications are enough for the purpose of making the drawing, as it does not make any difference in the lines whether the transom glass is double strength sheet, prism sheet, prism lights set in lead or copper, or if the lights are plain or beveled

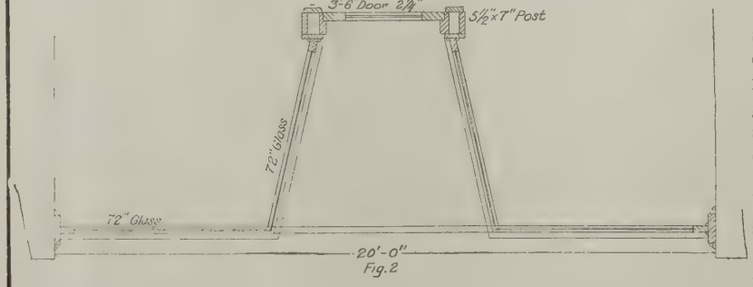


Fig. 2

plate, unless the carpenter making the drawing wishes to show how the small lights would look. It makes no difference with the woodwork, as the glass is stopped in from both sides.

Now if we are ready to begin, let us get a good smooth piece of paper, and if we cannot get hold of a sheet of detail paper, let's find something in a good heavy manilla wrapping paper, as this is about the right color and will stand lots of wear. It is not best to attempt such drawings on white paper, as they are almost sure to get so soiled that we are ashamed to show them to our customers, and at the same time dislike very much to do the work all over again.

Now get a smooth board and square it up for a drafting table if you haven't already got one, and make a T square with a tongue about 3 feet long.

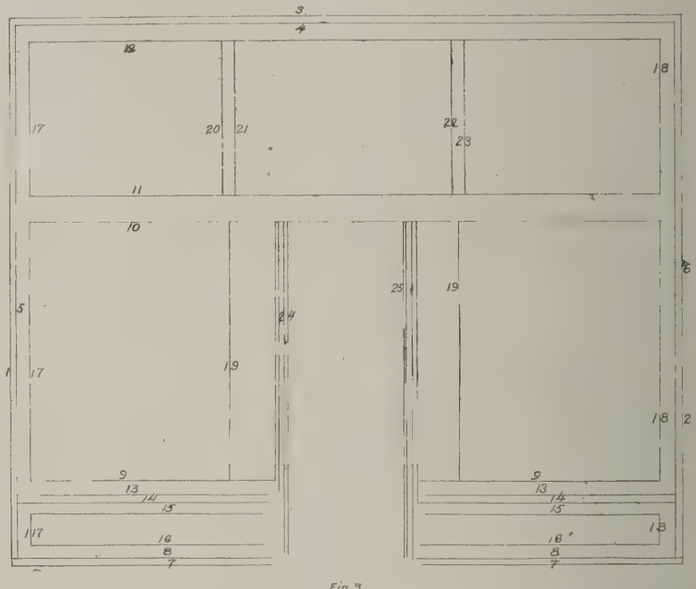
Fasten your paper on the board with thumb or other tacks, being sure that it lies smoothly.

I should have said before this that the scale of 1½ inch to the foot is a very good size to use for a store front, as it works out ⅛ of an inch to every inch of the full sized work. This would make the drawing of the elevation of the store front specified, 30" wide and 21" high and the drawing of the plan would be 30" wide and about 12 deep.

Now, referring to Fig. 1, we see that the lines are numbered from 1 to 33, which is as far as we can go in the first illustration without confusing the learner and making him lose track of the simplest way to draw the whole.

Lay the rule on the paper to be sure that the contemplated drawing will have enough room and to spare before beginning to draw. Now draw the first line back a convenient distance and then measure off the 20 feet to the right and draw the second line. The lines 3 and 4 make the angles of the wall and at once give the visible bounds of the work in width.

The lines 5 and 6 represent the face of the jambs outside of the store front proper, and their location back from the corner of the brick often depends upon the location of the I beams which


Fig. 3

support the superstructure; anyway it is necessary to locate them at the building. The short lines 7, 8, 9, and 10 complete the outlines of the jamb sections.

The two full lines 11 and 12 serve as the location for the main sash and transom of the front. 13 and 14 are the short lines which cut off the amount of width required in the stile of the sash. This may vary to suit the owner, and in this style of front may vary a good deal without having any noticeable effect upon the front as a whole, as it only makes the outside space of the recess a little more or less.

As this front shows a mitred plate glass and has no sash or bar at the angle, the lines 15 and 16 are run out 6 ft. from the sash which will be 9 inches on the drawing.

So far everything has been easy, but now we come to the hardest part of the whole task which is locating the door just far enough back so that the 72" glass and sash will just reach the outside casing of the door post. As the door is in the middle of this front, let line 17 be the center line, and draw it lightly as also all the lines from 17 to 23 as the greater part of all of them will have to be erased before the drawing is complete. The reason these lines are drawn so long is that we cannot tell exactly where the door is to come when we draw the lines. 21 inches on either side of the center line draw the lines 18 and 19 which give the width and lateral location of the 3' 6" door. ½ inside of these are drawn 20 and 21 which form the door rabbet and also the inside edge of the post. 22 and 23 are drawn 5" outside of the door line and form the opposite side of the posts.

Now returning to our mitred corners, we draw the other two glass lines 24 and 25, aiming them at the middle of the space marked off for the door posts. At the end of the 72″ we add the width of the sash and make the lines 26 and 27 which become the outer faces of the outside casings of the door posts. 28 to 31 inclusive are the sash lines for the recess lights, while 32 and 33 mark of the width of the recess sash.

We now pass to Fig. 2 which is the completed drawing of Fig. 1 and shows how the posts are developed and the door drawn into the plan. The sill lines on the outside of the sash are not drawn until the section is developed in connection with the elevation drawing, showing the width of the sill.

In Fig. 3 it will be seen that the first 6 lines serve to outline jamb opening, while the next two show the lower sills. These horizontal lines are numbered the same on both sides as they are drawn with the same stroke but broken in the middle for the recess. Here too, the lines should be light to facilitate erasing, as we do not know just now where all the vertical lines will fall.

Measuring off 2 feet from the bottom, we draw 9 which is the bottom of the plate. Then going up 84¼ inches draw 10, and 7½ inches farther draw 11. As the specification calls for about 8 inches in the bar, we make it 7½ as that will work out of an 8″ plank. Coming down 4 in. from the jamb at the top, we draw the top rail of the transom in line 12. Line 13 is the bottom of the sash, 14 the bottom of the sill and 15 and 16 are the outlines of the panel in the base.

As the horizontal lines given in this figure are all drawn, it is now best to slip the drawing, Fig. 2, under the bottom of this sheet of paper, having the jamb lines coincide perfectly and the front line parallel with the base of the elevation. We are now able to square up from our plan to get all of the vertical lines without going to the bother of measuring them off. Now finish all the lines given in Fig. 3 and draw lightly the bottom part of the door post lines.

From the base line measure up 2 inches to get the bottom of the door and then drop a half-inch from that to get the floor line.

Now it is better to shift and draw in the section as shown at *c c*, or this section may be placed outside of the elevation and figures, if it is likely to be confusing to the customer through having it break into the elevation as shown in the figure. But the reason for developing it at this time is to get the projection of the sills and place them on the floor plan. From there they may be squared up to the proper place on the elevation as shown at *a a*. After having located *a* it is easy to continue the base line to *b*, which is the floor line at the door.

It is difficult to see it, but the slant of 1½ in. is divided up between the bottom rail and the panel in the recess base and looks better this way than to take it all out of the panel.

As the door plate lines up with the front plates, it makes the bottom rail 22″ wide. If the door is to be made by hand it would be better to draw in a panel at the bottom; and if the paneled base

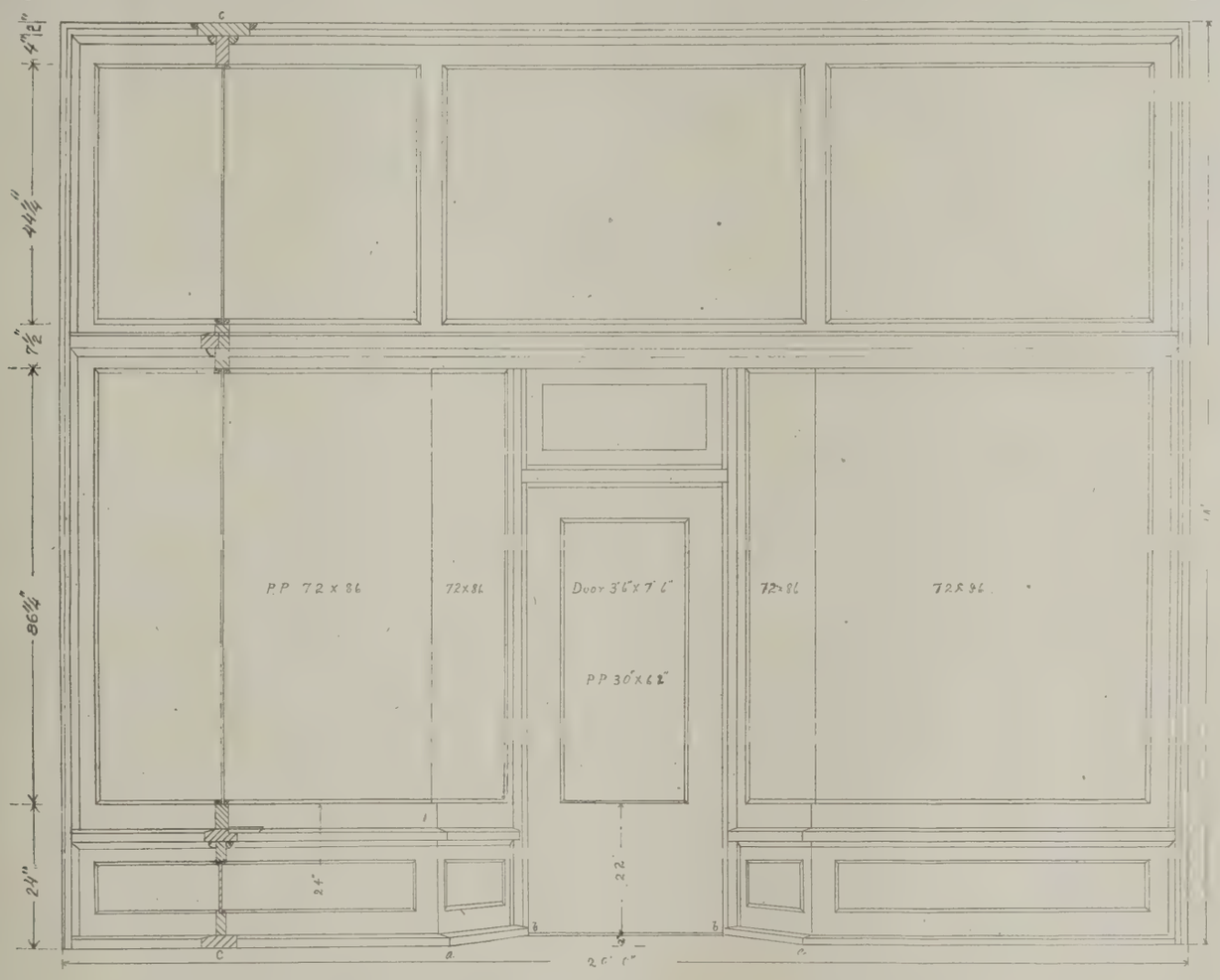


Fig. 4

were a little higher, the door could take the same panel as the base. Allowing 6 in. for stiles and top rail outside of the glass, this will make the door plate 30″x60″.

The exact height of the transom over the door and of the glass in the large transom are usually incidentals which are determined as the drawing develops, and rarely occur except approximately in the specifications.

In Fig. 4 is given the detailed height in figures at the left, and for the large lights ¼-inch play is allowed and this is not too much.

It is very seldom that a customer will ask for further details than are shown on the plan and elevation, and as this article does not contemplate the detailing of a store front, I will not confuse the reader by showing any more than those given in the section *c. c.*

It will be understood that the elevation shown in Fig. 4 may be drawn with fewer lines by not drawing in all the stops and mouldings, and the draftsmen can use his judgment as to whether it will be wise for him to spend the extra time for this purpose.

Wherever the lines have been made light for the purpose of erasing a portion of them, the remaining part should be gone over and made of a uniform strength. Avoid using a dull pencil or one that is very hard or very soft. The hard pencil will make creases in the sheet so that the erasures will show too plainly, and the very soft pencil will smudge the paper. Try and have all the lines accurate and sharp so that the drawing will stand out like a picture, and if you don't land the job it will be a pure case of bad luck!

STAIRS AND THEIR CONSTRUCTION

Materials.—Stairs are made in stone, concrete, brick, iron, and timber; all but the latter two have been already treated.

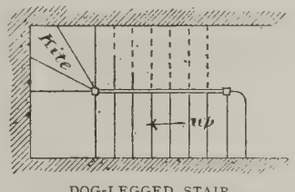
Iron Stairs.—Iron stairs are used for internal and external construction, where there is a minimum of space to be occupied, and where the least obstruction to light and air, and a measure of fire-resistance and economy are chiefly required, such as where the internal plan space is small, spiral steps are used, and for external area steps; they are not combustible, but they are slippery when worn, and are not much used for other purposes.

Planning of Stairs.—Buildings should be designed for and provided with convenient staircases, and the planning of the stairs considered as of primary, and not of secondary importance.

Design of Stairs.—Properly designed stairs should (a) be well lighted and ventilated directly from the exterior; (b) have the approaches convenient and spacious; (c) have the headroom in no case less than 7 feet measured vertically; (d) have a clear width between the strings of the straight portion of flights kept at all turns, landings, and approaches; (e) have the stairs of a convenient and easy pitch; (f) not have a landing between two adjacent flights, the center lines of which are in one straight line, with a length less than the width of the adjoining stairs; (g) have winders (if any at all) at the bottom and not at the top of a flight; (h) have not less than four steps in each flight.

The non-compliance with these conditions has resulted in numerous accidents.

Technical Terms.—Stairs.—Timber stairs or steps consist of a number of wooden blocks or casings fitted into, or resting upon inclined beams called strings and carriages, which distribute the load upon the main members of adjacent floors.



DOG-LEGGED STAIR

FIG. 1.

Staircase.—The chamber containing the stairs is usually known as the staircase.

Tread.—The upper surface of a step upon which the foot is placed.

Nosing.—The exposed edge of the tread, usually projecting and moulded.

Riser.—The face of the vertical member directly between the nosing of an upper and the back edge of the lower step.

Fliers.—Steps rectangular in plan.

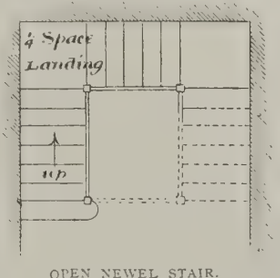
Winders.—Steps tapering in plan. Those fitting into a wall angle, as shown in Figure 1, are called kite winders.

Going.—The horizontal distance between two riser faces.

Rise.—The vertical height between two tread faces.

Flight.—A series of steps without a landing.

Landing.—The level platform at the top of a flight between floors.



OPEN NEWEL STAIR.

FIG. 2.

Half-space Landing.—A rectangular landing extending across the widths of two flights and against one edge, of which both flights abut, and on which a half turn is made.

Quarter-space Landing.—A rectangular landing, the breadth and length of which are of the dimensions of the two abutting flights, as shown in Figure 2, and on which a quarter turn is made.

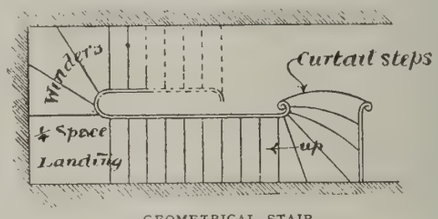
Line of Nosings.—An imaginary line parallel to the strings and tangential to the nosings. It is useful in the construction of handrails, giving the line with which the under-surface of the handrail should coincide.

Newels.—Posts forming the junction of flights of stairs with landings or other flats.

If the outline plan of newel stairs enclose a space or solid they are known as open or solid newels respectively.

Straight Stair.—Flight or flights of parallel fliers that may be seen from top to bottom, the centers of which being in the same straight line.

Open Newel.—Stairs, the turns of which have newels and enclose a well.



GEOMETRICAL STAIR.

FIG. 3.

Dog-legged Stair.—A flight of stairs with abrupt angular turns, usually about a newel, and often with winders and landing. The name is given owing to its supposed resemblance to a dog's hind leg, as shown in Figure 1.

Geometrical Stair.—Stairs having continuous strings or handrail, and usually compassing a well. Typical examples of those rectangular and circular in plan are shown in Figures 3 and 4.

Solid Newel.—Stairs radiating from a solid central newel, circular or rectangular in section.

Ramp.—A plane curve without change of direction, and occurs in handrails, as shown later, and in those parts of strings over windows and landings.

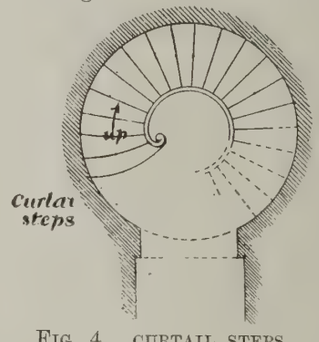


FIG. 4. CURTAIL STEPS.

Swansneck.—A plane continuous curve, such as would be formed by joining a concave with a convex ramp.

Iron Core.—The iron band about 3-16 inch to ¼ inch in thickness, used in the handrail and to which the balusters are fixed. Iron cores, are used in all stairs having iron balusters.

Balusters.—Vertical members between the handrail and strings to stiffen the handrail and prevent persons falling through.

Balusters should be tenoned to close strings and handrails, and dovetailed to the treads of cut strings, the return moulding of tread being planted, mitred, with returned end and covering the dovetail.

There are usually two balusters for each step of a cut string, and in close strings they are placed about 4 inches apart.

Balustrade.—The framed fence formed by strings, handrails, and balusters.

Curtail Step.—A step, the outer end of which follows the plan of a spiral scroll, and under which it is directly situated.

Bull-nose Step.—Steps with rounded ends, and may be quarter round, or half round.

Built-up Steps.—Wooden steps are usually built up of a number of comparatively thin casings, and dressed only on the seen faces. Each step takes a bearing on at least two or three varriages, or rough, or dressed strings, the soffit of which is plastered, or it may be boarded. The space enclosed is sometimes objected to as being unsanitary. (To be continued.)

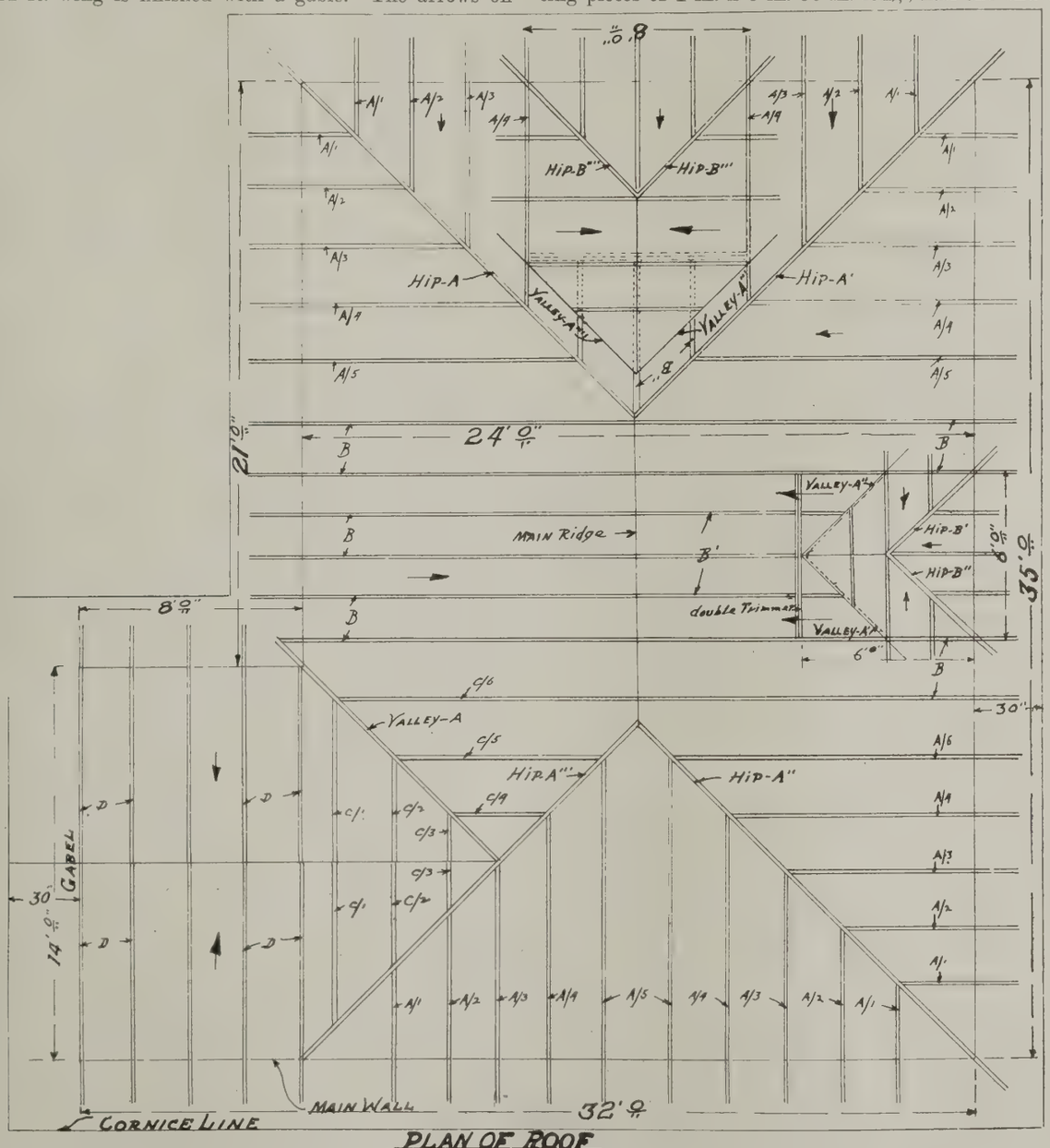
AN EXAMPLE IN ROOF FRAMING

By WM. C. A. STEVENSON

WHILE roof framing is undergoing a period of discussion in the columns of the NATIONAL BUILDER the writer feels it to be a proper time to submit another article that seems to him to be an extra good example, inasmuch as it not only deals with the problem of finding lengths, but also with framing for a sweep at the eaves and the framing in for dormers (a question that was recently asked). The drawings show the roof plan and the elevations of the frame of the front dormer and gable. Referring to the plan of roof, we see that the main building is 24 ft. x 35 ft., which is covered with a hip roof at both ends, with an 8 ft. dormer in the front and a 6 ft. dormer in the side; these also have hip roofs and a 30 in. cornice with a sweep the same as the main roof. The 8 ft. x 14 ft. wing is finished with a gable. The arrows on the plan point in the up direction of the roof on all sides. All the rafters in the main roof are marked as follows: The four long hips are all the same length, but in order to designate any particular one of them I have marked them A, A′, A″, A‴. There is only one valley in the main roof marked A, valleys A′, A″, A‴, and A⁗ being formed by the dormers setting on the main roof. The common rafters are marked B on the main roof, and D on the wing; there are five different jacks in the main roof of which there are 3½ pair of each A/1 to A/5. The cripples are marked C/1 to C/6; hips B′, B″, B‴, and B⁗ are on the two dormers, the jacks on the dormers I have not marked, but will discuss them later. The front dormer end and front elevation show the manner of framing. It will be noticed on the plan that jacks A/4 are set to suit the width of this dormer 8 ft. outside; the studding for the wall of the dormer being set plumb with the outside of these rafters. In this case the plates are made 5 ft. 6 in. above the main plate, the double trimmer being cut between the rafters A/4 just where the dormer plate meets the main roof, which will be found to be about 6 ft. 6 in. in from the plumb of the outside wall; rafters B″ are then cut from this trimmer to the hips in the main roof, the main roof boards being run across and the dormer cripples cut down onto the main roof boards thus forming the dormer valleys A‴ A⁗.

The manner of forming the sweep in the roof is done by cutting pieces of 1 in. x 6 in. 30 in. long; nail one end to the wall of building 15 in. below the top of plate; nail it to the tail of rafter which has been left to hang over as shown. Then pieces of 2 in. x 4 in. are cut to fit on top of the rafter, nailing one end onto the rafter at the sweep line and the other end to the 1 in. x 6 in., taking care to keep the 1 in. x 6 in. lookouts level and in line. The other dormer and the main roof is formed in precisely the same manner. However, when we come to the gable over the wing we meet a different proposition. We must either build a return as shown for the gable cornice to die down on, or extend the sweep across the end as indicated by the dotted lines.

Hip A‴ will only show as a hip above the point where the



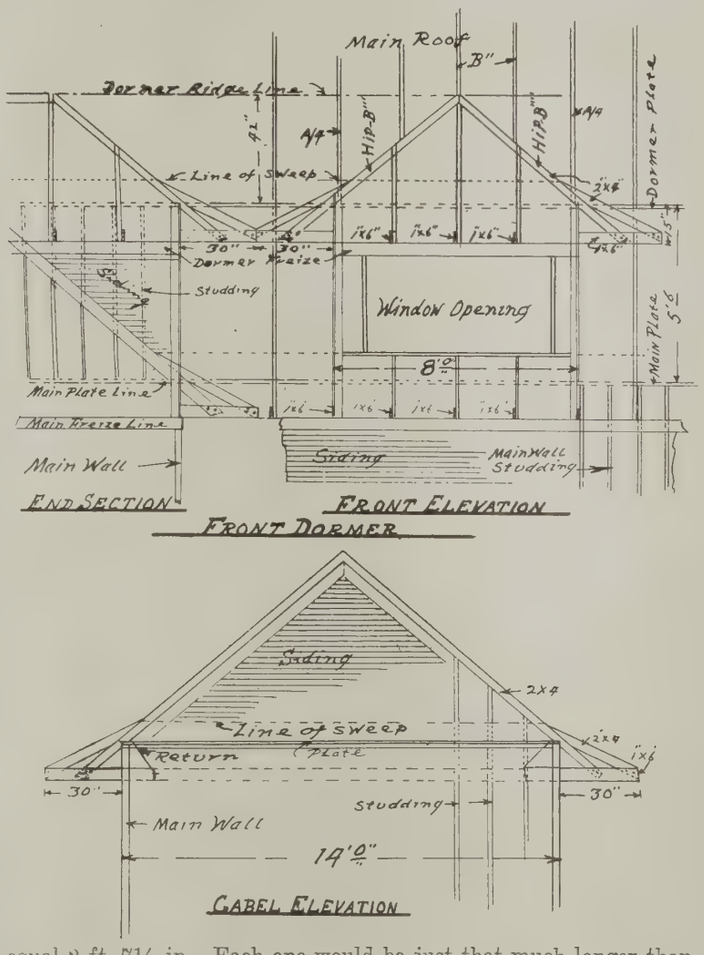
PLAN OF ROOF

valley A and the ridge of the wing intersect with it. It is extended down to the main plate in order to gain support for the roof. Cripples C/2 and C/3 and jacks A/1 and A/2 when nailed to the hip, in reality form a common D, as the reader will see by a moment's study of the plan.

PITCHES, LENGTHS AND BEVELS.

The pitch of this roof is 10 in. rise to the foot run—dormers as well. It ought not be necessary to go into this part of the question to any great length, as it was dealt with in my article in January; however, for the benefit of those who may not have that copy, I will briefly tell how to find the lengths for this roof.

For a rise of 10 in. to the foot, the length of the common is found to be 15⅝ in. to each foot of run; as the run in this case is just 12 ft. it would be 12x15⅝ equal 187½ in., or 15 ft. 7½ in. The figures 10 and 12 on the square give the foot and plumb cut. Half the thickness of the ridge must be cut from this length. The top of the main ridge will be 10 ft. plus 2 in., the portion of the rafter standing above the plate. The run of the long hips A, A′, A″, and A‴ is the square of 12 equal 17, then 17 x the rise 10 on the square 19¾ in. x 12 equal 19 ft. 9 in.; figures 10 and 17 on the square giving the bevels for the cuts. To cut the cheek cut for the hip to fit the ridge: Use the figures 13 and 15, cut on the 15 side; the first jack set 2 ft. from the corner would be 2x15⅝ in.



equal 2 ft. 7¼ in. Each one would be just that much longer than the one before it; the same figures used for the common would give the foot and plumb cut; the cheek cut to fit the hip would be found by using the figures 10 and 13 cut on the 13 side. To find the length of cripples scale the run of them on your draft and multiply by 15⅝ in. for each foot run. Example: C/4 is found to have a run of 3 ft. 6 in. x 15⅝ in. equal 54¾ in, or 4 ft. 6¾ in. long short to long point. The cheek bevels are found same as for jacks.

The commons D have a run of 7 ft. then 7x15⅝ in. equal 119⅜, or 8 ft. 9⅜ in. long, same bevels as long commons. Valley A has a run of the square of 7 or 9 11/12 in., the rise is 7 x10 equal 70 in., or 5 ft. 10 in. Then to get the length of valley A use the figures 9 11/12 and 5 10/12 on the square and we get 11 6/12 equal 11 ft. 6 in. long, same bevel as long hips, except it has no cheek cut, as it fits fair against the hip A‴. It must, however, be cut half the thickness of hip shorter than length given.

The ridge of the 6 ft. dormer will be 30 in. plus 2 in. above its plates, and the 8 ft. dormer 40 in. plus 2 in. above its plates. The hips on the 6 ft. one will be 4 ft. 11¼ in. long; on the 8 ft. one, 6 ft. 7 in. long. The bevels and lengths of jacks will be found the same as for the main roof.

It must be remembered that the figures given apply only to a roof of this pitch, 10 in. rise to the foot run.

LUMBER CALCULATION, SHORT METHODS

By E. P. HOERR

ANY man who has lumber to figure will do well to have the following table of aliquot parts. He will then be able to extend promptly and accurately lumber quantities and prices. In most cases he will find it possible to set out the correct answers with mental calculations, it not being necessary to first set down the examples on a separate paper to figure them out.

His knowledge of this table will place him in a position to figure mentally most any multiplication problem that comes before him. Then it will seem strange to him that he was not obliged to learn it "by heart" while at school.

The following table thoroughly mastered is worth many dollars to anyone:

87½	equals	⅞ of 100	37½	equals	⅜ of 100
83-1-3	equals	⅝ of 100	33 1-3	equals	1-3 of 100
75	equals	¾ of 100	25	equals	¼ of 100
66 2-3	equals	2-3 of 100	16 2-3	equals	1-6 of 100
62½	equals	⅝ of 100	12½	equals	⅛ of 100
50	equals	½ of 100	6¼	equals	1-16 of 100

After learning the table it is necessary to know how to make use of it.

Let us take first the simple figures—

You have bought 654 ft. lumber at $50.00 per thousand feet. What is the price?

If the price were $100.00 per thousand feet it would be seen at a glance that the cost of 654 feet would be $65.40. But the price is only $50.00 or one-half of $100.00, so it would be but $32.70, which is just one-half of the price it is at $100.00 per 1,000 feet. The above table says that 50 equals one-half of 100. We've first found the price at $100.00 per thousand, then taken one-half of that. That's the first rule. Find the cost at a basis of $100.00 per thousand, then take a part of it.

Let us use the same quantity at different prices:

654 feet of lumber at $25.00 per M. equals ¼ of $65.40; 16.35
654 feet of lumber at $12.50 per M. equals ⅛ of $65.40; 8.17
654 feet of lumber at $87.50 per M. equals ⅞ of $65.40; 57.22
654 feet of lumber at $75.00 per M. equals ¾ of $65.40; 49.05

As you can use the table at various prices—say at $62.50 per M, it would be ⅝ of the price at $100.00 per M; at $37.50 M, it would be ⅜ of the price at $100.00 per M.

Now let us use the above table in a different way. Let us figure up a list of lumber quantities at various prices.

Two hundred and fifty feet at $37.50 per M.

You have here the price per M. feet and before setting down figures to multiply in the long way notice that 250 feet is just one-quarter of a thousand feet; so the price would be just one-quarter of what the thousand feet price is—i. e., ¼ of $37.50 equals $9.37.

Three hundred and seventy-five feet at $24.00 per M.

Remember the table; 37½ equals ⅜ of 100; so 375 feet would be ⅜ of a thousand feet—thus ⅜ of a thousand feet at $24.00 per M. would be $9.00.

Seven hundred and fifty feet at $36.00 per M.

This would be ¾ of a thousand at $36.00 per M. or $27.00.

One hundred and twenty-five feet at $48.00 per M.

Would be ⅛ of a thousand at $48.00, or $6.00.

Eight hundred and thirty-three feet at $36.00 per M.

Would be 5-6 of a thousand at $36.00, or $30.00.

Now it must not be thought that each and every number extension can be so easily figured. It will be found though that much time can be saved in using this method, and the whole secret is in knowing this table here given.

You have often seen men calculate quietly, and it is only because they use rules such as these.

Seven hundred and fifty feet at $75.00 per M.

This can be figured by the two methods explained above. First by saying that 750 feet at $100.00 per M. would be $75.00, and that 75 is ¾ of $75.00, or $56.25.

Or you can say that 750 feet is ¾ of a thousand feet at $75.00 per M, getting the same answer, or $56.25.

ADVICE TO ASPIRING CONTRACTORS

By, CHAS. ANDERSON (Concluded from March.)

IN my article in the March number, a brief synopsis was given for keeping accounts; herewith I will endeavor to give a few hints on estimating and keeping the cost of the job.

It is not my purpose to give any lesson in estimating at this time, as space will not permit; in fact, it is too wide a subject to deal with in the brief space allotted (better secure a copy of Hodgson's Estimator and Contractors' Guide, or some other good work of which there are several in the field), but rather to show the importance of making the estimate and the manner of making it, etc.

The specimen estimate sheet illustrated herewith is a good example and shows how it should be made out. The Colonial shingled house published in the March number is taken as an example. The lumber bill only is shown here; but, of course, the whole list of the entire job should be made out.

Keep each list separate, that is the lumber bill on one sheet, mill work on another, etc., etc. The object for this is, so that you can hand a copy of each separate sheet to the men in that particular line to get their figures without having to give them something they do not figure on. You should make as many copies at the one time as you will require to hand out for figures and two for yourself; these can be made by using carbon paper and they will all be exactly alike. When making these out do not put the prices on as shown on the specimen here, but carry these out on one only afterward to file away for your own private information; the other one made for yourself is to carry with you in case you secure the job; this will be found to save considerable trouble, as it will show you what each item was figured for. Without such to guide you or your foreman, materials are very liable to be used in the wrong place, causing a waste of materials, confusion and loss of time.

ESTIMATE SHEET

ESTIMATE FOR Residence FOR Name here NAME OR CUSTOMER

ESTIMATE No. _____ LOCATION 37 No here

DATE PLANS AND SPECIFICATIONS MADE BY

PIECES	SIZE	LENGTH	MAT.	ARTICLE	FT. B.M.	PRICE	$	¢
2	4/6	22	Y.P.	Sills	88			
4	4/6	14	"	do	112			
1	6/8	14	"	Girder	56			
1	6/8	12	"	do	48			
8	2/4	14	"	For Cooling	72			
19	2/8	22	"	Floor joist	651			
25	2/8	20	"	" "	675			
96	2/4	18	"	outside Studdy	1152			
12	2/4	12	"	Gable do	96			
100	2/4	16	"	Part. & plates	1100			
40	2/4	14	"	Roof	360			
14	2/6	10	"	Porch joist	140			
14	2/4	12	"	" Ceilg	126			
14	2/4	16	"	" Roof	154			
22	2/4	20	"	Ceiling joist	286			
10	1/4	12	"	bridging	40			
20	1/6	12	"	Braces &c	240			
10	2/2	16	"	Furring	55			
	Total Framing Lumber				5351	@ 27.00	144	47
	1/8	Rund.	Y.P.	Shiplap D.4S.	3100	27.00	83	70
	1/6	"	"	Roofing D.2S.	940	27.00	25	38
36 M			R.C.	Shingles		4.75	171	00
138	1/10	2 D.4S.	O.P.	Cornice & Porch	115			
100	1/6	"	"	" "	50			
250	1/4	"	"	" "	84	$50.00	20	15
80	1/8	"	"	" "	53			
80	1/8/12	"	"	" "	100			
	1/4	14	W.P.	Hdg	175	$50.00	8	75
	5/8/4	14	Y.P.	Ceiling	175	30.00	5	25
	7/8/2/4	Rund.	Oak	Hdg mould	1460	45.00	65	70
100	1/12	2 D.4S	Y.P.	Sheeting	100	50.00	5	00
				Total Lumber bill			$529	40

You should number your estimates and number the job if secured to correspond to it. By filing away these sheets they will be found to be of considerable help in figuring on future jobs, and also if some items run over or under the estimate you will be able to correct the error on the next job.

THE COST KEEPING.

In the writer's opinion, one of the most important considerations of all is the keeping the cost of the job, as unless you do so you do not know how you have come out. Many a man has continued losing on job after job and finds it out too late to save himself from ruin, whereas if he had kept account and found he was running behind he might have been able to redeem himself.

The specimen time card shown herewith will be found to minimize the labor very materially in keeping account of the cost.

WORKMANS TIME CARD

NAME HERE _____ CONTRACTOR

FOR WEEK ENDING SAT. _____ 191

NAME OF WORKMAN _____ OCCUPATION _____

TIME ON JOB No. _____ OWNER _____

	HOURS	STATE HERE WHAT DOING
MON		
TUE		
WED		
THU		
FRI		
SAT		
TOTAL	RATE	AMOUNT $ ¢

REC'D PAYMENT _____ WORKMANS SIGNATURE _____

THE WORKMAN WILL STATE ON SPACE BELOW AND OVER SIDE. ANY MATERIALS TAKEN TO JOB BY HIM NOT OTHERWISE ACCOUNTED FOR

See that each workman keeps his time on the card for the work done on the job during the week. If he has worked on more than one job then he must make out a card for the time on each; also, if he has taken any materials to the job from stock he must enter it on the card in the space allotted for that purpose.

By filing all these cards together for each job and also the other material bills, etc. chargeable to the job, it is no trouble to figure by just totaling up all the bills and cards what the job has cost, and also how it was divided up, i. e., how much labor, etc. By crediting any materials that may be left you can easily tell what you have made on the job.

Never put in a 20 horse-power motor and expect to take off 30 horse-power all the time. It can be done for a time, but it does not pay in the end, and is expensive for both armature and field winding and for current. In laying down belt transmissions, or, in fact, transmissions of any kind, it is important not to increase the speed of shafts or machines unnecessarily.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

(Continued from March.)

AS we observed in the study of orthographic projection, three views are generally necessary to properly show the shape and dimensions of an object. But these views do not clearly show the appearance the object would have after it had been constructed, so we sometimes resort to another method of pictorial representation to show this appearance. There are three general methods in use; perspective, isometric projection and oblique projection. This latter is sometimes known as cabinet projection. Perspective is the most difficult to master, and later on an article will be devoted to it, but at present the other two will concern us.

Isometric projection. Besides showing the shape of an object, isometric projection sometimes gives the dimensions, as all lines are drawn full size. Often it gives the object in the drawing a distorted appearance as it makes parts of it look larger than they are in reality. For an explanation of the principles governing this projection, let us consult Plate VIII.

PLATE VIII.—ISOMETRIC PROJECTION.

In Fig. A we have the isometric axes, *a* being a *vertical* line, *b* and *c* lines at an angle of 30 degrees with the horizontal. These axes represent lines mutually perpendicular to each other, and correspond to the three dimensions, length, breadth and height. In Fig. B we have the isometric of a cube. Here we find that the edges are drawn in three fixed directions, respectively parallel to the isometric axes. All of them are in their full length and are either vertical or at an angle of 30 degrees to the horizontal. The view taken is in the direction of the diagonal of the cube, as indicated by the arrow in Fig. C, which is the top view of the cube. The isometric view is always taken in this direction. Note that while all the edges are in their true lengths, the angles are not shown in their true size, right angles being represented at 60 or 120 degrees. Isometric projection the direction of the ray of light is 30 degrees downward to the right, instead of 45 degrees as in orthographic. The shade lines are supposed to divide the light from the shade surfaces, hence the positions of these lines on the plate.

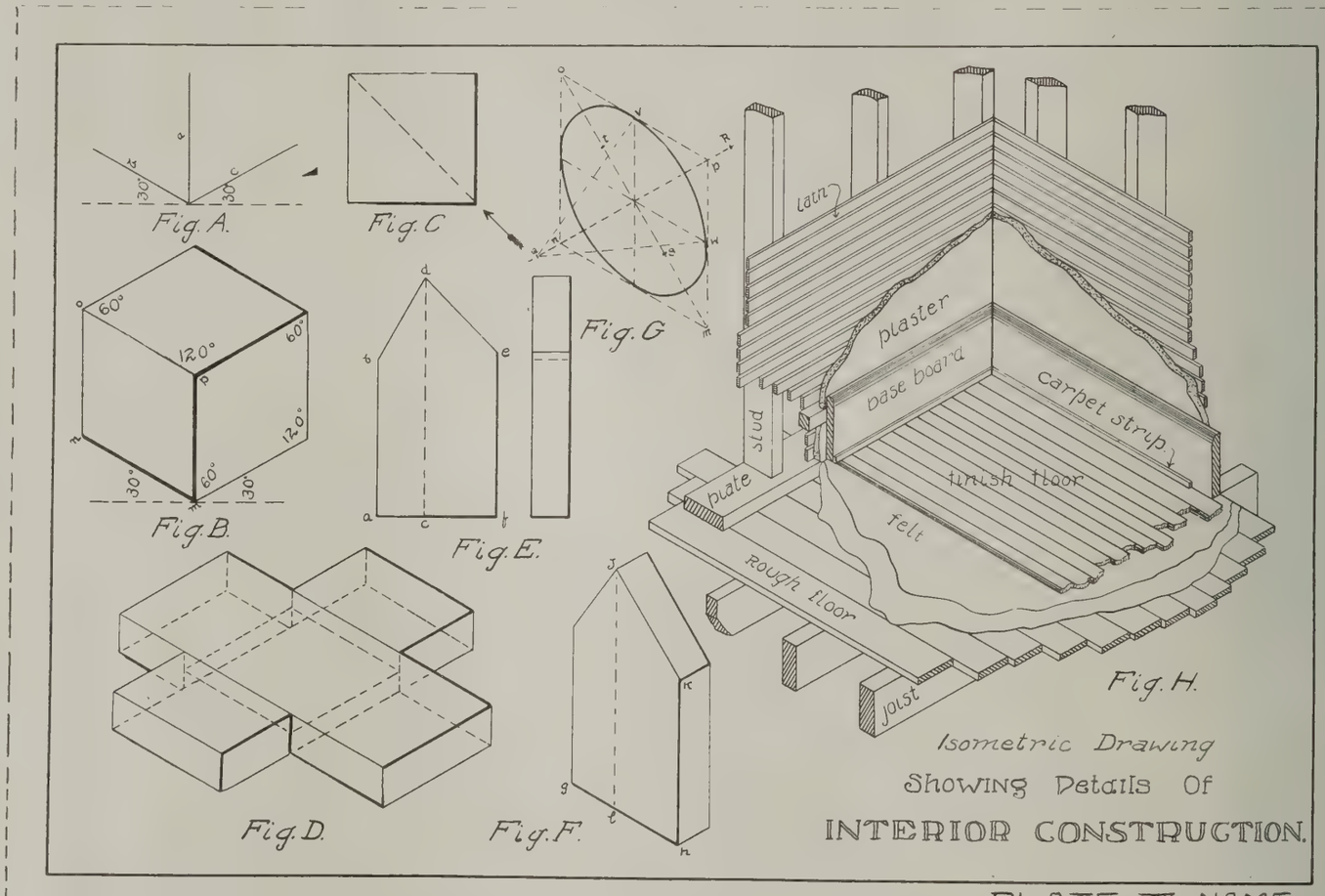


PLATE VIII. NAME.

A simple example of these principles is given in Fig. D, where we have the isometric view of a half-lap joint.

Non-isometric lines are those which cannot be drawn parallel to the isometric axes. This classification includes lines that are neither vertical nor horizontal and also curves.

In Fig. E we have an object, two of whose edges *bd* and *ed*, are oblique. In the isometric view they cannot be parallel to the isometric axes, hence we have to locate them by co-ordinates. To do this, draw the vertical dotted line *cd*. Start Fig. E by drawing the base *gh* equal to *af*. Draw the verticals *gi* and *hk* equal respectively to *ab* and *fe*. Lay off *gl* equal to *ac* and draw the dotted vertical *lj* equal to *cd*. Connect *i* and *j* and *k* and *j*, and complete the figure by drawing in the side. In a way similar to this, any oblique lines can be drawn in isometric.

In an isometric drawing a circle takes the form of an ellipse. It is projected on one of the planes of Fig. B, in this case we have taken *m. n, o, p*. Theellipse is drawn from four centers, *q, r, s, t.*

To locate centers *s* and *t*, lay off *ms* and *ot* equal to *ob*. To locate centers *q* and *r*, lay off *qw* and *qv* equal to *mp*. This locates center *q*. Lay off *rx* equal to *qx* and the fourth center is found. The ellipse drawn is not tangent to the sides, but the error is very slight and can hardly be detected.

Fig. H gives a practical application of the principles and should be drawn with extreme care by the student. It gives the interior details of the framing and finish of a house, and is the sort of work that draftsmen are sometimes called upon to do.

In this plate no dimensions are given for the student to work by, but he should make his figures large enough to balance the spacing on the plate.

PLATE IX.—OBLIQUE PROJECTION.

The oblique axes, as observed in Fig. A, are vertical, horizontal and at an angle of 45 degrees. This angle may be made enther 30, 45 or 60 degrees, but the 45 degree line gives the better appearance to the drawing. If the edges of the object to be drawn are at right angles to each other, they are drawn in parallel to the oblique axes, the same as in isometric drawing, and in their true lengths.

Fig. B is the oblique drawing of a cube, and is constructed under the above principles. The shade lines have the same general position as in isometric drawing, the top, front and left-hand edges being light.

In Fig. C is illustrated one of the principle advantages of oblique over isometric drawing. It represents a hollow cylinder and it is observed that the faces are true circles, whereas in isometric they are ellipses.

The next fourteen figures represent work that draftsmen are very often called upon to perform. They show sections of mouldings, etc., that are sometimes given as details on a set of house plans. Whenever they are so given, they are drawn in full size, so it would be well for the student to draw them in full size. Two sheets will be needed to do this properly, from Fig. A through Fig. K on one sheet and the balance on another. In the drawing here given no particular scale has been used. Shade lines have also been omitted from the details, this being left for the student to do. The parallel lines close together are known as section lines, and are used to show that the piece is viewed from the end. This end face is drawn in full size with vertical and horizontal lines, and then the lines at 45 degrees are added to it, giving it the appearance of having length.

The pieces represented by the figures are:

Fig. D. Parting stop.
Fig. E. Quarter round.
Fig. F. Quarter cove.
Fig. G. Picture moulding.
Fig. H. Window and door stop.
Fig. I. Casing.
Fig. K. Crown moulding.
Fig. L. Base with carpet strip.

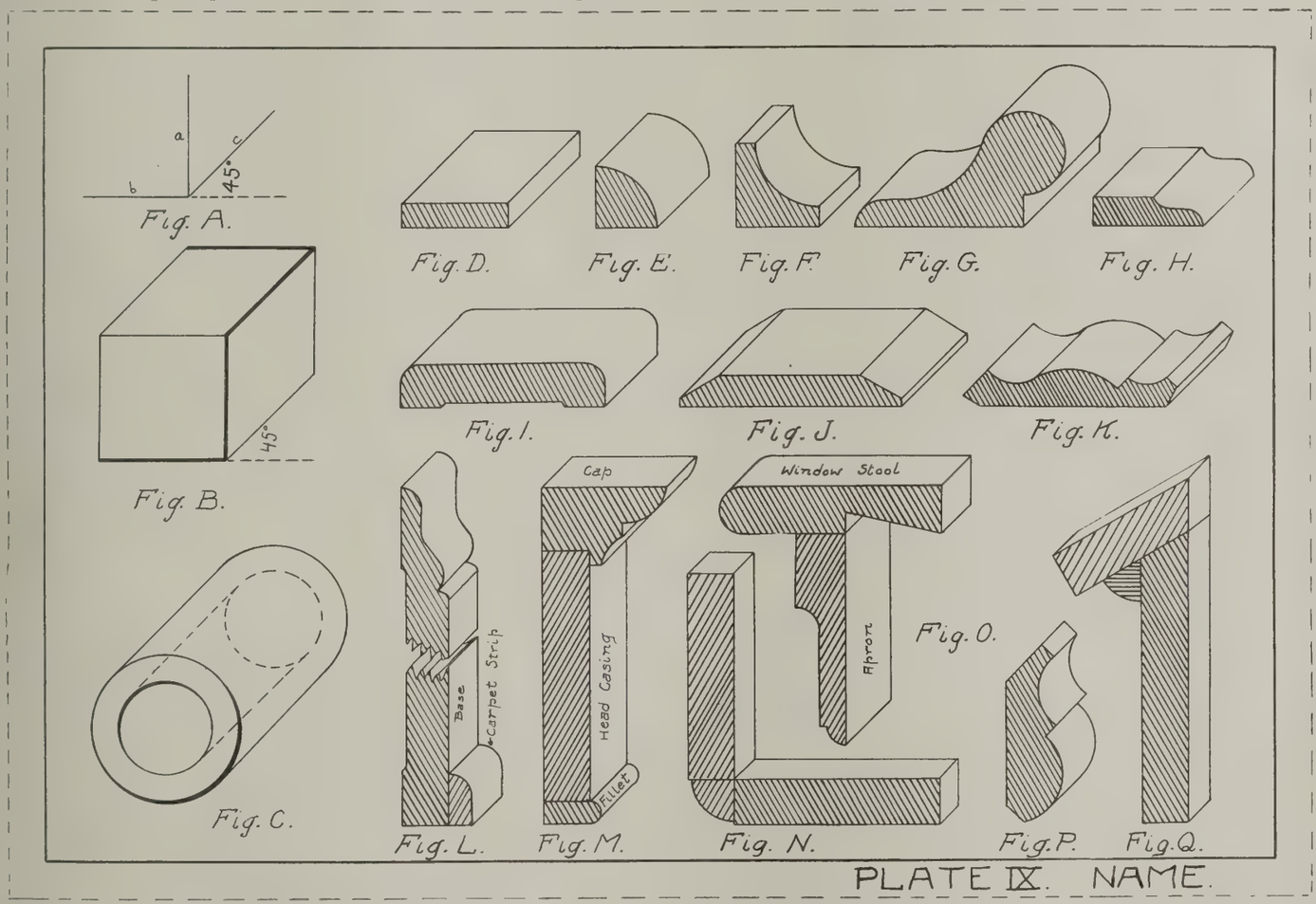


Fig. M. Head casing with cap and fillet.
Fig. N. Corner board with quarter round.
Fig. O. Window stool with apron.
Fig. P. Bed mould.
Fig. Q. Water table.

(To be continued.)

TELEPHONES IN THE UNITED STATES

THE United States leads the world in its intelligent use of the telephone. It has eight instruments to every 100 inhabitants, and no other country uses half so many. Herbert N. Casson, in the Electrical Review and Western Electrician, says that Germany has as many telephones as the State of New York, and Great Britain as many as the State of Ohio. Chicago has more than London, and Boston twice as many as Paris. In the whole of Europe, with her twenty nations, there are but one-third as many telephones as in the United States. In proportion to her population, Europe has but one-thirteenth as many.

The average European family sends three telegrams a year, and three letters and one telephone message a week, while the average American family sends five telegrams a year, and seven letters and eleven telephone messages a week. The United States, owns 6 per cent of the earth, and is 5 per cent of the human race, has 70 per cent of the telephones in use in the world.



OUR READERS' PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]

ANSWERS

CLEANING OFF CEMENT.

From H. W. C., Detroit, Mich.

In answer to G. W., Buffalo, N. Y. Cement may be cleaned off a rough faced brick by scraping or friction—not otherwise, without the use of muriatic acid.

A PITCH OR TAR ROOF.

From "J. P. C.," Clinton, Ill.

In reply to "C. G. W." of Rome, N. Y.—If he will take six gallons of pitch or coal tar, and mix with it one and one-half gallons of gasoline, and stir up good, then apply, and properly sand, he will have a cheap, durable, and effective roof. This amount will cover about two squares.

PAINTING SHINGLES.

From "B. O. T.," Spokane, Wash.

In answer to Michael J., Green Bay, Wis., in regard to painting shingle roofs, in this state where we have a wet and dry season, I have had some repair jobs on cedar shingle roofs that have been painted. I find that at the end of each shingle the paint line is just a little higher than the shingle under, which has a tendency to hold the water that drains between the shingles, and as there is no way for the water to pass over this line, it therefore goes into the wood and stains can be seen on the under side of the shingle, unless the roof be very steep. Many of our architects specify stain, using the common creosote stain, but the shingles are dipped before laying, which gives the stain an even surface for more than two-thirds the length, and makes a lasting and perfect exposed surface. I have found old roofs not painted, made of cedar shingles that were perfectly sound and waterproof.

NAILS FOR COPPER ROOF.

From "A. S.," Milford, Conn.

Answering H. R., New Orleans, La., I may say from long experience that I have found galvanic action has no direct bad effect on copper, but would have on the nails that hold the copper. As a matter of fact, the union of zinc and iron in galvanized nails, is not sufficiently strong to withstand the unequal expansion of the two metals, and the zinc coating gradually peels off, which exposes the iron to a more rapid corrosion, by the chemical action of the electro change produced. Herein lies the dangerous influence of the galvanic action on the zinc coating of the nails. When copper is used for roofing or for similar purposes, only copper nails should be used.

ARCHITECTURAL DRAWING.

From "M. C.," Spokane, Wash.

If "S. S." of Lagrange, Ind., is a regular reader of THE NATIONAL BUILDER, he must have read a whole lot of good things—instructive ones, regarding "Architectural Drawing." There is a series of excellent drawing lessons which are ample in themselves to show how to draw for ordinary work. These articles are quite clear and easy to understand. If S. S. subscribed for another or two building papers, or purchased a few of Hodgson's books on drawing and architecture, the investment would bring him in good results. Knowledge, like everything else, can not be obtained without an expenditure of either money or experience. I have always found it so and guess everybody else has too. "There is no royal road to either learning or wealth."

DRAFTSMANSHIP.

From "J. A. B.," Lake Magantic.

If S. S., Lagrange, Ind., would take a series of lessons from F. B. Dobe, who advertises in your paper, or take a course in either "The American Correspondence School of Chicago," or "The International School of Correspondence," Scranton, Pa., he will soon learn to become a good draftsman. This is what I did, and I am considered a pretty fair draftsman.

BOARD COVERING.

From "M. E. M.," Topeka, Kans.

I have taken your really good paper for years and derived much benefit from it. In answer to "J. B. R.," Palestine, Texas, I may say I have used "Beaver Board," in damp, as well as dry places, and it does equally well in either case. For damp, it requires closer nailing than in drier places, and must be drawn as tight as possible. I have never had any complaint about it.

QUESTIONS

CURING WARPED DOORS.

From "Aug. G. S.," Centralia, Ill.

Having been a reader of THE NATIONAL BUILDER, for a number of years, would like to ask if any of the readers could tell me how to straighten out doors that have drawn in from the stop, or twisted? The door in question is an inside door 2½ ft. x 7½ ft. 1⅜ in. Warp caused by a heating stove standing near. Had it in press for several days, but of no avail. Would be thankful for any reliable and inexpensive remedy?

COVERING UP A DOOR OPENING.

From "H. J. E.," Lackawanna, N. Y.

I would like to have some of the readers of our journal tell me the best way to put a door, or perhaps a roller curtain, in a grille opening between parlor and front stair hall? Size of opening 3 ft. 6 in. x 6 ft. 10 in., without grille. There are times when we would like this opening closed, and a door of this size would be a nuisance.

From "Slivers," Flushing, N. Y.

Will some "Chip," who knows all about it, publish in this department the proper figures to use on the "square" for obtaining the "side cuts" to fit against a "hip rafter" having unequal pitched roof; also how to find the lengths and cuts or bevels of common rafters without going to the trouble of making a draft? Suggestions of any kind along these lines will be appreciated very much.

REFRIGERATOR OF BRICK.

From "J. F. E.," McKenny, Va.

I want to build a small refrigerator of brick, 3x6x6 feet, and would like some advice on the matter. I would like to know more particularly how to prevent the walls from sweating on the inside? Any information on this subject will be thankfully received.

BEAM CEILINGS AND PANEL WORK.

From "John L. P.," Waupon, Wis.

I should be very much gratified if you would occasionally ask some of your subscribers to send you for publication some design for wood beam and panel ceilings, dining-room furniture, buffets, hall seats, settees, and other "odds and ends," that a good "carpenter" should be able to make for his own home?

CURVED CONCRETE WORK.

From "W. H. P.," Miltonvalle, Kans.

Would like very much if some reader would explain how to prepare the forms for making cement circular steps and other curved concrete work?

ROOFS AND STAIRS.

From "J. A. B.," Lake Megantic.

I am obliged for the nice and instructive answers to my questions. I am a constant subscriber, and have received a great deal of good from the paper. Just now I am studying roof and stairs,

and would like to see something more on these subjects, for I am sure others, as well as myself would appreciate such instructions.

DEADENING WALLS.

From "Fred T.," Flint, Mich.

I am an old reader of your "good paper," and go to you for advice. I wish to "deaden" a wall in a double house. We have now two partitions, with a space of two inches between the studding, leaving a hollow of that much, with deadening felt between, but it does not work well, as sound passes through. Will some reader help me out or explain and oblige?

ESTIMATING.

From "H. H. H.," Roanoke, Va.

For years I have bought all my books from you, and have been a regular subscriber to your paper for a long time, and have learned many good things from its pages, and expect to gather much more information from it, as time progresses. Just now I would like a few pointers on the method employed for estimating excavating, and if you, or some kind reader would work out the following details for me, I think I would be able to work similar matter out without outside help?

Excavating—For a cellar: 10 ft. deep, 30 ft. wide, 50 ft. long. Brick wall for a building 30 ft. wide, 50 ft. long, 19 ft. high. Weather-board for frame house 30 ft. wide, 50 ft. long, 19 ft. high.

To estimate flooring: 30 ft. wide, 50 ft. long.

After this is done, I can see a clear way with this little aid, and a little more of your help, and I thank you in advance.

H. H. H.

DEADENING FLOORS.

From "H. G. M.," West Homestead, Pa.

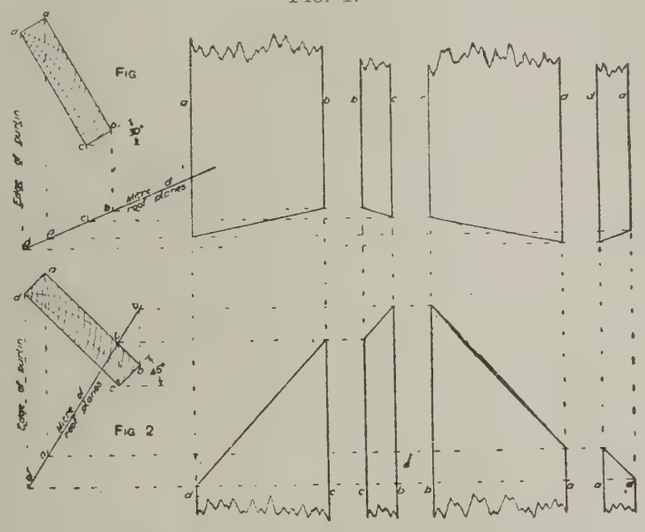
I would be thankful to any reader who would kindly describe an effective method of deadening floors in a three-story apartment building to be constructed of brick? Any suggestions will be appreciated.

OUR PRACTICAL COLUMN

BEVELS FOR HIPS AND PURLINS.

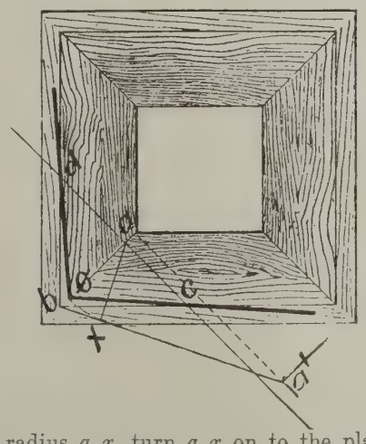
The bevels for the purlin shown in the Fig. mentioned are for an ordinary 45-degrees mitre. The angles of the cuts given by this method are as follows: Fig. 1 shows the bevels for the purlin marked on diagram. Fig. 1, p. 128, and Fig. 2 shows the bevels for the purlin at hipped end that meets the latter.

FIG. 1.



BEVELS FOR MITREING HOPPERS.

The shaded portion shows the plan of the hopper, *a b* being the plan of the mitre. At any point in the plan draw *c a* at right angles to it. Through the same point draw a line at right angles to the true length of the mitre, which is shown at *b* a^1. With *a*



as center, and radius *a x*, turn *a x* on to the plan of the mitre. Join the newly determined point to *c* and *d*, and the contained angle θ is the true angle at the corner of the hopper, and half this angle will be the mitre.

ROOFING SLATE

Table of Sizes and Number of Slates in One Square (100 Square Feet) of Roof

Size in Inches	No. of Slate in a Square	Size in Inches	No. of Slate in a Square	Size in Inches	No. of Slate in a Square	Size in Inches	No. of Slate in a Square
6x12	533	9x14	291	10x18	192	11x22	137
7x12	457	10x14	261	11x18	174	12x22	126
8x12	400	12x14	218	12x18	160	14x22	108
9x12	355	8x16	277	14x18	137	12x24	114
10x12	320	9x16	246	10x20	169	14x24	98
12x12	266	10x16	221	11x20	154	16x24	86
7x14	374	12x16	185	12x20	141	14x26	89
8x14	327	9x18	213	14x20	121	16x26	78

A square of slate is roughly estimated at from 600 to 700 pounds per square, varying according to the thickness of the different makes.

Weight Per Square Foot

Thickness	1/8	3/16	1/4	3/8	1/2	5/8	3/4	1
Weight	1.81	2.71	3.62	5.43	7.25	9.06	10.87	14.5 lbs.

Weight per cubic foot, 174 pounds

On account of laps, it takes an average of about 2½ square feet of slate to make one of slating.

PINE SHINGLES

Number and Weight of Pine Shingles to Cover One Square (100 Square Feet) of Roof.

Table based on 4 inch width. For other widths multiply given number by 4 and divide by the width.

Number of inches exposed to weather.	4	4½	5	5½	6
Number of shingles per square of roof.	900	800	720	655	600
Weight in pounds of shingles on one square of roof.	216	192	173	157	14

The number of shingles per square is for common gable roofs. For hip roofs add 5% to these figures. The weights per square are based on the number per square. Shingles come 250 to the bundle. 4-inch shingles weigh 240 pounds to 1,000.

SKYLIGHT GLASS

The Weights of Various Sizes and Thicknesses of Fluted or Plate Glass Required For One Square (100 Square Feet) of Roof

Dimensions in inches	12 x 48	15 x 60	20 x 100	94 x 156
Thicknesses in inches	3/16	1/4	3/8	1/2
Area in square feet	3.997	6.246	13.880	101.768
Weight in pounds per square of roof	250	350	500	700

No allowance is made for lap in above table.

NUMBER BRICK REQUIRED TO CONSTRUCT ANY BUILDING

(Reckoning 7 Bricks to Each Superficial Foot)

Superficial Feet of Wall	Number of Bricks to Thickness of				
	4 inch	8 inch	12 inch	16 inch	20 inch
1	7	15	23	30	38
2	15	30	45	60	75
3	23	45	68	90	113
4	30	60	90	120	150
5	38	75	113	150	188
6	45	90	135	180	225
7	53	105	158	210	263
8	60	120	180	240	300
9	68	135	203	270	338
10	75	150	225	300	375
20	150	300	450	600	750
30	225	450	675	900	1,125
40	300	600	900	1,200	1,500
50	375	750	1,125	1,500	1,875
60	450	900	1,350	1,800	2,250
70	525	1,050	1,575	2,100	2,625
80	600	1,200	1,800	2,400	3,000
90	675	1,650	2,025	2,700	3,375
100	750	1,500	2,250	3,000	3,750

HIP RAFTERS FOR CURVED MANSARD ROOFS.

Draw an elevation, say an inch and a half to the foot, of the side rib, perpendicular stud and outlooker. Strike the concave of the side rib, as shown by A B in the accompanying sketch. (Fig. 1.)

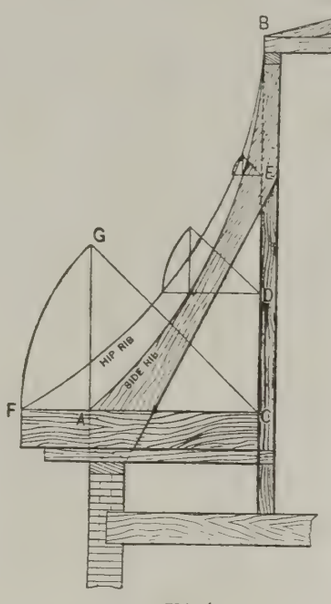


FIG. 1

Divide the line of perpendicular stud B C into any number of equal spaces—in this case three, as indicated by E D C. From each of the points thus obtained and at right angles to B C, draw lines indefinitely, as shown by C F, cutting B A as indicated. From the point of intersection of each of these lines erect a perpendicular, as shown by A G, making A G equal to A C. Connect G and C; then from C as center, with C G as radius, describe arcs as indicated by G, just intersecting C F in the point F; then F will be the point in the curve of the hip rib on the line F C. In like manner obtain other points upon the several division lines set off from B C. Then a line traced through the points thus obtained, as indicated by B F, will be the curve of the hip rib.

ANOTHER METHOD.

Let A B, Fig. 2, be the seat of the given rib E, standing square with the building. Let C D in the plan be the seat of the angle rib. By laying off the thickness of the angle rib on the plan, as shown by the lines parallel to C D, operations to be explained further on will be more clearly understood. From any point on the top edge of the given rib E, as indicated by $a\,a$, etc., draw lines perpendicular to A B, intersecting the center line of the seat of the angle rib, as indicated by C b^2 b^2 b^2 and D, from which points erect lines perpendicular to C D, producing them indefinitely. Upon these lines erect perpendicularly to the seat of the angle rib C D, set off distances corresponding to the height of similar points measured upon like lines from A B to the edge of the given rib E, or, in other words, make D e equal B a^1, and each of the several spaces b^2 b equal to a^2 a. Through the points b b b, etc., trace the form of the upper edge of the angle rib in like manner. By setting off on the lines perpendicular to C D spaces equal to the distance from A B to the under side of the given rib E, as indicated by the points b^1 b^1 b^1, etc., the under line of the hip rib may be developed. Of course, it is not necessary to be so particular about the lower edge in a case of this kind, but the two edges may be obtained in one operation if desired.

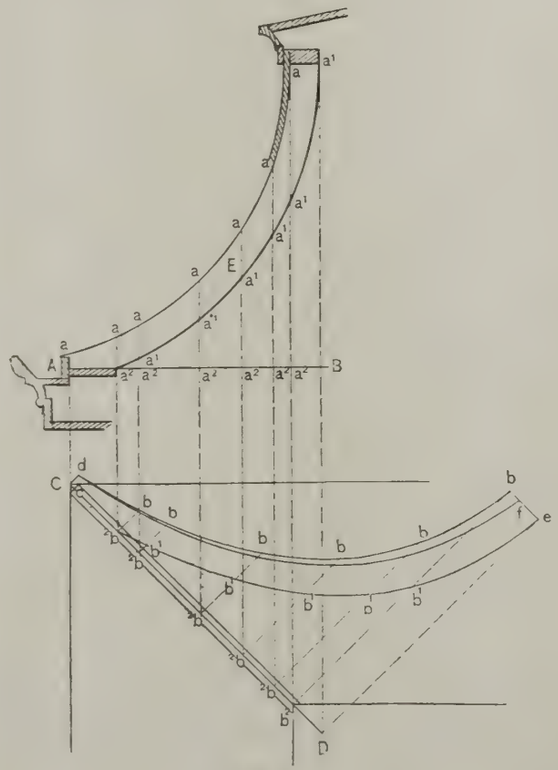
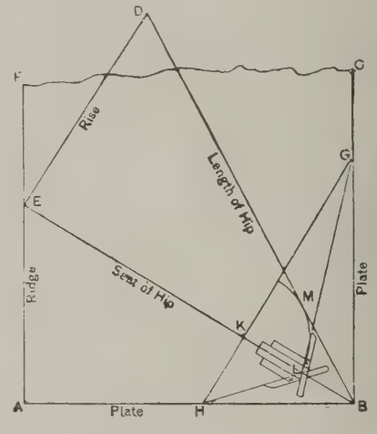


FIG. 2.

To back the angle rib, slide one rib on top of the other from C to c at the root, and from b to f at the top, making the space from b to f equal to C c, and mark the line a f. Reverse the ribs, and mark the other side in the same manner; then trace each side from the lines thus obtained to the center line on the edge of the rib; thus will give the required backing.

A HIP ROOF.

In the accompanying sketch let A B C represent the plates of a roof. Let A F represent the ridge of a roof. Let B E represent the seat of hip rafter, E D the rise of roof, and consequently D B the length of hip rafter. Draw G H at right angles



to B E; then, with K as center, find the radius of a circle that will touch the line B D, as shown at M. Make K L equal to that radius, and join L G and L H; then L G will be one and K L H will be the other bevel for backing the hip.

SCREWS IN SOFT WOOD.

The hinges of boxes, especially very small ones, frequently break loose on account of the small size of the screw, which easily pulls out of the wood. Consequently it is often very difficult to repair an article of this kind. Even experienced cabinet makers and others who work upon fancy articles find difficulty in making the screws hold. If the screw hole is not too badly broken out, the hinge may be taken off entirely, some thick glue made, and the hole filled with it. The screws are then immersed in the glue, the hinge put in place, and the screws driven home as quickly as possible. When the glue hardens, the screw will be held fast even in soft wood. If the screw hole is deep and glue is not at hand, an easier way is to heat the screw until it is hot enough to melt rosin. A little rosin is then put on so as to fill up the threads, and the screw is then quickly put into the hole and driven home. The rosin melting upon the screw, and being forced into the wood, makes a very strong and durable cement, which holds the screw firmly in its place. In this way fancy articles can easily be repaired, and often will be stronger than when they left the manufacturer's hands. These directions are especially applicable to screws which are driven into pine and softer woods.

BOOK NOTICES

(Notice.—All books noticed in these columns may be obtained from this office at publishers' prices. All postage or express prepaid. Money and address must accompany all orders.)

GARAGES AND MOTOR BOAT-HOUSES, GARAGE CONSTRUCTION AND GARAGE EQUIPMENT.—Comprising a large number of designs for both private and commercial builders. Showing the latest ideas in their planning and construction. For the country, suburban towns and cities, also motor-boat houses. The designs are contributed by well-known architects from different sections of the United States, compiled and edited by Wm. Philips Comstock, editor of the Architects' and Builders' Magazine. Bound in cloth and art paper. 119 pp., size 7½x10½. Price, $2.00.

The author states in his introductory remarks that "The garage, as the most modern of structures, presents a problem to architects and draughtsmen, with which they have had less experience than with any other form of building. In addition, the precedents which they may follow are not so clearly defined, nor so inviolable, as in the case with other buildings. Yet, this style of structure possesses requirements of a distinctive character, and usually of extreme simplicity, and in order to meet these requirements satisfactorily, all that is really necessary is a liberal application of the laws of common sense."

The work over 128 plans and elevations of well-designed garages for both motors and boats. These are in wood, brick, stone, concrete and half-timber buildings, and are designed with the intention of being convenient and complete. The book is decidedly the best exhibit of garages that has yet appeared, and will doubtless prove useful and instructive to every person who either designs or builds this kind of structure. The fact of this style of building being a departure from the ordinary, will render the book of great assistance to those who have never tried their hand on this line of architecture; and for those who have had experience, there are many things between its covers that will prove suggestive and of value.

DISTINCTIVE HOMES OF MODERATE COST.—Being a collection of country and suburban homes in good taste, with some valuable suggestions for the home builder. Compiled and edited by Henry H. Saylor. Bound in boards and cloth—flat. About 10x13 inches. Over 172 pp., with several hundred illustrations of exteriors and interior finishings. Published by McBride, Winston & Co., New York.

This is a very convenient work for those who are about to build or about to make changes in their residences, as it deals largely with construction and decoration of all kinds—including style of building, details of construction, roofing, porches, windows, doors, fireplaces, mantels, including an essay on heating systems and water supplies, installation, maintenance, and cost of steam heating, hot air and other methods. A long description of lighting by power and independent plant, electric fixtures of all sorts. Another chapter deals with built-in conveniences, bookcases, cabinets, wainscoting and built-in furniture. Floor and floor coverings—including furnishings, carpets of various sorts. Rugs—with a description as to their characters, styles and costs.

Various methods of furnishing living rooms, dining rooms, parlors, libraries, bed rooms, and dens. There is a chapter on portieres, window, wall and other draperies; ornaments, picture hanging, distribution and places for bric-a-brac, with advice as to the use and application of ornament.

Part Two.—This part shows and describes garages—a number of high-class residences, gardeners' cottages, some old-fashioned buildings and a number of excellent examples of tasteful and desirable structures. The work is an excellent assistant for the home where there is any intention to build, enlarge, or improve, and many useful hints can be gleaned from it for laying out lawns, landscape gardens, and outdoor decoration of any kind.

A POPULAR HAND BOOK FOR CEMENT AND CONCRETE USERS.—A comprehensive and popular treatise of the principles involved and methods employed in the design and construction of modern concrete work. A standard reference book, covering the uses of plain and reinforced concrete. Everything of value to the concrete user is given, including kinds of cement employed in construction, concrete architecture, inspection and testing, waterproofing, coloring and painting, rules, tables, working and cost data. By Myron H. Lewis, C. E., author of "Examinations of Civil Engineers," "Waterproofing of Concrete," etc., etc., and Albert H. Chandler, C. E., author of "Materials Employed in Construction," etc., published by The Norman W. Henley Publishing Co., New York. 430 pp. Over 120 illustrations and diagrams. Cloth. Price, prepaid, $2.50.

The title and introduction as shown in the foregoing give a fair idea of what this book contains, but it is impossible in an announcement of this kind to convey to the reader an idea of the real practical benefits that may be obtained from its contents. As the author states in his preface, "To compile material, all of which shall possess some definite value; to explain the principles and methods in concise and non-technical language; to describe the variation of cost for different kinds of concrete work; to give the reader a handbook that will prove interesting, as well as useful; to bring home the great economic and artistic qualities of concrete as a building material; and finally to help in producing a better, higher grade of concrete work. These are the criteria which have helped to shape the characters of this book, criteria difficult to satisfy and almost impossible of complete attainment."

After close examination of the contents of this book we are convinced that the authors have examined critically every subject pertaining to the use of cement and concrete and have given to the building trades a mass of the most useful of practical knowledge obtainable. Their discrimination from our point of view seems to be faultless—as nothing is presented that is not of value and much matter that might have been introduced, but which to a large extent, would have been repetition, has been avoided; and although the book is somewhat bulky, due to comprehensive references, it does not carry on its pages anything that may be considered useless. It has been our fortune—or misfortune—in our capacity as editor of a building journal, to wade through many a big tome of technical literature, but we do not know of many works now in the market where the true objects of the writings have been so easily reached, and made understandable, with less effort than in the work before us. This is quite an advantage to the busy man, whose time is taken up largely with his business affairs.

Nearly every phase in concrete and cement work is discussed, and methods, proper proportions, and correct usage are exhibited with a minimum of technical explanations, and yet, the language is clear and ample and conveys directly to the mind the author's intention.

The work is printed in good readable type, on strong book paper, and is well and durably bound, and will, we are sure, find its way to the book shelves of every contractor, engineer and architect in the land.

HOW TO READ PLANS. A simple practical explanation of the meaning of various lines, marks, symbols and devices used on Architectural working drawings, so that they can be correctly followed by the workman.

By Charles G. Peker, Co-Author of "Easy Lessons in Mechanical Drawings," etc.

Fully illustrated, Second Edition, revised and enlarged. Published by the Industrial Book Company, New York—1911.

Well bound in cloth. Price, 50 cents.

This is a very useful little work, and particularly so for students and young draftsmen, as it describes the scales used, and all the peculiar marks and symbols made use of by draftsmen. It contains over 100 pages and is illustrated with over 80 well defined illustrations. and some lessons in drawing and perspective. There being a complete set of architect's plans for a six-room frame cottage. The work is simple, low priced, instructive, and effective. Sent post-paid to any address on receipt of price.

VENEER MATERIAL

WASHINGTON, D. C., February 20, 1911.—The outlay for veneer material, both domestic and imported woods, during the calendar year 1909 was $8,977,516, as against $7,891,431 in 1908 and $6,436,237 in 1907. The number of establishments engaged in the manufacture of veneers during 1909 was 637, an increase of 235 and 267 over the number reporting in 1908 and 1909, respectively.

This information appears in a preliminary comparative report covering 1909, 1908, and 1907, which was transmitted today to Census Director Durand by Chief Statistician William M. Steuart, under whose supervision it was prepared by J. E. Whelchel, expert special agent of the division of manufactures. In cooperation with the Forest Service of the Department of Agriculture the Bureau of the Census annually collects and publishes statistics pertaining to the group of lumber and timber industries.

The rapid rate at which this industry has grown during recent years continued through 1909, the showing for that year disclosing not only a substantial increase in the number of mills, but also the fact that in point of geographical distribution the industry has extended from 30 states in 1907 to 34 states in 1909.

States Leading in the Industry.

Although veneer manufacturing was engaged in during 1909 in practically every state in which lumber timber occurs in commercial quantity, nearly three-fourths of the material consumed during the year was reported from the 11 states of Illinois, Michigan, Florida, Indiana, Tennessee, Missouri, Arkansas, New York, Virginia, North Carolina, and Kentucky, ranking in point of quantity consumed in the order named. Furthermore, of these states, the group composed of Illinois, Indiana, Florida, and Michigan alone contributed nearly one-third of the total, showing that the industry is still to some extent localized.

A point of interest in this connection is the fact that although the three states, New York, Illinois and Indiana, reported but 20.9 per cent of the total quantity of material consumed during 1909, their contribution formed 42.8 per cent of the total cost of all veneer material consumed during that year. This showing is due directly to the fact that the manufacture of veneers from imported and high-priced cabinet woods, especially mahogany, is to a large extent centered in these three states, Illinois alone reporting more than half of the mahogany consumed during 1909 and New York following with nearly one-third.

New York led in the consumption of both Spanish cedar and Circassian walnut, reporting more than three-fifths of the total of each of these species.

For many years the manufacture of veneers was mainly from the imported cabinet woods and to a limited extent from such domestic woods as walnut, oak, and bird's-eye maple. The extension of the industry has been more in the nature of the development of a new industry, the large increase in the total annual consumption of material being made up chiefly of domestic woods which are converted into veneer stock, from which are made baskets, berry crates, packing cases of various kinds, furniture, material for laminated lumber, barrels, etc. It is this branch of the industry which is widely distributed and in which the growth is most rapid.

LATEST LEGAL DECISIONS

A contractor with a city to make alterations in a public schoolhouse let a contract to a subcontractor for a part of the work, and the subcontractor contracted with a material man to furnish part of the material. The subcontractor failed to perform his contract, and the contractor paid a portion of the claim of the materialman, and, after the subcontractor failed, let the contract to another subcontractor. The amount paid the last subcontractor and the amount paid to the materialman exceeded the amount which the contractor agreed to pay the first subcontractor. Held, that the materialman had no lien upon money owed by the city to the contractor.—Meurer v. Kilgus, 75 A. (N. J.) 899.

A building contract provided that, should the contractor be delayed in the completion of the work by the act or default of the owner, architect, or other contractor, then the time fixed for the completion of the work shall be extended to a period equivalent to the time lost by reason of such causes, which extended period shall be determined by the architect; no allowance to be made unless a claim is presented in writing to the architect within 48 hours of the occurrence of such delay. No written claims were made to the architect, and no allowances of time were made by the architect. Held, that parol evidence that the architect had promised the contractor that he would take care of it on final payment was inadmissible in an action against the builder.—Van Buskirk v. Board of Education of Passaic Tp., Morris County, 75 A. (N. J.) 909.

A building contract provided that the entire building should be completed by the 15th day of September, 1908, providing, however, that the owner remove the present building from the proposed site before the 15th of May, 1908. The contract further provided that the contractor should pay to the owner the sum of $25 per day as liquidated damages for each and every day's delay that the work shall remain unfinished after the date agreed upon for the completion of the same. The contract provided that in case of delay in completing the work caused by any act or default of the owner, or other contractor, the time for completion should be extended for a period equivalent to the time lost; such period to be fixed by the architect upon written demand of the contractor. There was no extension of time by the architect. The owner removed the old building entirely from the proposed site on May 17th. The building was not completed until November 14th. Held, that the contractor was liable for liquidated damages from September 17th to the date of the building's completion.—Van Buskirk v. Board of Education of Passaic Tp., Morris County, 75 A. (N. J.) 909.

In an action on a contractor's bond for breach of a contract to erect a house for plaintiff, whereby plaintiff was compelled to pay certain lien claims against the property, findings in the lien case, to which plaintiff was a party, that certain claims for labor and material were for work not embraced in the contract, will, in the absence of the record in the lien suit, be presumed to have been within the issues in that suit.—Sheard v. United States Fidelity & Guaranty Co., 107 P. (Wash.) 1024.

To determine whether the limitation of time to sue in an indemnity bond given by a contractor is reasonable, the bond, the contract, and the facts of the particular case must be considered, and where a guaranty company gave a bond to indemnify the plaintiff from any pecuniary loss from the contractor's breach of a contract to furnish material and labor and erect a house for him, and providing that no suit could be instituted thereon later than February 22, 1906, the limitation was unreasonable where the contract was not completed until June, 1906, the liens were not filed against the property until after February 22, 1906, and the judgments in action thereon not rendered until June, 1908, since the obligation of the guaranty company was to indemnify against pecuniary loss, which occurred only when the liens were established against the property, which was long after the time to sue fixed in the bond.—Sheard v. United States Fidelity & Guaranty Co., 107 P. (Wash.) 1024.

A tenant cannot, without the authority, expressed or implied, of the landlord, charge the leased premises with a lien for material used in repairing a building thereon.—Cross V. Eyerley, 125 N. W. (Neb.), 1085.

The word "another," as used in Lien Law (Consol. Laws, c. 33) §17, providing that, if the lienor is made a party defendant in an action to enforce another lien, the lien of such defendant is thereby continued, is equivalent to "other."—John A. Philbrick & Bro. v. Ignatz Florio Co-op. Ass'n, 122 N. Y. S. 341.

When more than four months intervene between items of an account for material furnished a mechanic's lien will not attach for the items preceding the hiatus, unless it is made to appear by competent evidence that all the items were furnished pursuant to one contract.—Cross v. Eyerley, 125 N. W. (Neb.) 1085.

Under Employer's Liability Act (Code 1907, §3910) subd. 1, making a master liable for a defect in the ways, works, machinery, and plant, a ladder used in doing the master's work is a part of the "plant," and the master is liable for injuries caused by a defect in it.—Grasselli Chemical Co. v. Davis, 52 So. (Ala.) 35.

Ordinarily, as between a subcontractor and the contractor, who is in control of the general work to be performed, the law places the latter under an obligation to the former to make good all losses consequent upon delays in the progress of the work not attributable to the former.—Norcross v. Wills, 91 N. E. (N. Y.) 803.

A provision in a contract for building a county courthouse for the sum of $37,349 that the contractor should pay the county as liquidated damages $10 for every day the completion of the building was delayed after the contract date of completion was valid as a provision for liquidated damages, and was not a penalty.—Thompson v. St. Charles County, 126 S. W. (Mo.) 1044.

Where the express provisions of a contract between a subcontractor and contractor referred the former to the owner's architects, and offset their delays in furnishing plans by extensions of time for completion, the subcontractor could not enforce a claim against the contractor for damages for such delays of the architect.—Norcross v. Wills, 91 N. E. (N. Y.) 803.

Rev. Codes, §7290, giving any person performing any work on or furnishing any material for any building, structure, mining claim, etc., a lien on the property, provides for a lien in favor of any person bestowing labor on any character of property as such, or by whom material is furnished for the improvement of the property.—McIntyre v. Montana Gold Mountain Mining Co., 108 P. (Mont.) 353.

Under a contract between a subcontractor and contractor stipulation for liquidated damages for delay in the completion by the subcontractor, but, if he was not at fault and the delay was caused by the contractor or the architects, there was to be an extension of time equivalent to the time lost, the contractor was not liable for the default of the architects in furnishing plans.—Norcross v. Wills, 91 N. E. (N. Y.) 803.

Under Lien Law (Consol. Laws, c. 33) §17, providing that, if the lienor is made a party defendant in an action to enforce another lien, the lien of such defendant is thereby continued, the action to foreclose "another lien" which will keep alive a lien filed by a defendant to the action for the foreclosure of a lien created by a lien law, and not an action to foreclose a mortgage, although that in a sense is a lien upon the property.—John A. Philbrick & Bro. v. Ignatz Florio Co-op. Ass'n, 122 N. Y. S. 341.

Where a contract between a subcontractor and contractor provided that the architects were "acting for the purposes of this contract as agents of the owners," a subsequent provision that the architects should furnish the subcontractor further drawings necessary to detail and illustrate the work was not a covenant of the contractor, since, when read in connection with the part quoted, it simply meant that the subcontractor was to look to the architects for the delivery of the drawings.—Norcross v. Wills, 91 N. E. (N. Y.) 803.

A provision in a contract between a subcontractor and contractor that the contractor should "provide all labor and material not included in this contract in such manner as not to delay the material progress of the work" referred to what the contractor had undertaken to do, or furnish, for the owner, aside from the subcontractor's part of the work, and was an agreement by the contractor that the rest of the work should be proceeded with, so far as he was in control, without any delay which would interfere with the subcontractor's performance.—Norcross v. Wills, 91 N. E. (N. Y.) 803.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

980,397. Window refrigerator. Thos. W. Barry, Chicago, Ill.

980,406. Mandrel for reeling ready-roofing fabrics. B. G. Casler, assignor ½ to F. W. Ritter, Jr., Washington, D. C.

980,229. Locking mechanism for emergency exit-doors. C. J. Ericson, Salt Lake City, Utah.

980,414. Reinforcing device for concrete. Chas. A. Hanson, Chicago, Ill.

980,443. Fire-curtain for windows. A. Shuman, Philadelphia, Pa.

981,383. Machine for treating interior woodwork and flooring. Chas. H. Comstock, Indianapolis, Ind.

981,460. Self-closing door or shutter. H. T. Moody, assignor to Victor Mfg. Co., Newburyport, Mass.

981,972. Metallic window-sash. W. F. Bonness, Chicago, Ill.

981,913. Door-releasing device. H. C. Bunday, assignor to M. H. Hart, Akron, Ohio, and R. Many, Chicago, Ill.

981,613. Runway for stair-ways. Ed. V. Carter, Huntington, W. Va.

981,992. Collapsible building. G. Fugman, assignor to A. L. F. Fugman, Cleveland, Ohio.

982,055. Centering for concrete work. L. G. Hallberg, Chicago, Ill.

981,937. Metal door-frame. E. Ohnstrand, Syracuse, assignor Art Metal Construction Co., Jamestown, N. Y.

981,884. Earthquake-proof building. O. Ruhl, Bremen, Germany.

982,759. Floor surfacing machine. A. A. Bagalio, assignor to Andrews Floor Planing and Surfacing Co., New York City.

982,721. Apparatus for heating, cooling and ventilating buildings. E. C. Hodges, Joliet, Ill.

982,522. Removable floor-strip. W. S. Mitchell, San Francisco, Cal.

CUT OUT AND SEND

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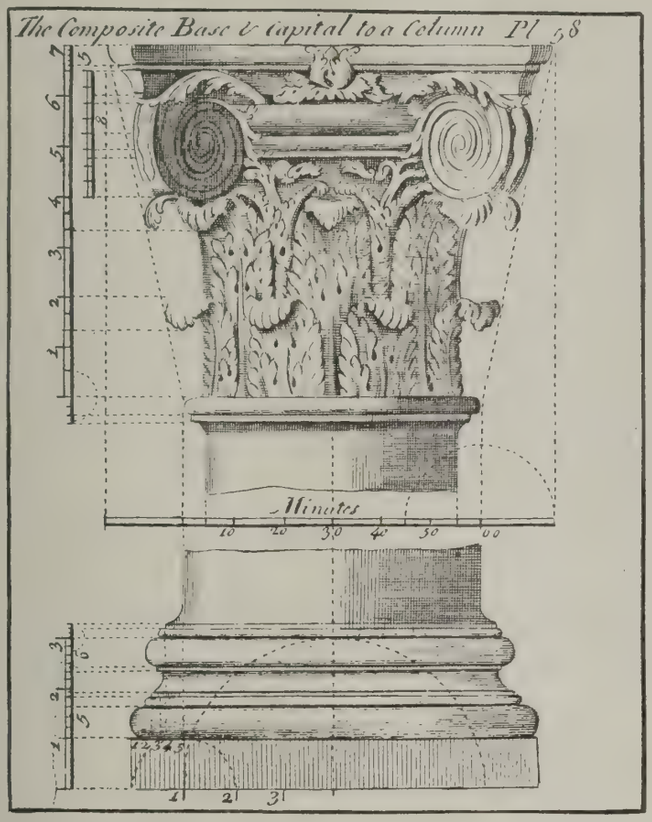
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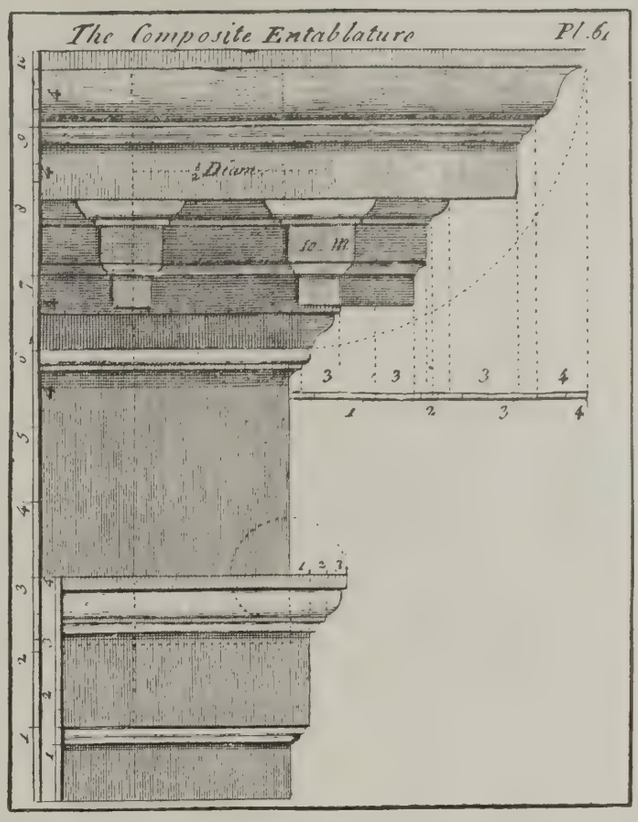
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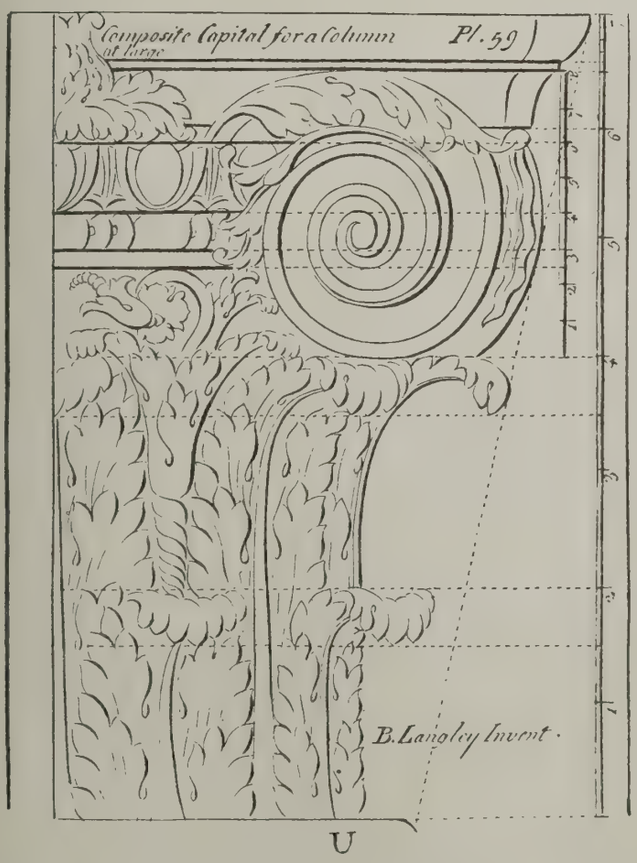
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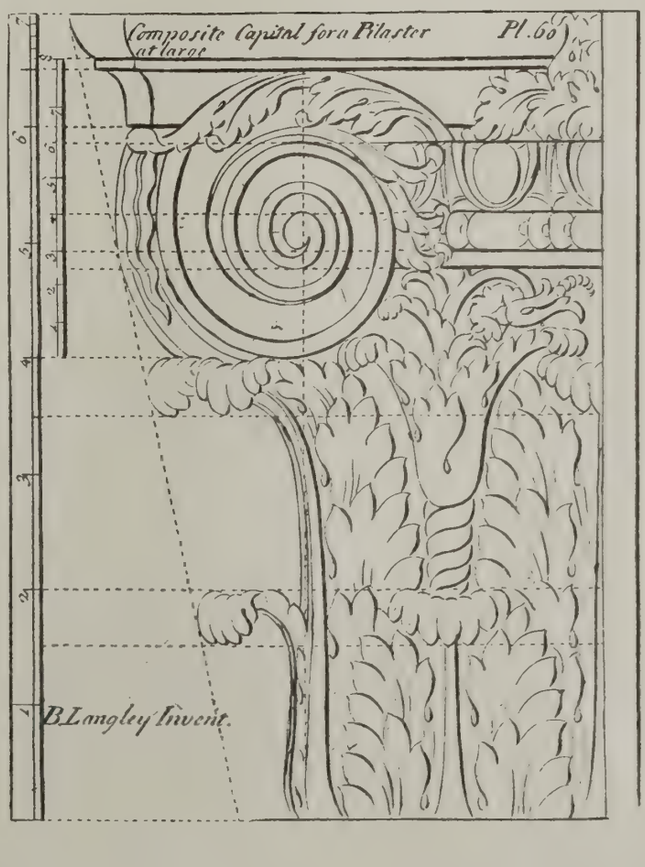
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A BRICK AND STUCCO HOUSE.



A VIEW IN BUNGALOW LAND, SOUTHERN CALIFORNIA.

BUILDING MATERIAL PRICE LIST

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce oc—Ontario cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. BM—Board measure. S 1 S—Sized one side. D 4 S—Dressed four sides. KD—Kiln dried. RG—Rough. C—Clears. Cdr—Common cedar.

	Philadelphia, Pa. Corrected by N. E. Duffey.	Chicago, Corrected by J. H. Touchstone.	Los Angeles, California, by Courtesy of B. & C.	Omaha, Neb Corrected by I. P. Hicks.	Southern Ontario. Corrected by F. C. Frantz.	Buffalo, N. Y. Corrected by J. W.	New York, N. Y. Corrected by F. M. Sammis.	Cleveland, Ohio. F. O. B. Yard Courtesy P. T. Co.	Seattle, Wash F.O.B. Mill or Yard Corrected by Courtesy F. T. Bradley
Dimensions, Hemlock Lumber	M ft. BM S 2 S	M. ft BM S 2 S	M ft BM R G	M ft. BM S 2 S	M t. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S.	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	h $23 00	yp $20 00	op $22 00 to 24.00	yp $27. 0	h $24 00	h$22.00	yp. $28.50	yp $26.00	F $13 50
2"x4" to 8" up to 16', No. 2	23 00	16 00	21 00	25 00	22 00	20 00	"	24.00	11 50
2"x4" to 8" 18 & 20'. No. 1	26 00	21 00	23 00	28 00	26 00	26.00	31.50	28.00	13 50
2"x10" up to 16', No. 1	24 00	21 00	24 00	29 00	24 00	22.00	31.50	27.00	13 50
2"x12" up to 16', No. 1	*	22 00	24 00	31 00	25 00	23.00	32.50	29.00	13 50
2"x14" up to 16', No. 1	*	24 00	25 00	*	26 00	25.00	34.00	35.00	14.50
Each 2 ft. over 20 ft., add per M	2 00	1.00	1 00	1.00	2 00	1.50	1.25	2.00	up to 32'1 00
Select stock as above, add per M	*	5.00	10 00	*	*	*	3.75	*	2.25
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft BM D 4 S.	M ft BM D 4 S.	M ft. BM D 4 S.	M ft. BM S 4 S.	M ft BM D 4 S
1"x3" to 1"x8", No. 1	s $48.00	yp $35 00	rw $35 00	yp $46.00	wp $35 00	wp $48 00	wp $62.50	wp $48.00	F $33.25
1"x10", No. 1	*	35 00	36 00	44.00	40 00	49 00	66.00	50.00	36.00
1"x12", No. 1	*	40 00	37 00	48.00	42 00	50 00	70.00	50.00	36.00
1¼"x3" to 1¼"x12", No. 1	60 00	42 00	50 00	50.00	45 00	48.00	70 00	52.00	36.00
1½" and 2" same as above	60 00	42 00	52 00	50.00	42 00	52 00	73.00	55.00	36 00
1" drop siding, No. 1	53 00	25 00	26 00 to 30 00	32.00	35 00	35 00	38.00	49.00	27.00
½" lap siding, No. 1	37.50	18.00	18.00 to 20 00	30.00	30 00	36.00	35.00	37.00	re 27.00
Enclosing and Fence Boards.	M ft BM S 1 S	M . BM S 1 S	M ft. BM D 2 S	M ft BM S 1 S	M t BM S 1 S	M t. BM S 1 S	M ft. BM D 4 S.	M ft. BM S 1 S.	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	apc $40.00	yp $18 00	op $25.00 to 30 00	yr $25 00	wp $30 00	wp $35 00	wp $32.50	wp $37.00	F $13 50
1 x8" to 1"x10" No. 1	50 00	18 00	25 00 to 30 00	24 00	h 24 00	h24 00	38.00	39.00	13 50
1"x10", No. 1	50 00	18 00	30 00 to 35 00	24 00	24 00	26 00	38.00	34.00	13 50
1"x10", No. 2	45 00	15 00	25.00 to 30 00	22 00	22 00	24 00	36.50	35.00	13.50
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D 4 S.	M t. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM. D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
⅛", T. & G. Flooring No. 1	yp $43.00	yp $30 00	op $40 00	yp $40.00	wp $40 00	yp $40 00	yp. $28.00	wp $35.00	$34.25
⅛", T. & G. Flooring No. 2	40.00	25 00	35 00	36 00	wp 30 00	35 00	26.00	30.00	29 75
Add for ceiling per M	*	1 00	1 50	2 00	1 00	1 00	1.50	2.00	M ft 27.00
Add for partition per M	*	2 00	2 50	2 00	2 00	2 00	2.25	2.00	29.25
⅝"x4", Ceiling No. 1	*	25.00	27.50	30 00	ap 30 00	30 00	28.00	31.00	24.50
	100 ft. run	100 ft. run	100 ft run	100 ft run	100 ft run	100 ft run	100 ft. run	100 ft run	100 ft run
4¼" Moulded Casing	wp $3.00	yp $1.85	rw or op $3.00	yp $2 00	wp 2 00	yp $2 00	$2.25	wp $3.00	$2 75
4¾" Moulded Casing	3.75	2.10	3.50	2 50	2 50	2 50	2.50	3.25	2 75
7¼" Moulded Base	6.00	3.25	6.00	3 50	4 50	4 00	4.50	4.20	3 50
7⅛"x9¼" Moulded Base	7 50	3.75	8.00	4 00	6 00	5 00	5.75	6.00	4 50
1⅛"x4½" Moulded Window Stool	5.50	3.00	7.50	4.00	4.00	4.00	4.75	5.00	3.50
Miscellaneous List.	Per M.	Per M.	Per M	Per M	Per M	Per M.	Per M	Per M.	Per M.
Shingles, No. 1	re $16.00	re $3.50	rw $2.75	$4 25	bc re $3 75	r $4.00	bc $5.00	rc $4.75	rc *A*c $2.25
Shingles, No. 2	13 00	3 00	2 00	3 75	*	3 50	4.00	4.25	*A*s 2 00
Shingles, fancy	18.00	5.00	rw 4.00	4 50	8 00	7.50	9.00	5.50	2 75
Lath, 4 ft., No. 1	6.00	yp 3.60	4 50	F 5 50	wp 5 00	h 4.00	5.00	5.25	F 2 25
Lath, 4 ft No. 2	4.00	2 75	3.50	5.00	s 3.75	3.80	*	4.75	2 25
Pickets, 1"x3"x4' 6", dressed	h 40.00	40.00	25.00	30.00	*	wp42 00	40.00	wp 45.00	25 00
Pickets, 1 x3"x4' 6", rough	30.00	*	20.00	*	*	38.00	36.00	30.00	20.00
	Piece.	Piece.	Piece.	Piece	Piece.	Piece.	Piece.	Piece.	Per 100.
6"x8' Post split	*	Cdr $0.13	re $0.30	Cdr $0.30	*	$0.25	.28	Cdr $0.15	re $12.50
8"x8' Post split	*	.20	.40	.35	*	.30	.32	.22	12 50
8"x8' Post whole	*	.44	.50	.40	Cdr $0 30	.50	.50	.40	Above prices prevail with a 10% discount.
6"x8' Post whole	*	.25	.40	.35	.25	.40	.45	.30	
Hardware List.	Cwt.	Cw	Cwt.	Cwt.	Cwt.	Cwt	Cwt.	Cwt.	Cwt.
Nails, wire, common	$2.25	$3 50	$3 00	$3 00	$2 85	$3.50	$2.25	$2.30	$2 95
Nails, cut, common	2.15	4 00	3 10	*	3 00	*	2.10	4.10	2 95
Nails, wire, fine finishing	2.45	1.60	3 50	3.50	4 00	3.50	2.50	2.20	2 95
Sash Weights, cast iron	1.50	1.50	1.60	1.50	2 25	1.60	New 1.50 S. H. .90	1.60	1.75
Tarred Felt Paper, best 2-ply	Roll $ .90	Roll. *	Roll *	Roll $1.00	Roll *	Roll .60	Roll $1.25	Roll $0.60	Cwt $5 00
Tarred Felt Paper, 3-ply	1 15	*	*	1.25	*	1.75	1000' 0.95	.80	Cwt. 5.00
Red Rosin, Atlas brand	1.60	.90	*	.90	$2.50	0.90	1000' 1.15	1.20	*
Red Rosin, durable brand	1.25	.75	*	.75	60	1.75	Per lb. .02¼	.90	*
Black Neponset	2.25		*	*	2 50	*	250 ft. 1.15	2.60	*
						Courtesy, Buffalo Bldr's Supply Co.			
Masons' Supplies.	Per M.	Per M.	Per M.	Per M.	Per M	Per M	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	$9 00	*	Hudson River	Not used	$6.50	*	*
Brick, blue, at kilns, No. 1	*	*	6 50	*	" "	" "	6.00	*	*
Brick, blue, at kilns, No. 2	*	7.50	6.00	*	New Jersey	" "	Pressed 22.00	*	*
Brick, white, delivered, face	30 00	7.00	*	7.50	*	7.50	" 25.00	$40.00	$45 00
Brick, red, delivered, backing	9 00	7 00	*	*	*	7.50	14.00	18.00	8 00
Brick, delivered, dry pressed	22.00	18.00	*	18.00	$17.00	18.00	25.00	22.00	35 00 to 45 00
Brick, vitrified, dry pressed	*	*	*	24.00	*	25.00	18.00	*	20.00
Lime, best gray	bu $0 27	bbl. $1.30	bbl. $1.80	bbl. $1.25	bbl. *	$ .80	bbl. $1.40	bu $0.27	bbl $1.65
Lime, best white	27	1.40	2.00	1.25	*	1.00	145 to 190 Atlas-	.27	1 85
Cement Portland	bbl net 1 85	*	2.25	1.85	1 80	bbl. 1.60	1.50 pr bbl.in wood	bbl. net 1.60	Cwt. 4 00
Plaster, calcined	" " 1.80	2.40	2.25	1.80	bbl. 2 50	ton. 6.00	(In bags $1.80 per	ton 5.50	bbl. 2.50 to 2.65
Hair, 8 lb. per bush	.25	.25	0.48	.25	*	.32	bbl., 4 bags to bbl., with rebate of 7½	*	*
					Plaster (patent) $6 per ton. White Rock $11.00 per ton.	Note, Plaster $5.00 ton. Portland Cement $1.75 barrel. All other prices correct to date.	per bag.)		

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

TRADE REVIEW

ATLANTA TOOL GRINDER.

Corundum, as a grinding agent, has the advantage of rapid cutting, small weight and bulk, does not require water for cooling and does not draw the temper of edged tools.

One man with an Atlanta Tool Grinder will do more work, and do it better in less time, than a power grindstone in a shop. Moreover, the grinder is small enough to go in the tool box and can be set up anywhere on the job.

The first requirement of a tool grinder is that it shall be capable of adjustment to do the various work required. The parts should be strongly made to stand the knocks it received on the job, and the bearings should be protected against the fine dust. In the Atlanta Tool Grinder, all these conditions are provided for, it being possible to grind close up to the handle of a knife blade and can be changed in a second to face off the head of a bolt. As the wheel gets smaller, the handle can be quickly adjusted to increase the number of revolutions, keeping the face speed uniform.

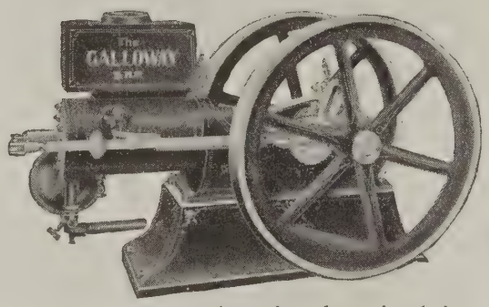
A rather novel construction is in the crank being set at right angles to the surface being ground, the operator standing at the side, where he can watch the progress of the work. This makes it as easy and safe to grind a butcher knife or scythe as a small chisel.

Corundum grinders are rapidly superseding the grindstone, and should be in every tool box, as well as in the shop and on the farm.

The A. A. Woods & Sons Company, Atlanta, Ga., are placing the

The A. A. Woods & Sons Company, Atlanta, Ga., will send you a descriptive folder and full particulars if you mention The National Builder.

THE WILLIAM GALLOWAY GASOLINE ENGINE.



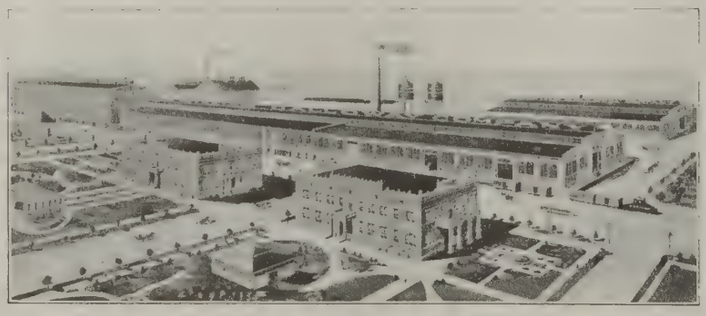
The gasoline engine has done wonders in the building construction field. It has made it possible for the contractor and builder to buy and operate power woodworking machinery and use it so economically that many jobs of millwork formerly turned over to the big mills are now done by them in their own shops.

The gasoline engine, when well designed and made, will do more useful things for the building contractor than any other machine or tool. It can be used to operate saws, planers, lathes, matchers, and concrete mixers, and many contractors are now using the gasoline engine right on the job when the building is going up. The main thing in buying a gasoline engine is to get one that can be relied on under all conditions.

The William Galloway gasoline engine is one of the best known and best liked standard engines. It is so well made and so good in every particular that the manufacturers give the buyers 30 days' free trial.

The William Galloway gasoline engine is the simplest, easiest running and most satisfactory engine selling at any price, and each engine has to stand a very rigid test before shipped.

The William Galloway Company have a decidedly different way of figuring the cost and selling price of their engine, which gives the buyer an unusually good buy. For example, they have set their stakes for making 10,000 gasoline engines for 1911. The price was based on that quantity. In other words, if a contractor or builder were to go to Waterloo and have his money right in his pocket and would ask the price on 10,000 engines, he could not get one cent better price on that number than he could on a single one, as the price of every one is based on the quantity of 10,000.



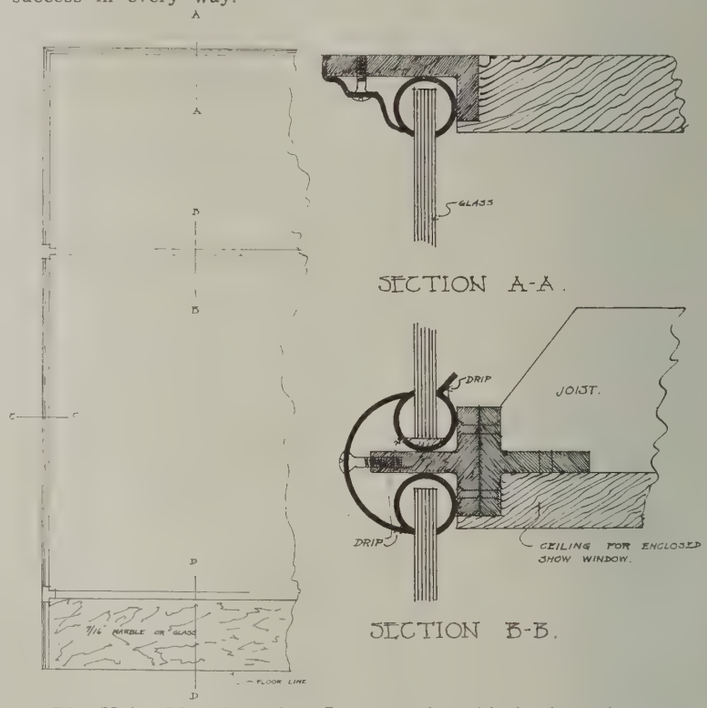
The William Galloway gasoline engines are manufactured in a factory 250 feet long by 100 feet wide, and which is crammed full of automatic machinery of the very latest type, giving them a capacity of 30 to 50 engines a day. One of the most interesting machines is a tremendous test block that permits the manufacturer to give every engine the most thorough test. Both this engine factory and the Company's new office building are constructed with concrete; made with a patented mold and under the flush concrete system and which gives the outside effect of limestone construction. All this construction work was done in the dead of winter with the thermometer as low as 15 to 30 degrees below zero. This speaks well for the contractors on the job and especially when it is a fact, that not a foot of the work was lost. A new sample room was also built during the winter for the accommodation of visitors and as the William Galloway Company does an immense business in manure spreaders, cream separators, agricultural implements, etc., besides their gasoline engines, many prospective customers and old friends call upon them.

The William Galloway Company issue a catalogue on their gasoline engines which is the finest piece of literature on this subject issued. The catalogue is beautifully illustrated and the reading matter is made up so as to give the prospective buyer an exact idea of how the engines are made; how they are sold and why they are better than any other engine, and why it is possible for the company to sell them on the most liberal terms.

A copy can be had by writing the William Galloway Company, 1695 Galloway, Waterloo, Iowa.

MARBLE OR VITROLITE GLASS FOR A BASE.

The Voltz Manufacturing Co., 1101-1103 S. 8th st., St. Joseph, Mo., call attention to the fact that their system of Universal Sash bars for store fronts is the first and only system wherein it is practical and easy for the small contractor, as well as the large one, to use Marble or Vitrolite glass for a base. With the Voltz system, the marble or glass requires no drilling, wiring or cement and the edges do not have to be polished, beveled or mitred. A sure fit at the corners, where the marble meets at the entrance, is always assured. Besides, the job is so simple that the services of a tile or marble setter is not required, and any carpenter or mechanic can do it with satisfactory results. An examination of the illustration in this article, will show that from the bottom of the plate glass to the top of the marble, there is but 1⅞ inch of metal between them. This makes the finest front ever placed on the market and one that is a success in every way.



The Voltz Manufacturing Co. state that this is the only system that will bring the use of Vitrolite glass for a base back into favor with architects and contractors. The Voltz system does away with any strain on this kind of glass and there is ample room for it to expand or contract. Therefore, there is no breakage.

At the present time it is a hard matter to find any other vitrolite base that has been up a few months where at least one glass is not broken. Architects and contractors have heretofore shied on marble, because of the trouble and risk in setting. The Voltz system is such a great improvement and gives such splendid satisfaction that contractors using it will have an immense advantage over those who do not.

The Voltz Universal Sash Bar now well known among architects and contractors as the one that "Holds with the Grip of Iron, Yet with The Touch of Velvet" is the system of construction to use for holding the most expensive glass store fronts. It makes any angle; it allows for the settling of buildings, and keeps windows from frosting. Voltz Universal Sash Bar will make it possible for the architect and contractor to give the property owner a finer store front, and one that will bring credit to all concerned.

The Voltz Mfg. Co. have a plant at 1101-1103 S. 8th St., St. Joseph, Mo. The high class work which they have done in Missouri and near by states in putting in the Universal sash bar store fronts quickly and safely, without the loss of any expensive glass, is a guarantee that the confidence shown in their system by men who want the best, is not misplaced. Their motto seems to have been, ever since they began the manufacture of the Universal Sash Bar, years ago, not to build up an immense business and sacrifice quality, but rather to go a little slower, and see that every customer

The NORTHWESTERN TERRA COTTA COMPANY

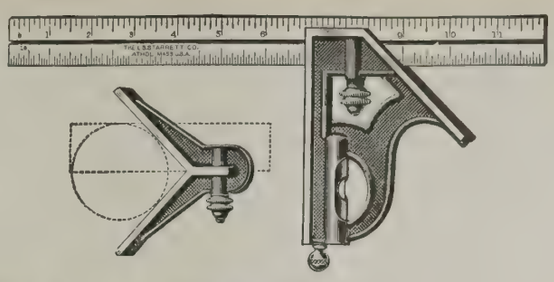
Manufacturers of High Grade

Architectural Terra Cotta

Enameled Work a Specialty

Main Office and Works, 2525 Clybourn Ave.
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CHICAGO, ILLINOIS



STARRETT TOOLS for Carpenters are made with just the same superiority in respect to accuracy, workmanship, design and finish as Starrett Tools for Machinists. And that's saying a good deal.

Complete Catalogue No. 18-M sent free

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Sanitary Steel Medicine Cabinet or Locker FOR YOUR BATHROOM





Handsome Beveled Mirror Door. Snow white everlasting enamel inside and out.

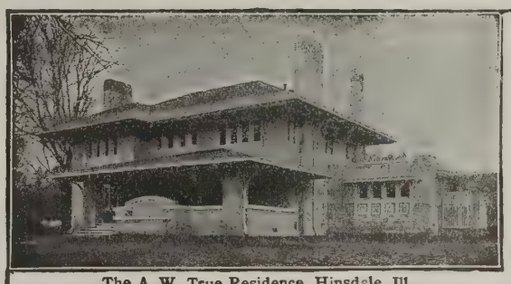
Costs less than wood and is better. Should be in every bathroom. Is dust, germ and vermin proof and easily cleaned with warm water.

Made in four styles and three sizes. **PRICE, $7.00 and up**

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HESS, 907L Tacoma Building, CHICAGO

Makers of the Hess Steel Furnace. Sold on Approval. Free Booklet



The A. W. True Residence, Hinsdale, Ill.

143 Cities USED "Stonekote" ROUGH CAST in 1910

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be: Gray, Silver Gray, White, Buff, Red, Brown.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce, CHICAGO, ILL.

ASBESTOS SHINGLES

Infringement Suit Injunction

THE PRESIDENT OF THE UNITED STATES
to

H. W. JOHNS-MANVILLE COMPANY, and its associates, directors, officers, servants, agents, workmen and employees, GREETING,

WHEREAS, it has been represented to us in our Circuit Court of the United States for the Southern District of New York, that Reissue Letters Patent of the United States No. 12,594, were issued to Ludwig Hatschek in due form of law on the 15th day of January, 1907, and that the Asbestos Shingle, Slate and Sheathing Company is the sole and exclusive owner of the rights to make, use and sell the inventions and improvements or discoveries of said Reissue Letters Patent No. 12,594, and that you, said H. W. Johns-Manville Company have infringed upon said Letters Patent, and upon claims 2, 3, 4, 5 and 7 thereof, which read as follows:

"2. The herein-described process of producing artificial stone plates, consisting of first mixing fibrous material and hydraulic cement in the presence of a great bulk of water, then forming therefrom a series of thin layers of the mixed cement and fibrous material superposed on each other until the required thickness is secured, then pressing the same and allowing the material to set or harden."

"3. The herein-described process of producing artificial stone plates, consisting of first mixing asbestos fibres and hydraulic cement in the presence of a great bulk of water, then forming therefrom a series of thin layers of the mixed cement and asbestos superposed on each other until the required thickness is secured, then pressing the same and allowing the material to set or harden, substantially as set forth."

"4. The herein-described process of producing artificial stone plates, consisting in mixing fibrous material and hydraulic cement in a bulk of water sufficient to render the cement colloidal, then forming therefrom a series of thin layers of the mixed cement and fibrous material superposed on each other until the required thickness is secured, then pressing the same and allowing the material to set or harden."

"5. The herein-described process of producing artificial plates, consisting of first mixing fibrous material and hydraulic cement in the presence of a great bulk of water, to render the cement colloidal, then forming therefrom a series of thin layers of the mixed cement and fibrous material superposed on each other until the required thickness is secured, then pressing the same and allowing the material to set or harden."

"7. A product of the invention herein-before set forth, being a composition containing hydraulic cement which has been rendered colloidal."

and upon the exclusive rights of the Asbestos Shingle, Slate and Sheathing Company thereunder.

NOW, THEREFORE, we do strictly command and enjoin you, the said H. W. JOHNS-MANVILLE COMPANY, your associates, directors, officers, servants, agents, workmen and employees, and each of them, from either directly or indirectly making or causing to be made, using or causing to be used, selling or causing to be sold, or disposing of in any way, or advertising for sale any Imitation Stone Plates, Slabs or Tiles containing or embodying the invention covered by said Reissue Letters Patent of the United States No. 12,594, issued to Ludwig Hatschek, and particularly specified in claims 2, 3, 4, 5 and 7 thereof.

WITNESS THE HONORABLE EDWARD D. WHITE, Chief Justice of the Supreme Court of the United States, at the City of New York, on the 18th day of February, 1911, and in the hundred and thirty-fifth year of the Independence of the United States.

JOHN A. SHIELDS,
Clerk of the Circuit Court.

[*SEAL*]

KEASBEY & MATTISON CO., Factors, Ambler, Penna.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

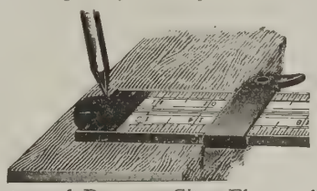
received the right attention, service and materials. Although it would be easy to put cheaper materials in the construction of Universal Sash Bars, and seemingly not affect their quality for some time, the Voltz Mfg. Co. have always used only the best. That this is known and appreciated by architects, contractors and property owners is evidenced by the high class business handled by this company and the constantly increasing demand for Universal Sash Bars.

Full particulars and samples can be had by writing the Voltz Mfg. Co.

FREE RULE GAUGE.

The A. W. Miller Mfg. Co. call attention to their lock mortiser, which has been improved until it is now recognized as one of the greatest time and labor saving mortisers on the market. It is no exaggeration or misstatement when the claim is made that this mortiser will cut an opening in any kind of wood complete in two minutes and any carpenter can do it in that time.

If the builder will have one man bore the two holes and another follow up with the cutter, the job can be done in one minute. There is no other mortiser operated by hand that can beat this time. The A. W. Miller Mfg. Co. have made a study of mortisers for years. All kinds of methods and devices have been tested by them and after years of experimenting the mortiser they now offer is the one worth having, and does the complete job easily in two minutes.



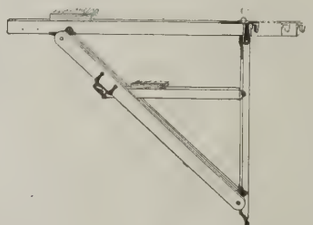
Mr. D. H. Minton of Panama City, Fla., under date of January 30th, 1910, writes as follows: "I have thoroughly tested your lock mortiser and find it is one of the greatest time savers I have ever seen. It is a complete piece of machinery and it does the work perfectly in every respect. I fully recommend it to any man who wants to put his money in something to get it back at once. It is just everything you claim for it. With thanks for the trial and having notified the agent to forward your money, I remain." When a contractor talks this way there must be something to the Miller Lock Mortiser.

The A. W. Miller Mfg. Co. will send a Howell's Rule Gauge, which is worth 15 or 20 cents, free to any of our readers who will give them the names and addresses of a few contractors they may know, and will enclose two cents in postage to cover cost of mailing.

Howell's Rule Gauge is a small, very complete device, and enables a line to be laid off with absolute accuracy and with great speed.

WEBER DOUBLE FOLDING BRACKET.

This bracket has supports for two standing planks, 22 inches apart, which makes it ideal for putting up cornices. By adjusting the top support, it can be used on any kind of a building—frame, brick veneer, or cement block. It is excellent for putting on siding, sheeting, etc., as it can be attached anywhere without injuring the surface. It also fastens into any window frame.



Many Scaffold Brackets seem sound enough when first put into use, but soon work loose and develop "side swing," one of the most annoying and dangerous of defects. Great care has been taken to eliminate any trace of "side swing" in the Weber Double Folding Scaffold Bracket.

Without loosening a single bolt, it can be quickly folded into a piece so small that 12 of them will not take up any more room than the ordinary tool chest. This feature will appeal to every contractor, as it greatly lessens the haul to and from jobs, and saves the time of the workmen.

While the sales on these brackets are just now assuming their greatest proportions, they have been in use ten years. During that time the inventor, a man who has devoted the major part of his life to perfecting such devices, has spared no pains to put them to the most exacting tests. And, while the principle has not been deviated from, many important changes were made, each one for the better.

Contractors and others can purchase these brackets complete, wood parts and all, or the castings separately. By sending a postal to Weber Mfg. Co., 661 71st Ave., West Allis, Wis., complete information and prices on these brackets and on numerous other labor saving devices can be had. The Weber Double Acting Floor Scraper alone is well worth knowing about.

THE QUICK ACTION DOVETAILER.

In these times of sharp competition, the man who wins is the one who takes most advantage of time and labor saving tools. The live man does not look upon modern tools as a useless expense but as a necessity. Much time and labor can be saved in making balusters by the use of Archer's "Quick-Action Dovetailer" for wood turning lathes. It is claimed to be the only tool known for making perfectly square shoulder and dove-tail, true to size and taper on balusters. One thousand of these perfect balusters can be turned in ten hours. The price of this tool, $15.00, would be saved on a few jobs. Write for further information or order the tool of the makers, Davis & Archer, 2515 Hanover street, Richmond, Va., mentioning THE NATIONAL BUILDER.

ON THE LEVEL TALKS.

Not so many years ago, some advertisers felt that the more hot air they placed in their advertisement, the better it was, but now many of the best advertisers believe the only way to properly sell their material is to tell the prospective buyer how the article is made and all about it.

The Baker-McMillan Co., Akron, Ohio, is one of these advertisers. If our readers will turn to their first advertisement on Page 73 of the February number and then to Page 69 of the March issue and also to their third talk in this number, they will find that each advertisement is really a short, instructive lecture on the way the Akron Eclipse Levels are manufactured and what they will do.

For instance, talk No. 2 in the March number calls attention to the Silver Lines in the Akron Levels, and states that these silver lines are an exclusive feature of these well-known levels. These silver lines show the exact level at once without any guess work. There is no straining the eyes on a cloudy day or when working in a dark corner to read the Akron Levels and they can be read accurately at a considerable distance.

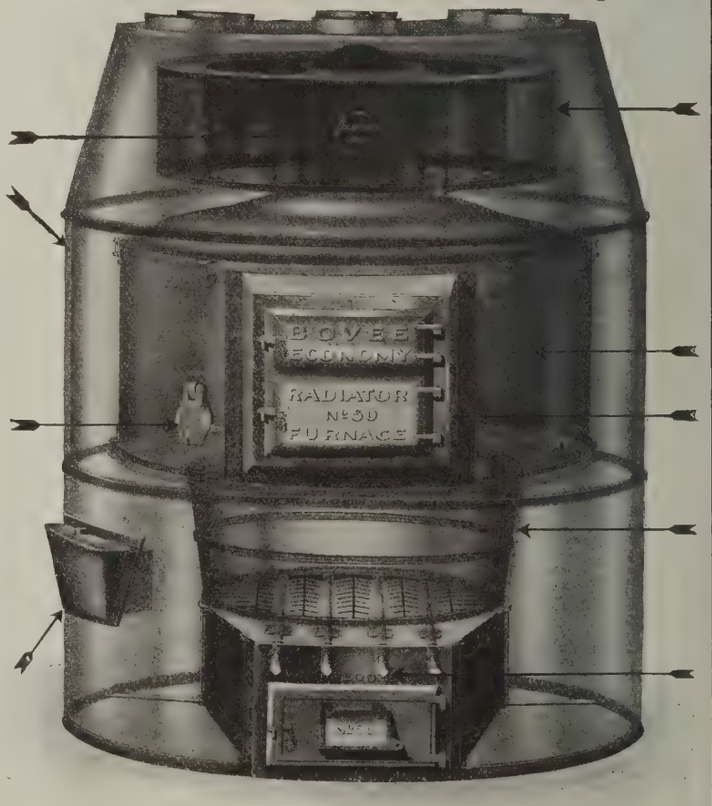
Akron Levels are made in 33 styles and sizes for every purpose, some with two plumbs and some brass bound and the manufacturers state every workman will find them the best levels for his special purpose but read the advertisement and write for their circulars.

Look for "On the Level" Talks by The Man From Akron every month, and you will surely learn a lot about levels that will be worth knowing.

THE BOVEE FURNACE.

The Bovee Grinder & Furnace Works, 60 Eighth St., Waterloo, Iowa, are offering special manufacturers prices on their three run heating plant for residences, and which include the pipe, registers and all fittings. They are also making special prices on their 54-inch furnace designed for stores, churches and schools.

The accompanying illustration gives a good idea of what a Bovee Furnace looks like. The Manufacturers state that their furnaces will save one-third to one-half the fuel and last much longer than



an ordinary furnace. They sell direct, giving the buyer a high grade furnace at the lowest possible price, and at one small profit.

In the furnace shown here, the arrow on the left hand side, at the top, calls attention to the clean out, with smoke pipe on opposite side and can be turned to any direction to reach the chimney most conveniently and have the furnace front just where desired.

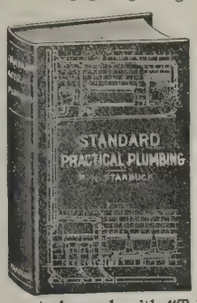
Some of the other good points are the galvanized iron castings, the sheet iron lining with asbestos between; the hot blast ventilator, the waterpot which supplies any desired amount of moisture, a return circulating-radiator, and a specially designed combustion chamber, etc.

The Bovee Grinder & Furnace Works are an old, well established company, owning and operating their own plant. They aim to manufacture a first-class furnace at the lowest possible cost, and feel sure that if those interested in heating will write for their circulars.

New Books for Building Mechanics

MODERN PLUMBING ILLUSTRATED. By R. M. Starbuck.

This book represents the highest standard of plumbing work. It has been adopted and used as a reference book by the United States Government, in its sanitary work in Cuba, Porto Rico and the Philippines, and by the principal Boards of Health of the United States and Canada.
It gives connections, sizes and working data for all fixtures and groups of fixtures. It is helpful in demonstrating and in figuring work. It gives the mechanic quick and easy access to the best modern plumbing practice. Suggestions for estimating plumbing construction are contained in its pages. This book represents, in a word, the latest and best up-to-date practice, and should be in the hands of every architect, sanitary engineer and plumber who wishes to keep himself up to the minute on this important feature of construction. 400 octavo pages, fully illustrated by 55 full page engravings. Price.....**$4.00**



STANDARD PRACTICAL PLUMBING. By R. M. Starbuck.

A complete practical treatise of 450 pages covering the subject of Modern Plumbing in all its Branches, a large amount of space being devoted to a very complete and practical treatment of the subject of Hot Water Supply and Circulation and Range Boiler Work. Its thirty chapters include about every phase of the subject one can think of, making it an indispensable work. Fully illustrated by 347 engravings. Price.....**$3.00**

PRACTICAL STEAM, HOT-WATER HEATING AND VENTILATION. By A. G. King.

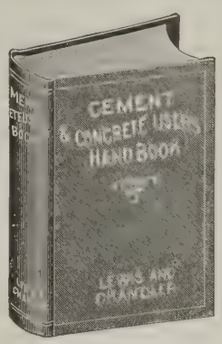
This book is the standard and latest work published on the subject and has been prepared for the use of all engaged in the business of steam, hot water heating, and ventilation. It is an original and exhaustive work. Tells how to get heating contracts, how to install heating and ventilating apparatus, the best business methods to be used, with "Tricks of the Trade" for shop use. Rules and data for estimating radiation and cost and such tables and information as make it an indispensable work for everyone interested in steam, hot water heating and ventilation. It describes all the principal systems of steam, hot water, vacuum, vapor, and vacuum-vapor heating, together with the new accelerated systems of hot water circulation, including chapters on up-to-date methods of ventilation and the fan or blower system of heating and ventilation. 367 pages. 300 detailed engravings. Price.....**$3.00**

CONCRETE CHIMNEYS, SLATE AND ROOF TILES. By A. A. Houghton

The manufacture of all types of concrete slate and roof tile is fully treated. Valuable data on all forms of reinforced concrete roofs are contained within its pages. The construction of concrete chimneys by block or monolithic systems of is fully illustrated and described. A number of ornamental designs of chimney construction with molds are shown in this valuable treatise.....**50 Cents**

POPULAR HANDBOOK FOR CEMENT and CONCRETE USERS. By Myron H. Lewis

This is a concise treatise of the principles and methods employed in the manufacture and use of cement in all classes of modern works. The author has brought together in this work, all the salient matter of interest to the user of concrete and its many diversified products. The matter is presented in logical and systematic order, clearly written, fully illustrated and and free from involved mathematics. Everything of value to the concrete user is given, including kinds of cement employed in construction, concrete architecture, inspection and testing, waterproofing, coloring and painting, rules, tables, working and cost data. Price.....**$2.50**



ORNAMENTAL CONCRETE WITHOUT MOLDS. By A. A. Houghton.

The process for making ornamental concrete without molds, has long been held as a secret and now, for the first time, this process is given to the public. The book reveals the secret and is the only book published which explains a simple, practical method whereby the concrete worker is enabled by employing wood and metal templates of different designs, to mold or model in concrete any Cornice, Archivolt, Column, Pedestal, Base Cap, Urn or Pier in a monolithic form—right upon the job. These may be molded in units or blocks, and then built up to suit the specifications demanded. This work is fully illustrated with detailed engravings Price.....**$2.00**

CONCRETE FROM SAND MOLDS. By A. A. Houghton.

A practical work treating on a process, which has heretofore been held as a trade secret by the few who possessed it, and which will successfully mold every and any class of ornamental concrete work. The process of molding concrete with sand molds is of the utmost practical value, possessing the manifold advantages of a low cost of molds, the ease and rapidity of operation, perfect details to all ornamental designs, density and increased strength of the concrete, perfect curing of the work without attention and the easy removal of the molds, regardless of any undercutting the design may have. 192 pages. Fully illustrated. Price.....**$2.00**

CONCRETE WALL FORMS. By A. A. Houghton.

A new automatic wall clamp is illustrated with working drawings. Other types of wall forms, clamps, separators, etc., are also illustrated and explained.....**50 Cents**

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The molds for molding squares, hexagonal and many other styles of mosaic floor and sidewalk blocks, are fully illustrated and explained.....**50 Cents**

CONCRETE SILOS. By A. A Houghton.

Complete working drawings and specifications are given for several styles of concrete silos, with illustrations for molds for monolithic and block silos. The tables, data and information presented in this book are of the utmost value in planning and constructing all forms of concrete silos....**50 Cents**

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The proper proportions of cement and aggregates for various finishes, also the methods of thoroughly mixing and placing in the molds, are fully treated. An exhaustive treatise on this subject that every concrete worker will find of daily use and value.....**50 Cents**

Any of these books sent prepaid on receipt of the price. Address **NATIONAL BUILDER, Pontiac Building, CHICAGO, ILLINOIS**



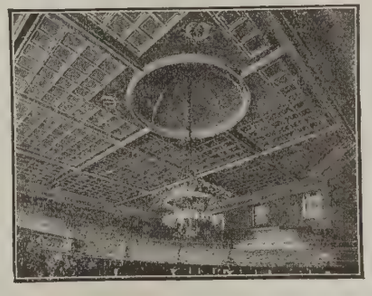
YOUR SUCCESS IS OUR NECESSITY

We Want to Show You Why

Your success is our necessity, because you will not buy our ceilings unless there is profit in them for you and satisfaction for your customers.
The great variety of our Art Metal Ceiling and Sidewall Designs insure the customer's preference when shown our Catalogue. Send us plans with measurements and we will prepare drawings of appropriate ceilings, without charge, and name you low price on all material, F. O. B. your station.

Get our Catalogue B and agency proposition

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Manufacturers of Metal Shingles, V Crimp and Corrugated Roofings and Sidings, Eaves Trough, Conductor Pipe, Ridging, etc.



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An Expensive Theatre Interior or a Plain Storeroom

A church, a school, a residence—any type of building and any style of architecture can be furnished with an appropriately designed ceiling and wall covering from

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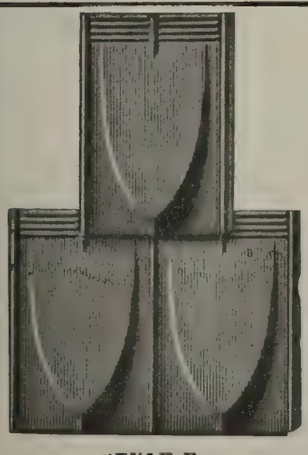
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The Berger Mfg. Co. **Canton, Ohio**

New York, Boston, Philadelphia, Atlanta, St. Louis, Chicago, San Francisco, Minneapolis

We also Manufacture

Black and Galvanized Roofing, Spouts and Conductor Pipe; Sidewalk Forms, Metal Lath; Tin Plate, etc.



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Showing Method of Laying

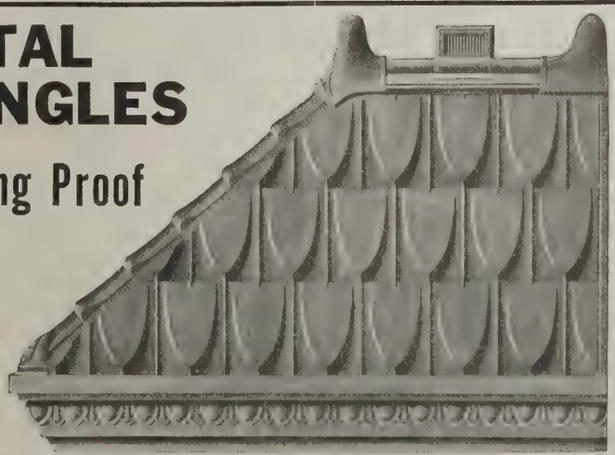
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MILWAUKEE, WIS. **KANSAS CITY, MO.**

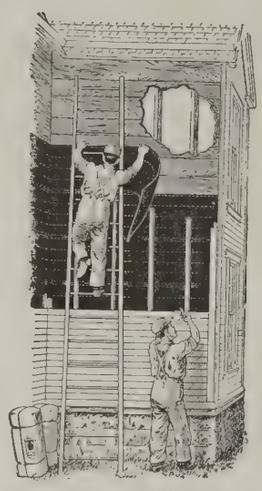


STYLE B. With Ridge and Hip Finish.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

INSULATION FOR WALLS, PARTITIONS, CEILINGS, FLOORS.

A Flax Fibre Product Which Comes In Rolls Used with Great Success by Architects, Builders and Carpenters Everywhere.



Architects, builders and carpenters of late years have been advocating the use of more advanced forms of insulation for walls, partitions, ceilings and floors—manufacturers of various so-called building papers and quilts have been put to the test. Even owners have pressed hard on the acquirement of an efficient lining for homes and buildings which should be in as far as possible, a non-conductor of heat, cold and sound. That is, that it should not allow those to pass through it.

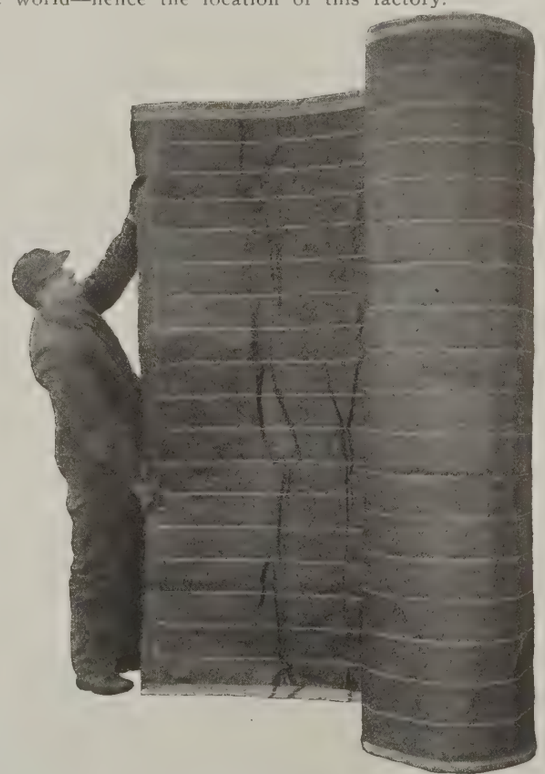
As a natural consequence, a product of flax, a form of flax fibre, from the same source as linen, obtained in rolls like ordinary building paper, is now advanced as the best insulating material for residences and buildings, and is being used very successfully by all who have given it a trial.

What we Mean by "Insulation."

To insulate is to "make an island of"—to "separate from conducting bodies by means of non-conductors." So to insulate a room the walls must be so constructed that they neither admit nor release, heat, cold, sound, dampness or vibration. Such a state of entire insulation—or isolation—is of course practically impossible to attain, and would in many respects be undesirable even if possible.

The usual insulation used in the construction of homes and buildings is known as "building paper." This "building paper" is most efficient in all uses for which it has been intended.

It accomplishes almost none of the results it is supposed to accomplish—and why any builder will longer tolerate its use is more or less of a mystery. The trade name of the real efficient material for insulating is Linofelt. It is a linen felt made from flax fibre. This is a product of the Union Fibre Company, of Winona, Minnesota. Winona is generally conceded to be the greatest flax market in the world—hence the location of this factory.



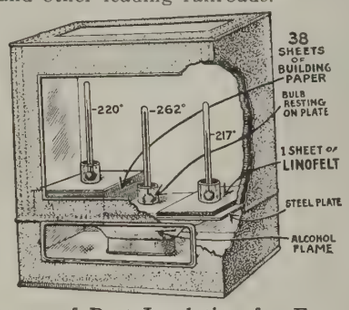
Linofelt (pronounce the "i" as you would in "light") is an insulating quilt made of degummed flax fibre, felted and stitched between two sheets of rosin-sized building paper. By this degumming process, all the vegetables, gum and oils are extracted from the flax straw and thereby all source of decay or disintegration is removed. The reason that a woolen blanket is warmer than a cotton one is because the wool fibre contains more of the tiny air spaces than the cotton.

Linofelt is like the woolen blanket—it contains countless of these little air cells and this "confined air" is the best possible non-conductor of heat, cold and sound. Linofelt is odorless and absolutely vermin proof. Bugs, rats, mice or other vermin will never touch flax fibre after it has been treated by the degumming process. It is also antiseptic and odorless—as sanitary as a surgical dressing.

As a sheathing Linofelt is used like building paper, between the weather-boards and lumber sheathing. It comes in rolls and is fastened on with lath exactly the same as you would put on ordinary building paper. A second layer of Linofelt (called Frost Linofelt) is used in place of back plaster. For this purpose it is not laid directly in contact with the lath, but it is tacked to the studs about two inches back of the lath, thus dividing the space between the lath and sheathing into two air spaces. It has been proven by actual tests that the above construction will save 40 per cent on fuel bills.

Real Insultation for Cold Storage Plants, Creameries, Breweries, Refrigerator Cars.

Linofelt is just as powerful in keeping heat out in summer as for retaining it in winter. In other words neither heat nor cold can penetrate this material. The best proof of this argument is that Linofelt is used in cold storage plants, creameries and breweries, such as Van Blatz Brewing Co., John Gund Brewing Company, A. Booth & Company, Fairmont Creamery Company. It is also used in refrigerator cars on the Chicago, Burlington & Quincy, Chicago & Northwestern R'y. Company, Illinois Central Railway Company, the Harriman Lines, and other leading railroads.



The Importance of Best Insulation for Farm Buildings.

The care of live stock during the winter months is a problem every farmer should give careful attention. It is particularly important that the barn should be so built as to keep out draughts; nothing will so quickly cause cows to run down as draughty quarters. The loss in milk supply would frequently amount to more than what it would cost to have made the barn comfortable and warm. A horse kept in a warm stable will go through the winter in much better condition. A chilled animal cannot digest food so as to get the greatest benefit from it. It is an old saying that a warm barn in winter is a cool barn in summer. A warm, comfortable poultry house is just about the best investment that the owners of the poultry can have. Give hens comfortable quarters where they won't freeze their combs and your supply of eggs will keep up to a surprisingly high figure.

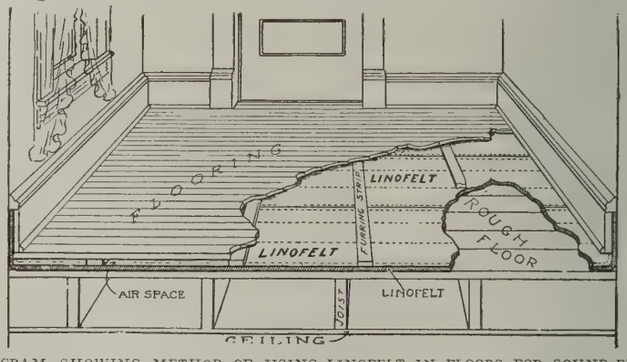


DIAGRAM SHOWING METHOD OF USING LINOFELT IN FLOORS FOR SOUND-DEADENING PURPOSES.

Linofelt is not Expensive.

Yet Linofelt is not expensive and adds less than one per cent to the cost of residences and buildings—but at least 40 per cent to their warmth in cold weather—and almost equals that record in keeping out the extreme heat of summer.

As a deadener of sound Linofelt is extremely efficient. Experiments have demonstrated that the same sound heard 200 feet through ordinary building paper is heard only two feet away through Linofelt. Apartments that have been made sound proof by the use of Linofelt are found to be in great demand and besides renting more readily bring a larger rental. Its sound-proof quality is desired everywhere and especially in school buildings, hospitals, offices and hotels. When dance floors are insulated with Linofelt no disturbance occurs on the floor below.

No house is too small to have Linofelt. It makes the house quiet, comfortable, and restful. The booklets issued by the Union Fibre Company are sent free upon request. These books show the methods adopted in using Linofelt in walls, floors, ceilings and partitions.

Architects, builders and contractors, invariably specify Linofelt after they become acquainted with it.

The Union Fibre Co., Winona, Minnesota will send samples and full information freely upon request and a large force of experts who are familiar with scientific insulating is constantly maintained for consultation. The services of these experts are free to contractors, architects and any others requiring such advice.

THE WINTHROP

SOLID TAPERED ASPHALT SHINGLES

Are of a Cool, Gray Slate Color

And have the durability of asphalt—the fine appearance of slate and the light weight and low cost of wood shingles. They are fire-resisting—weather proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

Special Inducements to Those Who Apply First Roof in Each Town. Catalogue on Request

WINTHROP ASPHALT SHINGLE CO., 1100 THE TEMPLE CHICAGO, ILL.



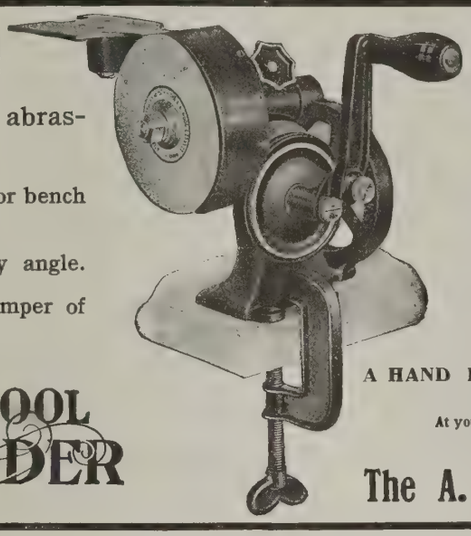
All Gears Guarded

WHEEL—Best known abrasives, 5″ x 1″

Can be clamped on table or bench —Weight 11 lbs.

Rest adjustable to any angle.

Positively will not draw temper of any edge.



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CARPENTERS

Every workman needs sharp tools for good work. You can have yours sharp at all times by owning an "Atlanta" Grinder, an accurate, workmanlike, high-grade machine.

It costs only $7.50—is always handy to sharpen and grind out a nick when you need a tool the most.

It pays for itself in a short time. Any carpentry or building contractor can save its cost many times over in time saved in grinding tools and in faster and better work due to tools being kept in perfect condition.

A HAND POWER GRINDER THAT MEETS THE MOST EXACTING REQUIREMENTS

At your dealer's—If not, the manufacturers will send by express prepaid on receipt of price.

Manufacturers

The A. A. Wood & Sons Co., -:- Atlanta, Ga.

Standard Spring Floor Hinges

Chicago, Ill., Feb. 23, 1911.

THE STANDARD MFG. CO.,
Shelby, Ohio.

Gentlemen:

In my twenty-two years experience I have used all kinds of double acting spring floor hinges. I have also used the STANDARD Spring Floor Hinge, and astonished by the results superior to any other.

First of all, one of the essential points: It eliminates labor necessitated by cutting a hole in the floor, which has its disadvantages.

The Spring is very powerful and another advantage is proven in the convenience by which it can be adjusted, simply by removing the plate instead of removing the door from its position.

I cannot say too much of it as a labor saver.

Yours. etc.,
A. SORENSEN

Torrington, Conn., Feb. 7, 1911.

THE STANDARD MFG. CO.
Shelby, Ohio.

Gentlemen:

I am a persistant user of your handy STANDARD Double Acting Spring Floor Hinges, and am always glad to express my reasons to anyone.

The following is the argument I employ when questioned about this device:

1. It is made of good material.
2. It is simple and has lasting qualities.
3. It does away with all floor wedges used to hold the door open, thus saving the valuable time of the builder as well as his customer.

Thus far I have never met anyone that did not appreciate the usefulness of your world-beater floor spring.

Yours, etc.,
AUGUST DIDIER.

Lamark, Ill., 2-21-1911.

THE STANDARD MFG. CO.,
Shelby, Ohio.

Gentlemen

The Standard Spring Floor Hinge is the best. Is all steel, double acting, durable and simple. Will positively control doors swinging in either direction. Is noiseless and positive in action. Is adjustable to doors of various weights. Will remain open if desired. The case hardened ball bearings and wearing parts carry weight of door and thrust of spring. The hook attachment does away with mortise and brings weight of door directly over bearings. Alignment screws are placed where anyone can adjust door. Finish plates cover all defects in cutting. The STANDARD Spring Floor Hinge satisfies all customers because it is always in working order.

Yours, etc.,
WALTER HAWES.

Results of Prize Contest

We have known all along that STANDARD Double Acting Spring Floor Hinges were **good.** But until the answers from our prize contest began pouring in we had not realized how enthusiastically the trade had adopted them.

The five letters herewith reproduced were considered the best from among the huge quantity sent in. The judges could not decide upon which one was better than the other four, so the prize was divided into five equal parts and a check for the amount has been sent to the winners.

All you carpenters and builders who use hinges are requested to read these letters. They are written by men like yourselves—actual users of STANDARD Hinges — and clearly prove **our** statements are based on facts.

After you have read them, write for our literature and prices.

The Standard Mfg. Co.

SHELBY :: :: OHIO

Lincoln, Indiana, Feb. 13, 1911.

THE STANDARD MFG. CO.,
Shelby, Ohio.

Gentlemen:

The STANDARD is neat and simple in construction. It has a detachable floor plate that adjusts itself to the floor level. It will hold the door open in either direction, also permits door to be taken down without removing any screws.

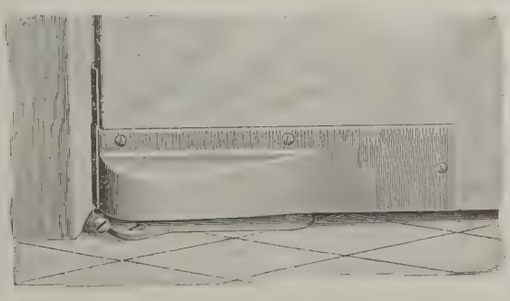
The short plunger takes same side movement as spring; this with the ball bearings produces a noiseless and easy moving door. The hardened steel bearings and ball race give life to the hinge. The hook attachment with easy access to spring adjustment and alignment screws, together with the separate finish plates, saves half the labor of other makes. Yours, etc.,
O. H. BECKWITH

Cincinnati, Ohio, Jan. 31, 1911.

THE STANDARD MFG. CO.,
Shelby, Ohio.

Gentlemen:

First the hinge is placed at the bottom of the door and carries the weight of the door on ball bearings, thereby reducing the friction to a minimum and causing the door to swing easily and noiselessly. Second, the wearing parts are made very true and of hardened steel, which contributes to ease of action and long lasting qualities. Third, the construction is very simple and the hinge is therefore easily put on a door, quickly adjusted to work right and does not get out of order. This commends it, not only to the expert mechanic who wants to get his work done quickly and to do it well, but also to the less skilled man who may not have had much experience in putting on hardware of this description. And finally after the hinge is put on it pleases the owner because it works easily and well, and looks neat whether it is put on a common pine door or upon the most expensive oak, birch or mahogany door, and is therefore never out of keeping with its surroundings. Yours, etc.,
EDWARD A. PEACOCK



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

AMERICAN "CONTRACTORS'" PORTABLE SAW BENCH.

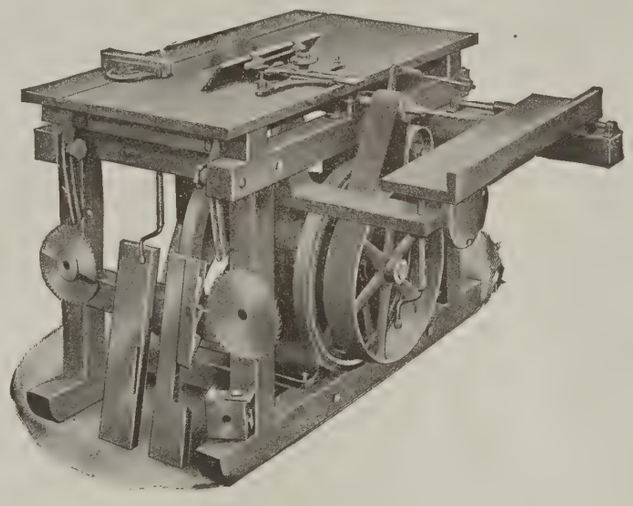
No matter how large or how small the job, nor how carefully the material is listed for the mill, there is always a large amount of sawing, boring, mitering, dadoing, etc., to be done in the shop or on the job.

Until recently, this either has been done laboriously by hand or foot power and a delay resulted from sending to the shop or mill for extra or odd pieces. Then, too, there is a lot of work which cannot be run out until the building is practically ready for it.

At a time like this, every contractor appreciates work which may be done on a portable saw bench and variety worker. The variety of work suitable for a machine of this character makes it valuable for the shop as well as the job. Its portability allows its use in the shop in getting out the bulk of the work, and then being taken to the job for the cutting and fitting.

As it is practically self-contained, it can be placed to the best advantage as to light, etc., or moved to another place where another strip may be run up through doorways or windows.

Some contractors move the machine up from floor to floor as the work progresses, as it can either be brought to the work or the work brought to the machine.



A machine of this description is manufactured by the American Saw Mill Machinery Co., Hackettstown, N. J.

Standing on hard-wood skids, covering a space only 54 inches square and weighing less than 1,000 pounds, it is equipped to do cross and rip sawing, boring, dadoing, jointing, rabbeting, etc. It is designed to rip 1-inch stuff at the rate of either 75 to 125 feet per minute, and will work up to 4-inch stuff.

The manufacturers claim that the machine will save its cost on one job, and that is easy to believe when it is considered that a large part of the cost of concrete construction is in the cost of cutting the lumber for forms, etc. As will be seen from the cut the frame of the machine is built for service, being of hard wood bolted together, insuring strength, rigidity and durability. The motive power may be either gasoline engine or electric motor, built in the frame. The adjustment of the machine allows a variety of work to be done with little delay in changing from one class of work to another.

The American Saw Mill Machinery Co., Hackettstown, N. J., will be pleased to give further information and quote prices on an equipment best suited to the contractor.

"RED TOP" ASPHALT SHINGLES.

The Cincinnati Sheet Metal & Roofing Co., 36-40 Main St., Cincinnati, O., have been manufacturing an asphalt shingle for quite a number of years—the entire output of which has heretofore been used up in their home city. This in itself is an unusually strong recommendation for its use for the home architect is often the last to believe in a locally manufactured material. But in the case of "Red Top" Asphalt Shingles, the leading architects needed just such a roofing. The beautiful gray, green and red slate colors in which these shingles are made give the architect and property owner an unusually good opportunity of securing a roof which not only adds greatly to the fine appearance of the building, but also makes a substantial material.

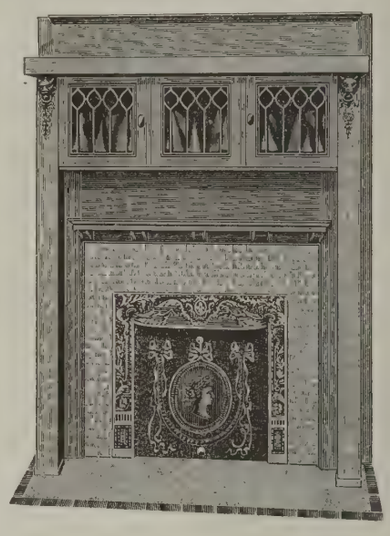
"Red Top" asphalt shingles are manufactured in one size and that is 8x13 inches. They are made of pure wool felt and of the best asphalt. The top or exposed surface is covered with real slate chippings in red granite, gray, green plate and red slate colors, doing entirely away with painting. "Red Top" asphalt shingles are fire, hail, storm and water-proof. As the shingles are made of asphalt, it is not necessary to use galvanized nails for every nail when driven through a "Red Top" shingle is coated with asphalt, giving it a much longer life. The shingles are laid 4 inches to the weather. A hammer and a knife are all the tools that are needed for laying "Red Top" shingles. The knife is used to trim when laying around ridges or trimming for gutters. The work of laying is done twice as quickly as with wooden shingles because one asphalt shingle covers twice as much surface. When "Red Top" shingles are laid they are flat, and flat they remain, never buckling or warping and the longer they are on the tighter the roof gets. They are packed one-quarter of a square to a case and one square covers 100 square feet.

The Cincinnati Sheet Metal and Roofing Co. will be glad to co-operate with architects and contractors in other states, with a view of getting "Red Top" asphalt shingles introduced. They will send samples, catalogue, and prices on request, and their guarantee is one which fully protects anyone who specifies or buys their shingles.

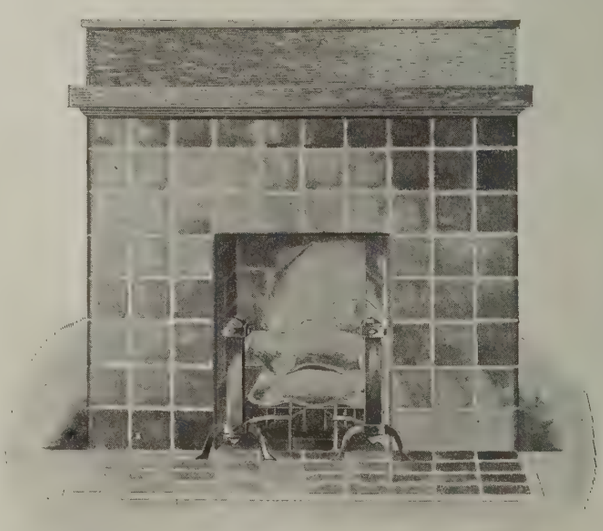
ATTRACTIVE AND COMFORTABLE HOMES.

Home is what we make it—within its walls. The home as a structure may be ornamental and attractive to look upon, but the most elaborate exterior could not add to the comfort and attractiveness of the interior, "the dwelling place of the house."

It is the sacred pledge of our lives where the ties of love and affection are knit more closely together.



Every home builder should give the interior of his home the most careful consideration and one of the most important features that makes a home comfortable and attractive is the open fireplace combined with a suitable and well proportioned mantel. The greatest care should be exercised in the selection of mantels, to get the proper wood and finish and also the color and texture of tiling, producing a happy and pleasing combination in perfect harmony with each other.



The great variety of designs shown in the handsomely illustrated catalogue issued by Moorman & Otten, 611-613 Main St., Cincinnati, Ohio, will enable the home builder to make a ready selection for his new home. With a copy of the catalogue before him, the contractor or architect is able to assist the owner in the selection of a mantel best suited to his individual requirements.

This firm has been in the mantel business over twenty years and has established a record for fair dealing, and is well qualified to give any information or supply anything appertaining to the mantel or fireplace proposition. Their catalogue, showing about fifty of their latest designs, will be sent upon request.

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Take Up Slate Roofing in Your Territory—This Spring

Wherever there are roofs of private residences, churches, schools, public buildings, barns or factories to be laid—slate is stipulated in the contract.

Prepare now to get and hold this profitable business—by taking up slate roofing. It is easy to learn, can be conducted in connection with your present line with no extra trouble or expense and will yield sure and increasingly satisfactory returns.

If *your* territory is *not* already covered by a slate roofer—now is the time to establish yourself in this business and take orders for

SEA GREEN OR PURPLE ROOFING SLATE

the one roof that *never wears out;* can't rust or decay, crack or disintegrate; that never requires repairs, is fire and spark proof; that reduces insurance rates, affords clean, pure cistern water and is practically indestructible.

Wherever new roofs are to be laid or wherever there are worn out shingles, metal, tin or composition roofs *to be replaced*—there is business for *you.*

A few simple, inexpensive tools and a little capital is all that is necessary. If there is no Slate Roofer in your territory—write to us at once for delivered prices on slate, tools, supplies. We furnish all the necessary *instructions free.*

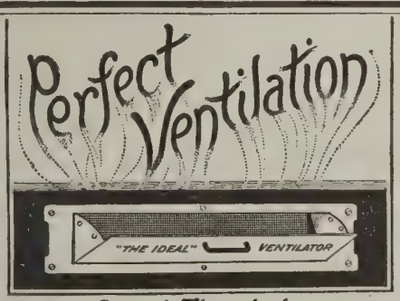
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Their Rooms Kept Warm in Winter, Cool in Summer

THESE Homes and this magnificent high school building are the more highly **valued** because their walls are insulated with **Linofelt** and not with ordinary building paper.

In the case of the high school building, each room is very quiet and isolated because **Linofelt** is sound-proof and noise is kept out. We want architects, builders and owners to send for our beautiful **free** books which show many such illuminating examples, tell **all** about **Linofelt** Lith Board and Rock Wool, give the plans, method of sheathing walls, floors and ceilings, to keep out the heat of summer and have the house cool, to keep out the cold of winter and have the house cozy and warm in every cubic inch of its space and keep out all noise all the time.

LINOFELT
Linen-Felt made from Flax Fibre

The white house at the top of the left border is in New Orleans; the **Linofelt** used in it cost only $31 more than ordinary building paper; it has added many times that sum to the actual **value** of the house. Considering tests show **Linofelt** is 38 times more effective than building paper, we do not believe there is a single architect, builder or owner who will not insist on using it once he knows about it.

Linofelt is an insulating quilt. No other is as light as **Linofelt** cubical contents considered. It is odorless, chemically clean, sanitary. It saves 40 per cent in fuel bills. It is the best sound deadener. The same sound heard 200 feet through ordinary building paper is heard only 2 feet away through **Linofelt**. These features make it especially valuable for homes, hospitals, sanitariums, office buildings, school buildings and all structures where comfort and quiet are absolutely essential.

Linofelt is so preeminent as the greatest insulating material that it is used in thousands of refrigerating cars. For building purposes, it is equally important in either northern or southern climate.

Linofelt comes from the same source as linen. It is made from flax in the largest flax market in the world—Winona. Its manufacture is supervised by experts—engineers and specialists who have developed perfect processes and who know **all** the uses and exactly what is required. The methods and plans they have put into effect into hundreds of state'y houses and buildings such as are shown here have made architects, builders and owners alike enthusiastic.

Building Men, Send for Our Beautiful Book

Here's the knowledge that will enable you to get ten years ahead of your competitor right away. Our book is exceptionally attractive, full of fine home elevations, methods of using **Linofelt**, Lith Board and Rock Wool. Let us tell you what **Linofelt** is, how it is made and this alone will convince you that it will do more than we claim it will—that its adoption in your work will prove a lasting benefit and satisfaction to you. Write for the FREE Books for Architects, Builders and Owners today. Your nearest dealer's name on request.



Union Fibre Co.
Manufacturers
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Winona. Minn.



FREE Book for Architects Builders Owners

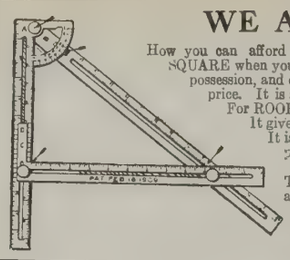
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Cincinnati, Ohio

Branches and warehouses in all the large cities in United States, Canada and Mexico.

UNION FIBRE CO.,
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Winona, Minn.

Gentlemen:—
Kindly send me your FREE **Linofelt** Book for.....
.....(Designate Architect's Builder's, Owner's)
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Address.....

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How you can afford to get along without the A B C PROTRACTOR SQUARE when you can BUY IT FOR $2.00. If you had one in your possession, and could not get another one, you would not sell it at any price. It is a TIME SAVER and mistakes are IMPOSSIBLE. For ROOF, STAIRWAY and CIRCULAR work it has no equal. It gives lengths as well as bevels. It is no new method, just the old one made easy by the proper construction of the tool. IF NOT SATISFIED with the A B C PROTRACTOR SQUARE, return it to us within 30 days, and your money will be CHEERFULLY refunded.

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P. T. MacLAGAN, Architect

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Slate Blackboards Guaranteed Strongest and Best Finish

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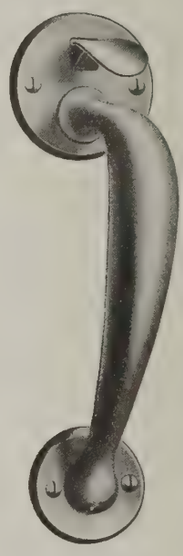
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A NEW "COMBINATION WOODWORKER."

The Tannewitz Works, Grand Rapids, Mich., are completing the tryout of a new combination woodworker for millmen, contractors and builders, and will place it on the market within the next thirty days. The machine will be illustrated and discussed at some length in a later issue of this journal. Such information that has been given out so far indicates that this concern has spent over a year in careful investigation and consideration of the needs of this branch of the woodworking industry. They promise that the result of their labor will be recognized as a decided step upwards for all contractors, builders and millmen who are interested in modern methods for reducing labor costs and quickening the completion of jobs. Such a machine would prove of great benefit and it is suggested that all interested readers should write the Tannewitz Works, Grand Rapids, Mich., for the advance information, which it is understood will soon be off the press.

NEW BUILDERS' HARDWARE CATALOGUE.





CYLINDER FRONT DOOR SET AND HANDLE.

Not so many years ago very little attention was paid to the hardware for residence work. The only place that the contractor and property owner could learn about the different designs and finishes of a lock set was to go down to the hardware store and look over the stock. This was not always convenient, especially when the contractor and home owner were going over the plans and figuring things out. The contractor not having well illustrated catalogues to show the property owner what he was going to get for hardware and not having any samples to show the different finishes, was at a disadvantage and, therefore, the matter of hardware received the least attention. This was not a fair proposition to the hardware end for nothing dresses a house up more than high-class builders' hardware. It will add so much to the good appearance of the building that it makes the property easier to sell and more valuable in every way. The large manufacturers' printed catalogues fully describing their different lines but those catalogues were big, bulky affairs, intended only for dealers and many of them were so inconveniently arranged that it was hard to figure out the different designs, prices, etc. Besides, the contractor could very seldom borrow such a catalogue so when the Rehm Hardware Company completed their book on builders' hardware and got it up especially for contractors and builders, it met an instant and popular demand.

The catalogues which the Rehm Hardware Company began printing years ago, have been steadily increased in size, until now they are able to give, without any charge, whatever, a book so full of illustrations of high-class builders' hardware, etc., that it gives the contractor specifying and estimating from it, an extraordinary advantage over the man who is not lucky enough to have one. Their 1911 catalogue is just off the press and ready for distribution. In it, is illustrated everything needed to complete houses with the latest and most up-to-date hardware. It contains a fine assortment of Cylinder Front Door Sets and Handles in all of the leading finishes; Cylinder and Regular Store Door Locks and Handles, ranging in prices from $1.45 per set up to $15.00 per set. Sargent's Union Lock Sets, Cylinder and Bit Key Door Sets in Cast Bronze Metal wrought bronze metal and steel plated finished. Prices from $1.35 per set to $10.00 per set.

Also Inside Lock Sets consisting of all the leading and up-to-date designs for bungalow or office buildings. Prices from $3.15 per dozen sets to $39.60 per dozen sets. Glass Knobs, Door Knockers, Nickel Plated and Bower Barff sets, Sash Locks in all finishes. Prices from $0.33 to $3.10 per dozen. Sash Lifts $0.12 to $2.70 per dozen. Casement Fasteners and Adjusters, Door Holders, Flush and Chain Bolts, Butts and a big assortment of Double Acting Spring Hinges, Screen Hardware, Sliding Door and Barn Door Hangers, Galvanized Gutter, Ridge Roll, Finals and Tools.

The Rehm Hardware Company, 1503 Blue Island avenue, Chicago, have been advertising in every issue of THE NATIONAL BUILDER for the past five or six years and have among its subscribers many men who appreciate the advantages of an easily understood catalogue which enables them to make selections from the latest designs and standard makes and at wholesale prices.

If you have not received one of these new catalogues, it is surely worth while to write for one. In estimating on the different designs and makes the Rehm Hardware Company never deceive the buyer in giving prices on coated ware, when solid copper or bronze is wanted.

In the first place, they tell the prospective buyer exactly how to tell the difference between the coated and solid materials and in doing this, the buyer is always assured of getting figures based on just what the article is and later on when ordering, receives exactly what he pays for. This means a great deal to the contractor and builder and to the property owner and by thus dealing honestly and fairly with all their customers, the Rehm people, have gained for themselves the confidence of their customers. The new catalogue is worth having, even if you happen to have an old one on file.

NIAGARA HARDWARE SPECIALTIES FOR CONTRACTORS AND BUILDERS



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Niagara Wall and Veneer Ties for use in Brick and Brick Veneer Walls offer greater resistance than any bond on the market. They are galvanized as a protection against rust. Folder N. B. on request.

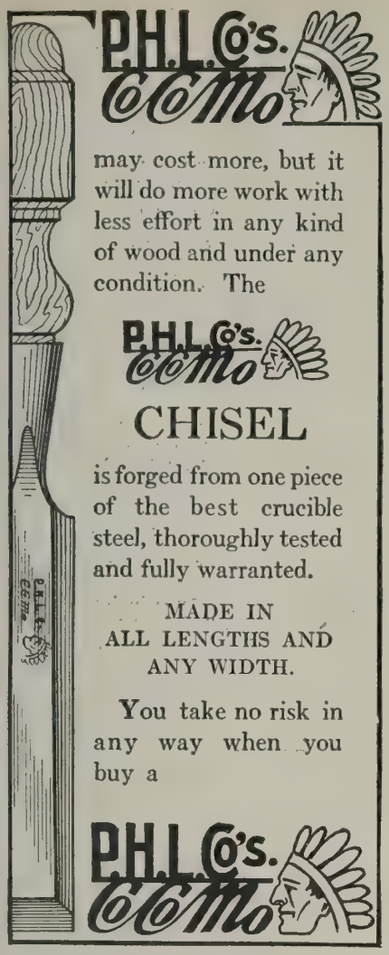
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is forged from one piece of the best crucible steel, thoroughly tested and fully warranted.

MADE IN ALL LENGTHS AND ANY WIDTH.

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chisels could look the same and cost half as much. It's what you don't see that makes the cost and gives the service.

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It is a known fact that a roof of red cedar shingles, rightly laid, can be guaranteed for twenty years. Many such roofs have stood the test of weather for much longer.

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was awarded the only Double Grand Prize given shingles at the Alaska-Yukon-Pacific Exposition, Seattle, 1909.

We sell them only to retail dealers, but yours will get them for you if you insist.

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PACIFIC COAST LUMBER AND TIMBER LANDS — Menz Timber Gold Bonds — BUCKEYE BRAND RED CEDAR SHINGLES
Profit Sharing Interest Bearing Deed Protected

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An absolutely *first-class* **high-grade** watch at a price within the reach of the people—the Burlington Special Anti-Trust Watch.

The World's Masterpiece of watch manufacture—the Burlington Special—now sold direct to the public at its *rock bottom, anti-trust* price (and besides without middlemen's profits.

We do not care what it costs—we will uphold our independent line and so we are making the most sweeping, baffling offer ever made on watches.

Some trusts are legal and some are not. **We do not say that the watch trust is illegal;** but we do say that the **methods** of the giant factories in making "contracts" with dealers **to uphold double prices** on watches is very **unfair**—unfair to **us** and **you.** Hence our **direct** offer on the Burlington at the **very same** price the **Wholesale** Jeweler must pay.

This is *your* opportunity—**NOW**—while this great Anti-trust offer lasts—get the best watch made anywhere at one-third the price of other high-grade watches. Furthermore, in order to fight the Trust most effectually, we even allow terms of

$2.50 a Month on our finest watch—easiest possible payments at the rock-bottom price, the identical price the **Wholesale** Jeweler must pay.

WATCH BOOK ON REQUEST.

Now do not miss this opportunity. At least we want you to know about WATCHES and WATCH PRICES. Write today.

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The very nature of a level demands accuracy. Its purpose is to prove whether *your* work is accurate or inaccurate, therefore you must have a level that you *know* is right—one that you can fully depend upon.

Akron Eclipse Levels are the standard of accuracy to which others are compared. No other levels have those clear, distinct Silver Lines, around the spirit tube, which show L-E-V-E-L, or otherwise, instantly, and can be seen at a considerable distance. No other level is so scientifically accurate, or so satisfactory to skilled mechanics.

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are exceptionally strong and durable. The spirit glass is carried on elastic bearings and enclosed in an outer tube of heavy steam-gauge glass which is practically unbreakable. Thus it will endure the falls and jars incident to daily use, without injury. All glasses are adjustable so that accuracy is assured under all conditions. Made in 33 styles and sizes for carpenters, masons, concrete men and everybody who uses a level—many with two plumbs so that stock can be applied either end up.

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If you want the best, the most durable, the most accurate level ever made, ask your dealer for an Akron Level. Insist on having an Akron. Don't accept something else for there is nothing else "just as good."

If your dealer does not sell Akron Eclipse Levels, write us for catalog, mentioning dealer's name, and we will see that you are supplied without delay.

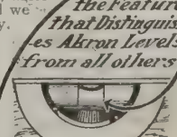
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This is the Feature that Distinguishes Akron Levels from all others



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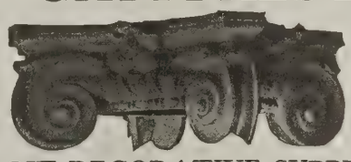
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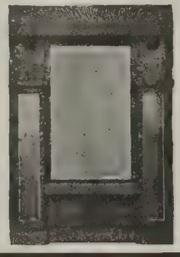
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add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

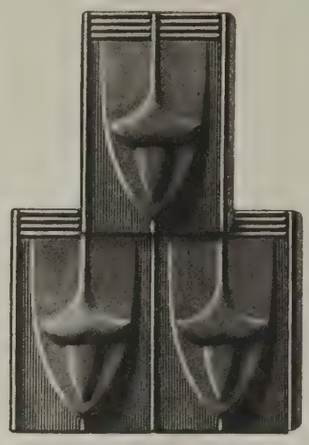
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It contains many beautiful designs of Consoles, Columns and Grilles.

NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

"TITELOCK" METAL SHINGLES.

The Metal Shingles which we are illustrating and which are described here are manufactured by the Milwaukee Corrugating Company of Milwaukee, Wis., and are placed on the market under the name "Titelock." The Shingles have met with exceptional success, and are being specified by many of the best architects and used by the most conscientious contractors and builders.

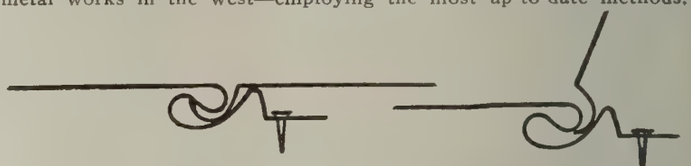


STYLE A—SHOWING METHOD OF LAYING

"Titelock" Metal Shingles are not made from a galvanized sheet. They are manufactured from full-weight terne-plate. After the shingles are completely formed they are dipped into paint or submerged in spelter, as the case may be. This method of galvanizing Metal Shingles insures an absolutely perfect coating of spelter. There are no raw edges exposed to the weather, no places on which the zinc coating has been cracked, and the perfect covering absolutely protects the iron from corrosion. Our readers can easily realize why "Titelock" Metal Shingles have so generally met with the approval of the architect, contractor, tinner, hardware dealer and property owner, all over the United States and Canada, and why the life of these shingles exceeds that of others.

"Titelock" Shingles are made in two sizes, 7x10 inches and 10x14 inches—painted or galvanized in both styles, "A" and "B."

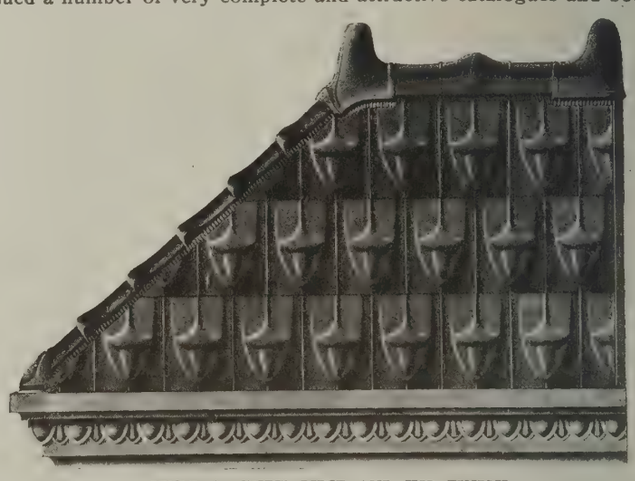
The Milwaukee Corrugating Company is one of the largest sheet metal works in the west—employing the most up-to-date methods,



SIDE LOCK—WHEN LAID IN PLACE SIDE LOCK—WHEN LAYING SHINGLE

using only the best materials and producing a line of sheet metal shingles which have gained for that company a high place in the building material field.

In order to make it easier for specifying and buying, they have issued a number of very complete and attractive catalogues and book-



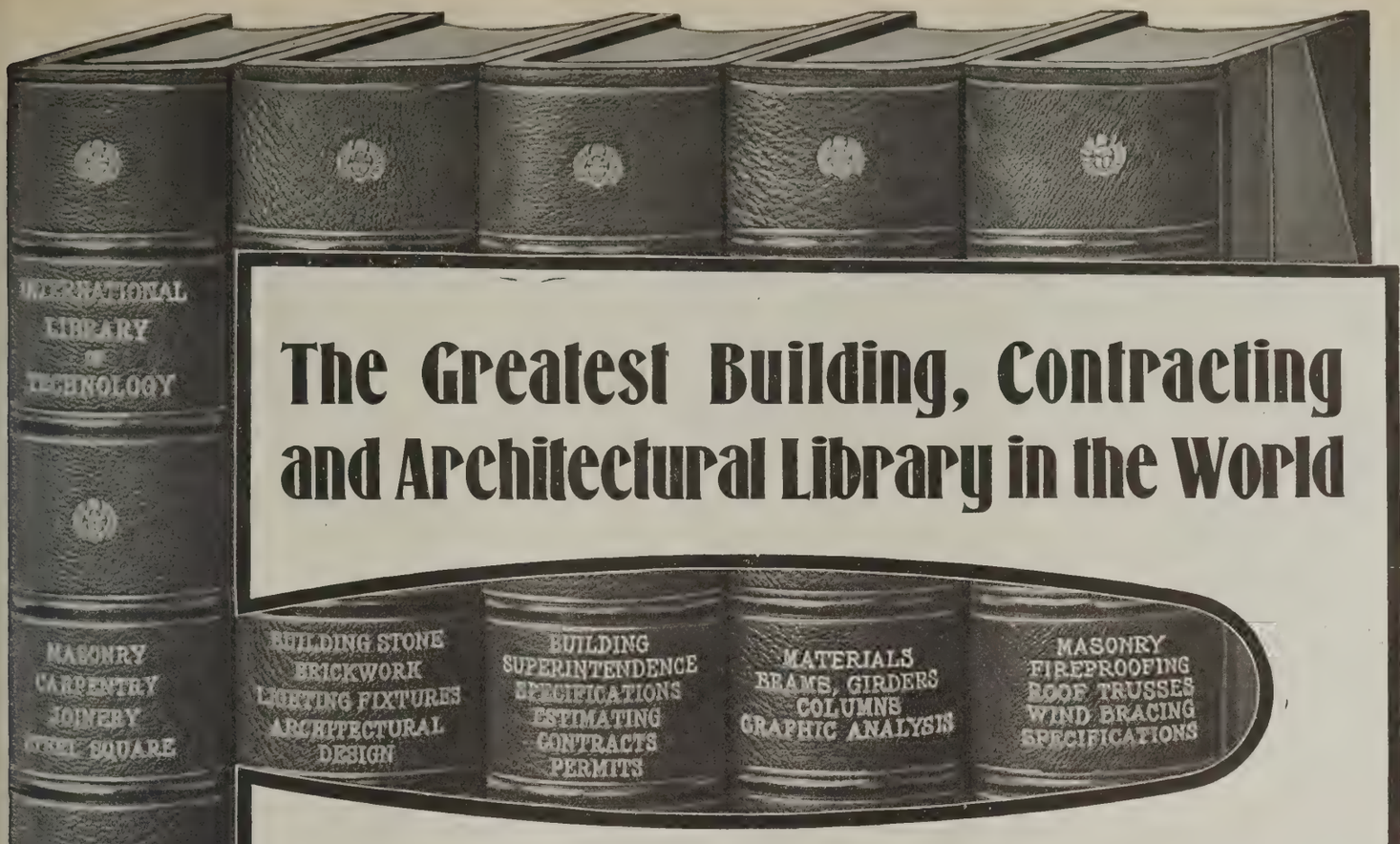
STYLE A—WITH RIDGE AND HIP FINISH

lets and these, together with samples of their "Titelock" shingles, they are sending out free of charge to those interested. We would suggest, therefore, that any of our readers or their friends who are interested in building should take advantage of the opportunity of posting themselves thoroughly on these shingles and write the Milwaukee Corrugating Co., Milwaukee, Wis., or Kansas City, Mo., to send them this information, prices and samples.

LUTHER CARBORUNDUM TOOL GRINDERS.

A good carpenter, or any other user of fine tools, will not only get everything out of them that the manufacturer claims but will often surprise the maker or inventor by showing him an entirely new use for them and one that would never have been thought of had not a necessity arisen for it. Take the Luther Diamond Tool Grinder for instance. It is advertised by the manufacturers to sharpen chisels, planes and other of the smaller tools, yet a new use was discovered for it by a carpenter. This carpenter got a job cutting down trees in the woods, while on the Pacific Coast. Being a thinking and reasoning sort of fellow, and having a desire to do his work as easily as possible, and knowing that sharp tools not only cut easier but faster, he tried sharpening his ax on a small carborundum grinder he had with him. That sharpener was a Luther Diamond Tool Grinder. Finding that it not only did the sharpening quicker and better than the big, old-fashioned grindstone the lumber company owned, he was soon the envy of the whole camp. For no man in the gang had such sharp axes, and no one did better or as much work, and yet he never asked to have any sharpening done on the old company grindstone. It was not long before the foreman found out that the carpenter always car-

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The Greatest Building, Contracting and Architectural Library in the World

This Library of Architecture is part of the 99 volumes of the International Library of Technology that cost over $1,500,000 in its original preparation. It contains the results of years of experience of the best building experts in the country. It contains the best modern practical methods used in every branch of architecture. The matter has been written by the foremost technical building experts and illustrated by a special staff of artists and craftsmen. Not only is this Library suited for architects already well trained in their profession, but it is especially adapted for the use of laborers, carpenters, and contractors that wish to acquire in the easiest and most thorough manner the knowledge that will qualify them for advancement. This Library is the only practical technical library in existence wherein the subjects treated can be readily understood and practically applied by persons having no knowledge of higher mathematics.

The volumes of the International Library of Technology are used and indorsed by 95 of the leading colleges and universities throughout the country. They are also indorsed by leading engineers. An example of these indorsements is to be found in the statement of **Frank L. Mueller, Assistant Secretary of the O'Rourke Engineering Construction Company, of New York,** who states: **"Some time ago I received several volumes of your Library of Technology and it will certainly give you pleasure to know what I think of these books. I have at my disposal a reference library containing more than one thousand engineering books, but I must say that none of these works contain the information generally desired in such concise and simple form as the volumes of your Library of Technology."**

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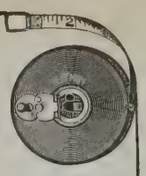
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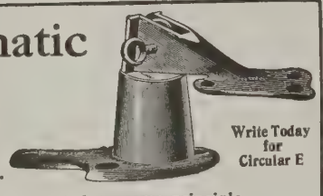
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Whipple's Automatic Blind Hinge

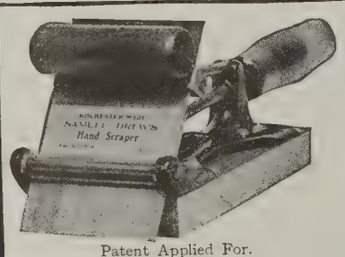


Reasons Why THEY ARE THE BEST
- Cannot slam or blow off.
- No fastening required.
- No blinds to trim or catches to interfere.
- Will hold blind—open, half open or closed.

Write Today for Circular E

We also manufacture a flush hinge, constructed on same principle
Two styles, for brick or wood buildings

R. P. WHIPPLE & CO. 277 Main St., Springfield, Mass.



Patent Applied For.

DREW'S HAND SCRAPER

Positively meets the requirements of a scraper which does work properly and satisfactorily. It has been thoroughly tried and comes nearer to perfection than any other hand scraper in existence.

For cabinet or floor work the DREW HAND SCRAPER is unsurpassed. Ask your dealer about them—if he cannot furnish them write to us for information, or we will upon receipt of price **($2.00) express one, charges prepaid.**

DREW & JUDD
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The Pruden System Portable Fireproof Garage



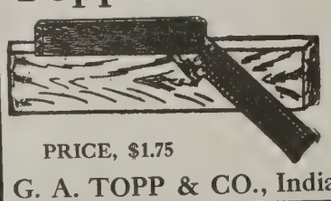
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Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS
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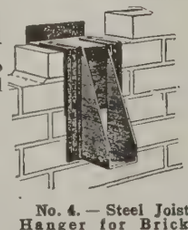


Van Dorn's Steel Joist Hanger Has no Equal

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THE VAN DORN IRON WORKS CO.
CLEVELAND, : : OHIO
Structural Steel and Ornamental Iron Workers

No. 1—Steel Joist Hanger for Wood Header.



No. 4.—Steel Joist Hanger for Brick Walls.

ried that small Luther grinder with him, when working up among the trees, and sharpened his axes right on the job. It wasn't long, either, before Luther Diamond Tool Grinders were being used entirely in that neck of the woods for sharpening the axes. So the manufacturer found out in that way that Luther Grinders, although small, compact affairs, and not intended for such heavy work as sharpening axes for timber, were plenty strong enough and well made to do more than they were originally intended for.

Right there is the point that manufacturers often overlook, but the Luther Grinder Mfg. Co. started out to make the very best grinder they could, and the evidences of their success is daily shown by the great number of Luther Grinders that are being used, and the constantly increased size of their factory. They are now said to be the largest manufacturers of Carborundum grinders in the world, having increased their outfit from a few to thousands. Luther Diamond Tool Grinders are claimed to be 25 times faster than the grindstone and six times faster than emery wheels. Luther grinder wheels are genuine carborundum. Carborundum wheels do not glaze, they peel steel away in tiny shavings at the lightest touch; no hard pressure is necessary, and there is no danger of drawing temper.

There are many other good points about the Luther grinders, and the best way to find out about them is to write the Luther Grinder Mfg. Co., 55a Madison St., Milwaukee, Wis., for their circulars, prices, etc. They will be glad to give full particulars.

OTTUMWA SASH PULLEYS.

In Ottumwa Sash Pulleys it will be noticed that the manufacturers have done away with the small pin axle, and instead, make a pulley (in either ball bearing or cone bearing) which has a large ⅝ inch bearing. The extreme size of same insures long life, a rigidly upright wheel and smoothness in operation. The wheel is fastened together by six circular eyelets, not simply the points turned over, but are wedged down tightly around the full circle, on the principal of a shoe eyelet. The two sides of the casing are swedged securely together by a large ½-inch circular eyelet, formed in the same manner as in the wheel and far superior to the fastening of axles.

This method of manufacturing guarantees greater strength than the methods heretofore employed, and the weatherproof finish with which these pulleys are coated is also a valuable feature. It is not uncommon to see buildings partly constructed with the window frames set or lying about and the pulleys exposed to the elements in such a way that the ordinary pulley cannot help but prove unsatisfactory from rusting within a short time. Ottumwa pulleys, however, being weatherproof, are not affected as other pulleys are in this respect.



One-half actual size. Detail showing deep groove, gripping the lower half of the balls.

Close inspection of Ottumwa pulleys clearly shows that they are made for service, and have distinctive features. The large lubricating bearing (built on scientific principles), the rigidly upright wheel that does not wabble nor chatter, together with the weatherproofing means long life and a noiseless, fine running pulley.

In the Ottumwa plan of construction the use of the largest possible number of balls is employed and these give a larger bearing, and Ottumwa pulleys are guaranteed under cord and equal weight to carry longer than any other pulley without noise.

No. 2 shows an Ottumwa Ball Bearing Pulley, made in black finish. It has extra heavy face, 1 inch wide by 4 inches long and $\frac{1}{16}$ inch thick. Mortise 2½ inches long by ⅝ inches wide. Actual size of wheel is 2 inches.



No. 2. One-half actual size.

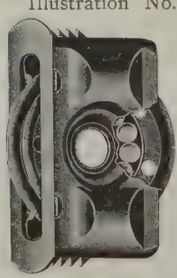
For No. 7 mortise in any one of three ways: First bore three one-inch holes in line, centers ¾ inch apart of bore mortise with Johnston & Sharp Manufacturing Company's Triple Boring Bit, or make a common straight side mortise with round ends, 1 inch wide and 2½ inches long. This style of fastening is preferred for soft wood frames.



No. 7. One-half actual size.

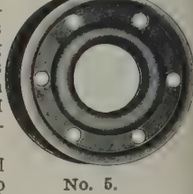
No. 9 can mortise any one of three ways. This pulley fastens itself securely when driven into the mortise, thus saving much time. It is recommended for use in hard pine frames.

Illustration No. 4 shows the large conical, concaved axle in the Ottumwa Ball Bearing Pulleys, the deep groove gripping the lower half of the balls, and explains in detail the unusually fine workmanship and scientific operation of the pulley.



No. 9. One-half actual size.

Cut No. 5 shows the Ottumwa Cone Wheel containing lubricant. Attention is called to its scientific regard for centralizing wear under pressure within its cone bearing.



No. 5.

The Ottumwa line of sash pulleys, both ball bearing and properly fitting concaved conical track. are manufactured by the Johnston & Sharp Manufacturing Company, Ottumwa, Iowa, who feel that a test will make permanent users of their pulleys. It is this high class trade that they are aiming to secure through our readers. Many sash and door or mill concerns have for years been using these pulleys, and contractors operating good sized shops will find the Ottumwa line the one to use in all their work. They are packed in cases of 50 dozen and in barrels, 100 dozen each, and can be had in black, brass, oxidized copper or lacquered face.

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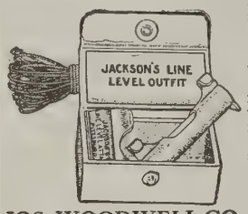


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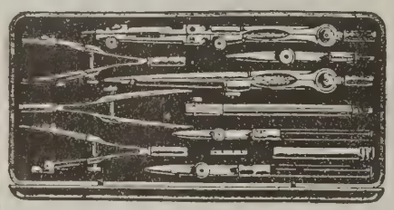
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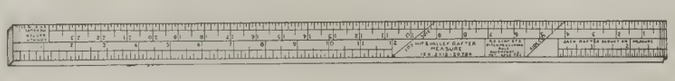


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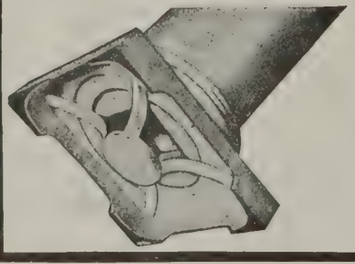
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A catalogue is issued by the Johnston & Sharp Manufacturing Company which describes the full line and can be had for the asking by those interested in good sash pulleys.

"BURMITE" ROOFING AND SIDING.

Because of unusual activity in the construction of buildings during recent years, there have been many new and improved building materials offered to building owners, architects, contractors and others interested. Important building materials are roofing and siding, and consequently considerable attention has been given to these products. Inventors and manufacturers have devised and tested various kinds of roofing and siding that have proven practical because of their economy of application and their durability of surface, one of these being "Burmite," which is manufactured by the Bermingham & Seaman Company, offices in the Tribune building at Chicago. This company is a well known paper manufacturer, and its roofing department is extensive and rapidly growing because of the success of "Burmite," which is referred to as the only material except one having a cement composition between the burlap and felt base, the felt base being thoroughly saturated with pure asphalt, and the claim is made that it will not dry out. In the center of this "Burmite" material is embedded an eight-ounce Calcutta burlap, placed there to give added strength, and carefully protected on the top and bottom by heavy layers of pure asphaltum composition, into the upper layer of which is embedded, under great pressure, and put there to stay, bird-sand for the one, and two permanent attractive natural colors of slate chips for the other style of surface covering. Further meritable features are included in the following claims:

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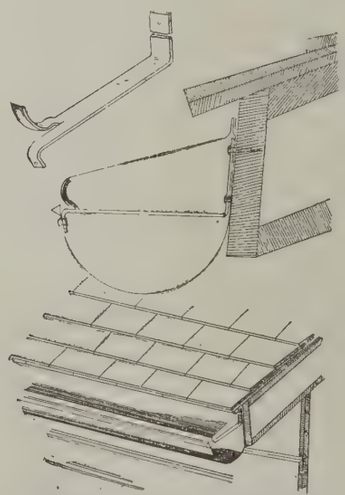
"'Burmite' is durable and attractive in appearance, the first cost being practically the only expense for years. Rain water is not affected by it, and immediately after the roof is laid the water running from it can be used for domestic purposes. Not only is the material adapted for flat or pitched roofs, but it can be laid over old shingles or tin.

"It is made to meet extreme weather conditions, and is not affected by summer's greatest heat or winter's most rigid cold. It can be applied in winter as well as in the summer without danger of buckling, expanding or contracting—a feature which cannot fail to be appreciated by people experienced in roofing construction.

"It requires no painting, is odorless, is easily applied, does not require an expert to lay it, is inexpensive, always remains in a flexible state and is strong and durable.

"Galvanized nails and lap cement, with instructions for laying the material, are packed in the center of each roll for all package shipments, and these articles are packed separately for bulk shipments."

CASSENS IDEAL EAVES TROUGH.



CASSENS IDEAL EAVES TROUGH
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Among the objections to the ordinary hanging gutter are the clogging with leaves, freezing when full of ice and snow, and the certainty that during the long summer the birds will build their nests in them or over them.

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The back of the trough is nailed to the cornice while the front is supported on strong braces, which also support the cover, which is removable for painting, etc. By the cover, the protection afforded should add to the life of the trough at a minimum expense.

The Cassens Manufacturing Co. of Edwardsville, Ill., will be pleased to receive inquiries concerning the "Ideal" Eaves Trough. They are establishing agencies throughout the country.

SHEET METAL AND ROOFING HINTS.

A new catalogue is now being issued by the Willis Mfg. Co., Galesburg, Ill., on their complete line of Architectural Sheet Metal Supplies. This book contains 180 pages devoted to a complete line of cornices, skylights, metal ceilings, ventilators and ornamental and stamped metal work. It is fully illustrated, conveying to the builders these products as they appear ready for use.

The reading matter also contains valuable information for men who deal with this line of work and also those who have not as yet branched into this line.

Every man in the building business should have a copy on file for ready reference. It is sent free of charge to readers of the National Builder, so in writing for same, mention that you are a reader or subscriber.

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The workman who wants to make a reputation for good work and so advance to a better place at better pay, usually is very particular about his tools. He not only wants tools that are adapted to the various kinds of work, but these tools must have quality, and be so well made that they will not give out at a trying time.

In buying tools upon which so much depends in his daily work, the wise workman will place quality before price. He will buy tools that last, such as those which Braumsdorf-Mueller Co., Elizabeth, N. J., have a well-earned reputation for producing. This company has been making high grade tools for twenty years and its products are in demand throughout the land. To still further reach the man who wants the best, the company will deliver its tools to mechanics anywhere at close prices. An illustrated catalogue with prices will be sent on request. Better send a postal today. The Braunsdorf-Mueller Co. make quite a variety of tools for wood-workers such as nail sets, prick punches, bits, awls and chisels. A tool that every carpenter should have is the Dorn Revolving Mitre Box. That it stands high is shown by the extracts here given from letters received by the company. One writes: "It is the only mitre box I ever saw that I could cut a square mitre on a 12-inch board with a 24-inch saw. A saw can be used till it is worn out. For framing door and window frames it saves all laying off with a square after the pattern is made." Another says: "I have used the Dorn Revolving Mitre Box for four years. It has given perfect satisfaction. As a time-saver it is the best, and does work that cannot be done on other boxes." "It is adapted to all kinds of work." "It is superior in quality and quantity of work that can be done." Send to the company for illustrations and full particulars of the Dorn Mitre Box before deciding on what make of mitre box to buy. In writing mention the NATIONAL BUILDER.

THE "PRUDEN" PORTABLE FIREPROOF GARAGE.

In these days of the rapidly growing popularity of the automobile and the necessities in the way of convenient accommodations for housing it, the garage which we illustrate here cannot fail to prove of widespread concern. Interest attaches not only to the fact that the structure is fireproof, but is also portable, and, if necessary, can be taken apart in a few hours and re-erected on another location without loss of value. The construction is of sheet metal, there being no wooden framing whatever used. By ingenious architectural and structural methods, the siding, roofing, gables, cornices, ridges, sills and tie rods are so made as to interlock and support each other, producing a building in "knock-down" form which may be erected without skill and labor at small cost. The sheet metal is galvanized iron and the paneled siding sheets are embossed, while the roofing sheets are fluted in a way to represent tile. The doors are embossed metal, with heavy hinges and interior braces, while the windows are galvanized metal frames and the sash is glazed with wire glass if desired. The floor may be of cinders, cement, or wood, according to preference. The windows may be inserted in every other unit 2 ft. from any corner, and a single door inserted in any unit 2 ft. from any corner.



In cases where it is necessary to heat the building, the company has provided an ingenious and effective method of lining with any of the various makes of composition wall boards. The sheet metal garage shown here measures 12x20 ft. in plan, and is intended for a residential district. In the present picture are shown the purchaser's concrete floor and base. The "Pruden" portable fire-proof galvanized steel buildings are made by the Metal Shelter Company, 5-50 W. Water street, St. Paul, Minn., and the claim is put forth that this system permits of buildings being set up ready for occupancy within 48 hours after the receipt of the materials. These buildings are adapted to a great variety of uses, including outing cottages and auxiliaries, private garages, boat and bath houses, shore pavilions, hunting lodges, municipal voting booths, moving-picture show houses, farm implement shelters, dining or sleeping halls, railroad, switch or tool houses, vehicle shelters, etc., etc. A point which is emphasized in connection with the portable garage is that it is adapted to either pleasure cars, runabouts or commercial trucks, although for the latter the side walls are made 12 ft. high, and entrance doors with 11 ft. 9 in. opening. In the combination garage and sleeping apartment, which is found desirable, one end is provided with double doors and at the necessary distance back a partition is made across separating the two rooms. The rear or sleeping room has separate entrance door and windows as desired, while a single door establishes communication between the two rooms. The partitions are of the same height as the side walls and do not run to the peak of the roof. The porch may be open, screened or closed by siding sheets and have a window or doors where wanted. Another point



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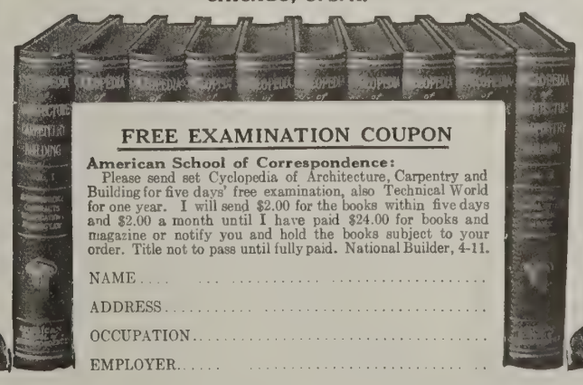
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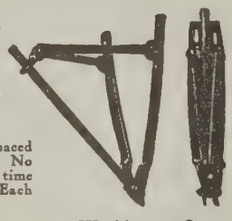
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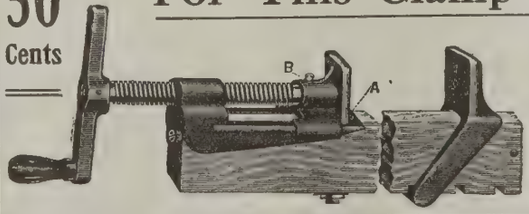
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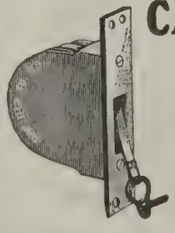


IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO.
321 N. May St., CHICAGO

CALDWELL SASH BALANCE



Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.

which the company makes is that any man handy with tools can, with the aid of a helper, put up one of these portable buildings in one or two days, the only tools necessary being a monkey wrench and a screw driver. When built the house is fire-proof and neat and attractive in appearance. It is also thoroughly substantial, strong and durable.

PLUMBING GOODS.

For a quarter of a century the John Hardin Company, 4543 Cottage Grove Ave., Chicago, Ill., has been supplying their customers throughout the country with plumbing, heating and water supply material and outfits. Besides the Standard Plumbers' Supplies and Steam Goods, this company has for some time been making special efforts to introduce their complete outfits for the purposes stated.

There is a considerable advantage in this method, as it insures a harmonious assembly of fixtures and parts. Wherever possible a complete plan is sent with every outfit, thus insuring proper installation.

A very large stock insures prompt delivery of almost anything



in their line, but should special fixtures manufactured by another company be required, their trade relations enable them to fill this class of orders with little delay.

Being pioneers in the mail order line, they early saw the necessity for systematic methods of making their outfits complete, for it is annoying to find an order complete except for a few necessary fittings. The delay incident to supplying them costs the purchaser at times nearly as much as the original bill of goods.

The cut shown above illustrates one of the many combinations which may be made up from the goods shown in their catalogue, which is sent on request. Anyone contemplating the installation for a plumbing, heating or water system will do well to write them in regard to it, or send a list of material required.

IMPROVEMENTS ON THE OSHKOSH SAW RIG.

The Oshkosh Portable Saw Rig is used extensively by retail lumbermen for sawing up broken, warped or defective lumber and has been found a good investment for the operator for that purpose. The outfit can also be used to big advantage by contractors for sawing work, in the construction of cement forms, etc. This machine is manufactured with either a gasoline engine or electric motor for power and is mounted on heavy hardwood skids, so bolted and mortised together as to afford a base practically as solid as a permanent foundation, thus insuring perfect and permanent alignment of shaft, boxes and belts, an extremely important consideration in the constitution and operation of a portable saw rig.

The machine part of this rig, it is claimed, is the only one of its kind on the market today, and is fully covered by patents. The feature of this machine is the swinging arbor which is made to swing for cross cutting and held rigid for rip sawing and is controlled by a lever on the side of the machine. A lever is placed in a suitable position for operating the saw when cross cutting. These machines are equipped with sliding scale for sawing various widths, also miter device for all kinds of miter sawing. The saw is covered by an adjustable saw guard which may be set to any height. Iron saw tables are made amply large enough. Attached to the iron tables are two side tables which make the sawing of long and heavy lumber much more handy. A hook is fastened on each end of the skids which allows the handling of this rig by team of horses and may be hauled to any desired place.

The portable saw rig is made in two sizes. Size No. 1 carries 14-inch saws and weighs 1,800 pounds and has a 6 horse-power gasoline engine; with the same saws and with a 5 horse-power electric motor weighs 1,400 pounds. Size No. 2 carries 20-inch saws with a 10 horse-power gasoline engine, weighs 2,400 pounds; with the same size saws and 10 horse-power electric motor weighs, 1,600 pounds. The manufacturers of the Oshkosh Portable Saw Rig have just added a very useful improvement to their outfit, which is in the shape of an adjustable device for raising and lowering the arbor. This device can be used for jointing and dadoing and is said to be a much better arrangement than the tilting table, as it does not weaken the frame and accomplishes the same results.

In order to make this device as perfect as possible, the manufacturers have constructed a separate pair of plates; the one in the rear being adjustable so that the operator can set it the same height above the table as desired for planing. This insures a smooth piece of work so that when the operator is near the end of the lumber which he is working, it does not leave a gouge in the stick, such as the old fashioned planers used to make.

The Oshkosh Logging Tool Co., 414 S. Main street, Oshkosh, Wis., are the manufacturers of this well made portable saw rig and will be glad to quote prices and give full particulars on request.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Johnson's Hardwood Floors



Parquetry No. 60, Laid Straight.

are recognized by authorities as the most elegant and highclass floors on the market. If you are interested in hardwood floors you cannot afford to be without our new Illustrated Floor Catalogue containing the latest original designs. **Mail us the coupon below today, and get it FREE.**

You See

Every Johnson Hardwood Floor is the product of 20 years' close attention to the manufacture of fine hardwood floors.

Every Johnson Hardwood Floor is of the most carefully selected stock from the woods of Wisconsin, Michigan and Minnesota, which our location gives us special advantages in obtaining.

Every Johnson Hardwood Floor is cured and finished with the utmost caution in every detail by the world's most skilled workmen who have been in our employ for years.

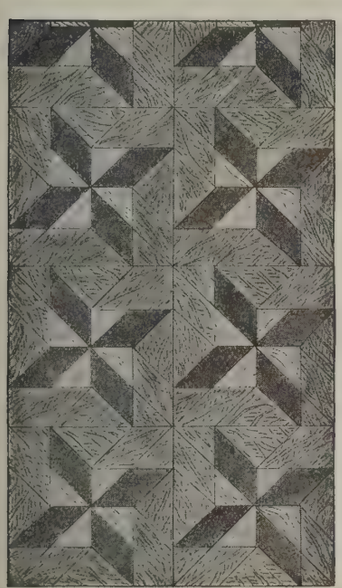
Every Johnson Hardwood Floor is absolutely guaranteed to be first class. We stand back of it with our reputation.

Please note the three floor designs in this advertisement, and the following prices on same:

Parquetry No. 60. 12 x 12 inches.
Plain Oak, 13c sq. ft.
Quartered Oak, 18c sq. ft.

Parquetry No. 811. Oak.
Maple and Cherry, 42c. sq. ft.

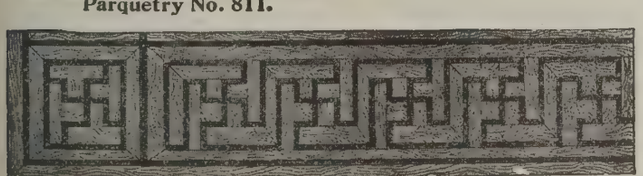
Border No. 721. 16-inch. Oak and Dark Oak.
60c lineal ft. Corners $1.00 each.



Parquetry No. 811.

We have hundreds of other beautiful designs in our catalogue

Any good carpenter can easily lay our floors over old floors.



Border No. 721.

We have just published our new **Illustrated Catalogue of Ornamental and Plain Hardwood Floors.** It is the most elaborate and complete catalogue of its kind, and should be in the hands of every Carpenter and Builder, and others interested in floors. It **contains valuable information about floors**—Ornamental, Plain and Parquetry—and about different kinds of wood. Please fill out coupon below, mail and we will send catalogue **FREE.** Write today.

S. C. JOHNSON & SON
RACINE, WIS.

"The Wood Finishing Authorities."

CUT OR TEAR OUT THIS COUPON

FREE COUPON

S. C. JOHNSON & SON, Racine, Wis.

Without any obligation on my part, please send me FREE (prepaid) your illustrated catalogue of Ornamental and Plain Hardwood Floors.

Name.....

.....

Town and State.....

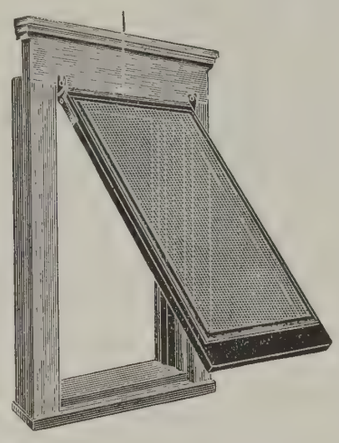
N.B.4

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



THE "E-Z-WAY" HANGERS.



The "E-Z-Way" Hanger is a recently patented device for hanging whole or half screens and storm sash on windows in either masonry or frame walls.

The hanger is applied to the screen or sash after it is fitted to the opening and is so constructed that one piece is put on the sash, the top of the hanger coming flush with the top of the screen, the other piece being applied to the outside casing, or in a brick building, to the corresponding brick mold. There is, therefore, no necessity for measuring or close fitting to be done, and in consequence, the manufacturers claim the carpenter can equip the windows very rapidly. In one case, Mr. Peters, the patentee, equipped forty-eight windows in 11 hours and 40 minutes.

The requirements of a device of this character are such that the screen must be instantly removable without the use of tools and still be secure against falling out accidentally or being blown off by a high wind.

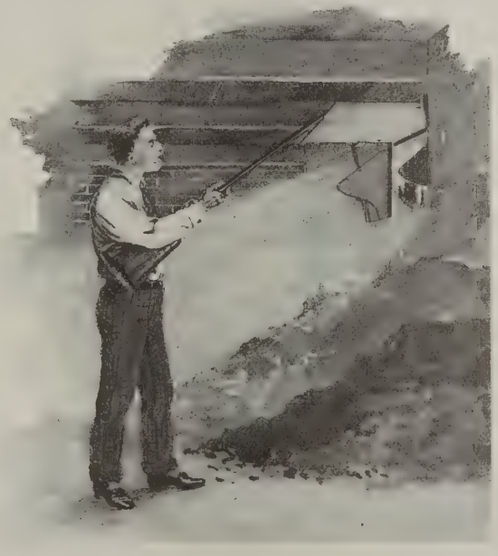
To remove the screen for cleaning or putting away for the winter, it is only necessary to swing the sash out (as shown in the cut) when the screen can be lifted up out of the hanger. While the hanger holds the screen securely in position and close against the frame, the bearings are loose enough so that one side can be removed, while the other remains in position.

The sales department of the Peters & Grant Co. are meeting with such success with the "E-Z-Way" Hanger that it has been necessary to increase the manufacturing facilities. The "E-Z-Way" Hangers are manufactured by Peters & Grant, 2218 18th St., Kansas City, Mo., who will be pleased to give further information, prices, etc.

THE WINDOW-CHUTE.

Every house must have coal, and the question of combining utility with ornament has interested builders ever since the first basement superseded the cellar.

For many years we have been satisfied to put up with the inconveniences of the hinged or removable glass sash or solid door with its awkward fastenings. A careless driver "never even knew the glass was broken and didn't leave it open anyway."



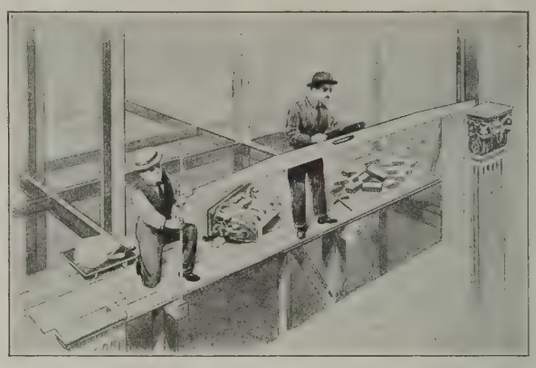
Now, however, we have a great improvement in the Window-Chute, manufactured by the Holland Furnace Company, Holland, Mich. The coal opening is no longer a black eyesore, but a clean, neat window when closed, and a wide chute when open. Just as easy to open and close, too, and no chance to be left unlocked. The manufacturers are anxious to have the Window-Chute installed in every home, new or old, and want to hear from every builder. Their literature is interesting and convincing.

DISPLACES THE OLD STRAIGHT EDGE.

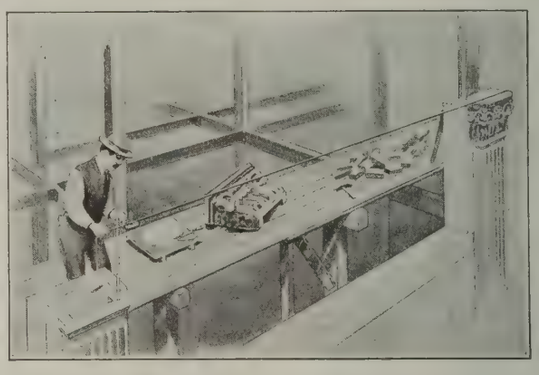
The Jackson Aluminum Line Level is the most unique time and labor saving device that has been offered the trade for years. It is a radical innovation, yet so accurate, practical and compact a tool that the Bricklayers' and Masons' International Union have formally endorsed it, while unsolicited commendations of it daily reach the manufacturers from architects, engineers, contractors, builders, carpenters, etc.

In building construction it fills every requirement of the ordinary 16-foot straightedge, and an accurate level can be taken by one man in half the time formerly needed by two men.

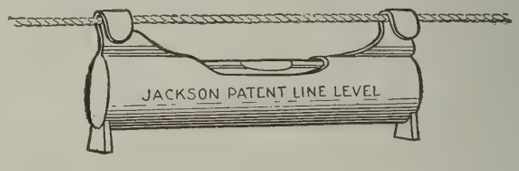
The Jackson Line Level weighs but one-fourth of an ounce, is easily fastened to a line. It is made of the highest grade of aluminum, handsomely finished, filled with a proved level glass, and is practically indestructible. Its accuracy is guaranteed on a line stretched from one to forty feet. It can be used as a pocket level.



A double spring clamp permits attachment to any ordinary steel square, giving a perfect plumb and level. It can also be fastened to a regular pocket rule, a machinist's steel scale or a strip of wood for leveling larger surfaces.



Although on the market but a few months, orders are coming from every state in the Union, and many foreign lands. It takes the place of a surveying instrument, and is invaluable for foundation work, grading, getting angles, etc.



The outfit is placed in a handsome black leatherette, stiff case, holding the level, a forty-foot line, and the spring clamp, yet suited for the vestpocket in size. The price complete is $1. The makers are Joseph Woodwell Co., 201-203 Wood st., Pittsburg, Pa.

STANDARD SPRING FLOOR HINGES.

In the January issue of the National Builder, the Standard Manufacturing Company of Shelby, Ohio offered to pay $10.00 for one hundred words or a 100 word article, written by a contractor or builder who would send in the best arguments on why the Standard Double Acting Spring Floor Hinges are better than others.

These articles were to reach the Standard Manufacturing Company by March 15th. The manufacturers, wanting to be perfectly fair with every carpenter and builder who had sent in an article, asked three prominent carpenters and practical men located in their town to aid them in going over the large number of replies received and making a selection of the best one.

After carefully reading all of them, there were five articles which were so good that it was impossible to tell which one was actually the best and, therefore, it was decided to divide the prize between the five and a check for $2.00 was forwarded to each one of the five prize winners. These are Axel Sorensen, Chicago; O. H. Beckwith, Linton, Ind.; Walter Hawes, Lanark, Ill.; August Didier, Tarrington, Conn., and Edward A. Peacock, Cincinnati, Ohio.

In order that the readers of the National Builder may see the articles and know why the Standard Spring Floor Hinges are so well liked by the man who specifies and buys them, the Standard Manufacturing Company reproduces the five replies in their advertisement in this issue and it would be well to turn to the announcement and read it through carefully.

Amatite ROOFING

Why the Buyer of Amatite Never Complains

WHEN a man buys ordinary ready roofing he usually neglects to paint it and after three or four years he comes back to the dealer with a protest. It is human nature to neglect painting roofs.

When a man buys Amatite Roofing he lays it on his building and in three or four years it is still as good as new and does not need any paint. He forgets he has such a roof but no harm is done by that.

There is nothing to neglect in the case of Amatite. Amatite has a peculiar surface—a sort of plastic concrete made of pitch and mineral matter.

This surface is plastic enough so that the material can be rolled up into handy rolls in the usual manner and handled just like any other ready roofing. When unrolled on the roof and nailed down it presents to the weather a continuous surface of mineral matter and pitch. On this surface wind, rain, storm, heat and cold have little effect. Year after year it looks up to the sky undisturbed and unaffected. It costs nothing to maintain and relieves the owner from all responsibility.



Dealers can improve their business by selling Amatite and buyers make a good bargain when they buy it. The price of Amatite is less than that of most painted roofings of less weight and durability.

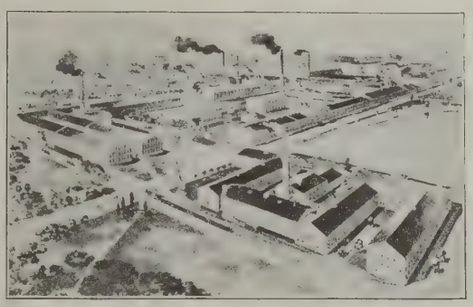
Sample free on request. Address our nearest office.

Barrett Manufacturing Company

New York Chicago Philadelphia Boston St. Louis Cleveland Pittsburg Cincinnati Kansas City Minneapolis New Orleans Seattle London, Eng.

Mr. Frank H. Milham, *President*, writes us under date of August 15, 1910, as follows: "After going into the Roofing question carefully, we have decided that your **'Burmite' looked the best to us of any Roofing we had seen."**

Durable, Practical, Attractive, Inexpensive, Easily Applied with Superior Fire-Retardative and Storm-Resisting Qualities to meet Extreme Weather Conditions—Sparks, Hail, Sliding Ice, Rain, Snow, etc., do not affect the upper coating of "BURMITE"



Bryant Paper Co.'s Plant KALAMAZOO, MICHIGAN

Birds-Eye View of their present Plant—the new buildings, now being constructed, double present floor space, making it the largest Paper Mill of its kind in the world.

2,500 SQUARES — 5 CARLOADS OF

READY-TO-LAY **Burmite** (Reg. U. S. Pat. Off.) **ROOFING**

Flexible-Cement-Burlap Inserted

Also used as a **SIDING**

Have been Ordered to ROOF THIS PLANT

Burmite Material for Roofing and Siding (PATENT PEND'G)

Proven *The* BEST *By* TEST—GUARANTEED FOR 10 YEARS Without Coating

Used in any Climate; can be applied in cold or hot weather; equally well adapted to uneven, flat or steep surfaces; can be laid over old Shingles or Tin. Lasts longer than Shingles—costs less. Has perfect Fire-Retardative Qualities. The First Cost—The Only Cost.

To make yourself acquainted with this up-to-date Material for Roofing and Siding Plants, Business and Factory Buildings, Residences, Summer Homes, Bungalows, Barns, Garages, Churches, Warehouses, Elevators, Mills, Depots, etc., of CONCRETE, BRICK, STONE, FRAME or other Construction — *be they NEW or OLD,* WRITE TODAY for Samples and Booklet,

"Burmite Quality Counts"

Illustrated with Buildings, Beautifully Printed in Colors, showing effect of BURMITE MATERIAL applied as a Roofing and Siding. Mailed free of all charges and obligation.

Bermingham & Seaman Co., Roofing Mfrs. **Chicago**

GENERAL OFFICES: 1208-1226 Tribune Building
PLANT: 56th, Armitage and Grand Avenues

CHICAGO CINCINNATI BUFFALO
BIRMINGHAM, ALA. DALLAS, TEXAS
DETROIT, MICHIGAN GRAND RAPIDS, MICH.
GREEN BAY, WIS. KANSAS CITY, MO.
OKLAHOMA CITY MEMPHIS, TENNESSEE
NASHVILLE, TENN. PITTSBURG, PA.
RICHMOND, VA. ST. LOUIS, MO. ST. PAUL

Distributors of BEAVER BOARD

BERMINGHAM & SEAMAN CO., N.B.
1208-26 Tribune Building, Chicago.

Mail to my address, as above, Sample and Booklet. This places me under no obligation.

Name _____

No. & St. _____

Town _____ *State* _____



CORTRIGHT

Selling Talk No. 12

THE HANDSOME ROOF

The most important qualities of any roofing material are that it be tight, fireproof and durable—all of which Cortright Metal Shingles are.

But:—

Cortrights would **still** not be **the ideal roof if** they were not **also more ornamental.**

Different styles of architecture require roofs in harmony, but until the inception of Cortrights this was impossible.

Neither wood nor slate possesses this adaptability to various forms of architecture, so in the past every character of building has of necessity been adorned (?) with the same commonplace roof.

That is the beauty of the Cortrights.

We design them in several styles which make them adaptable to very artistic architectural effects.

Cortrights are therefore **handsome enough for the most elaborate building** and **economical enough for the most unpretentious structure.**

So you could **see** how suitable to any condition Cortrights are and how well they look on all kinds of buildings, we have filled two books with photographs, showing them in actual use under all conditions.

We have two of these books here for **you,** just waiting for you to send your name and address.

Send them now.

Cortright Metal Roofing Co.

Philadelphia and Chicago.

COUPON

Cortright Metal Roofing Co., Philadelphia, Pa.

Gentlemen:—

You may send me the two free books offered by you in the April issue of the National Builder.

Name .....
Street Address .....
City .....
Business .....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Send us Two or More Names of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.



ANDREWS HEATING CO.
1166 Heating Building
MINNEAPOLIS, MINN.

$1.00 Good For $1.00

TO INTRODUCE
The SELF-SETTING PLANE
(As long as this Ad appears.)

Any dome in this paper is good for one dollar, in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our Planes are not sold.

If you want more than one Plane and they are not sold in your town we will allow you dealer's discount.

List price of **Beech Wood Planes:** Smother $3.25, Jack $3.50, Fore $3.75 and Jointer $4.50.

Do not say the price is too high until you try it, then if the Plane is not worth to you, twice its cost, return it at our expense and the trial won't cost you a nickel.

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

If you don't want a **Self-Setting Plane** now, send us a dome and the addresses of ten carpenter friends, no matter where they live, and we will send you a hard, tough, carpenter's pencil and circulars.



Gage Tool Co. VINELAND, NEW JERSEY

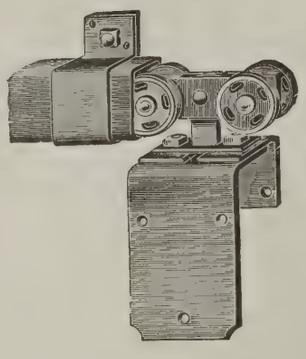


The Excelsior Dumb Waiter

Sent complete to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. Send for Descriptive Pamphlet.

R. M. RODGERS & CO.
175 Washington Ave., Brooklyn, N. Y.



RICHARDS-WILCOX TROLLEY HANGERS

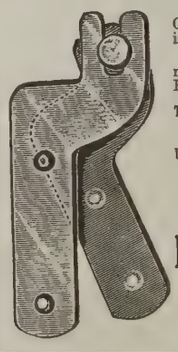
for that garage job. We'll solve your problems in warehouse work, too. Tell us your needs, get catalog and mention name of your hardware dealer.

Richards-Wilcox Mfg. Company
Aurora, Illinois

THE "E-Z-way" SCREEN HANGERS

NEVER ALLOWS SCREEN TO BIND OR STICK WHEN HUNG—
ALWAYS FIT SNUG TO BLIND STOP

Everything Done from the Inside of the Building

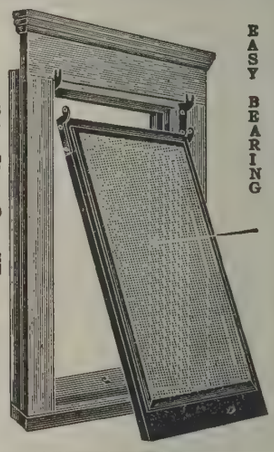


"E-Z-way" Hangers are made of 18 Gage Black Iron and are electro galvanized. THEY WILL NEVER RUST.

You can hang one-half to two-thirds more screens in a day with "E-Z-way" Hangers than with any others.

TRY TWO DOZEN SETS FOR $1.00—NO PERSONAL CHECKS

Use a No. 1 Hanger on a 1 Inch - Casing
" No. 2 " " 1¼ "Brick Mould
" No. 3 " " 1¼ " " "



PETERS & GRANT
Patentees and Manufacturers
2214 East 18th Street
KANSAS CITY, MO.



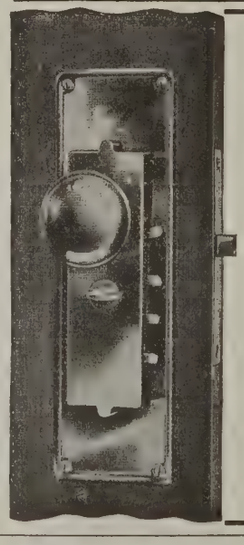
Wood's Key to the Steel Square

Has been tried by thousands of Builders and not found wanting. It is a wonderful instructor as to the uses of the square in obtaining cuts and bevels for all kinds of work.

Made of celluloid and put up in neat leather case of pocket size, so that it can readily be carried on the job. It is a snap at our low price of $1.50.

Send your order at once and it will be shipped prepaid to your address

HODGSON BOOK CO.
358 Dearborn St., Chicago



Dayton Keyless Locks

REMOVE ALL THE KEY NUISANCE

Cannot be picked—Easily and instantly opened in 3 seconds—day or night—by just touching one or more of the sentinels you see here on the side of the lock.

Architects, contractors and carpenters will find them money winners—meeting every want in locking and opening doors, and giving absolute protection.

SALESMEN WANTED

Let us tell you about them—also about our padlock having 38,005 combinations. Write today.

THE DAYTON KEYLESS LOCK CO.
804 U. B. Building, DAYTON, OHIO

THE "EUREKA" SPIRAL SCREWDRIVER

PUSH ON THE **HANDLE and THE SCREW GOES IN**



Will Drive a Screw in Hard or Soft Wood
QUICKER AND EASIER THAN ANY OTHER
THE "EUREKA" SPIRAL SCREWDRIVER
is made in two sizes from the highest class materials—No. 1, 14 in. long opened, 9 in. closed; and No. 2, 19 in. long opened, 12 in. closed. Can be used as an ordinary screwdriver.

GET ONE TODAY FROM YOUR DEALER

DECATUR COFFIN CO., E. North St., DECATUR, ILL., Manufacturers

OLDEST AND BEST

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Miller's Two Minute Lever Lock Mortiser

Chisels the opening for Locks and is the greatest time and labor saver



One builder wrote us last month: "You may expect an order for 3 machines as the carpenters are going crazy about my machine. The more I use it, the better I like it."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

are sent on trial to any reliable contracter and builder. Write for circulars and order now for spring work.



We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs and similar work—which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

Nevada Building, CINCINNATI, OHIO Western Office, RIVERSIDE, CAL.

THIS CHISEL IS RIGHT FROM TIP TO EDGE

P.H.L.Co's. COMO CHISEL

fits the hand just right. No matter what price you pay you can't get a better Chisel than

IT IS THE CHISEL OF SERVICE.

The best that will and skill can produce is in the edge of the

P.H.L.Co's. COMO

Looking at a P.H.L.Co's. COMO chisel in any way it is the best.

P. H. LEARNER CO.
—INC.—
Factory: KOKOMO, IND.
SALES DEPARTMENT
108 W. Lake St., Chicago, U. S. A.

DON'T PUT SASH WEIGHTS IN YOUR WINDOWS—THEY ARE OUT OF DATE

THE "AUTOMATIC" SASH HOLDER

is better and cheaper, more convenient, less perplexing, easier to put in, more reliable, more durable, more satisfactory.

The "Automatic" Sash Holder is the new modern, up-to-date device that dispenses with cumbrous sash weights, kinking cords or ribbons, useless weight pockets, misfit pulleys and reluctant balances, and saves all the time, labor and expense of fitting them in place.

Architects are specifying them, Contractors and Builders are buying them. Sash and Planing Mills are providing for them, Carpenters are putting them into old and new buildings.

Prevent rattling and permit the window to be moved up and down with ease. Hold it safely at any point desired.

Sample sent on request

Sold by hardware dealers or direct from us. Correspondence solicited. Representatives and side line travelers wanted all over the world.



AUTOMATIC SASH HOLDER CO.
279 Broadway, New York City.

THE LITHOGRAPH POSTAL WILL INCREASE YOUR BUSINESS

By using Lithograph Postals you convey the natural color effects to the prospective home builder as well as the architectural construction.

This is an entirely new idea for the contractor and builder.

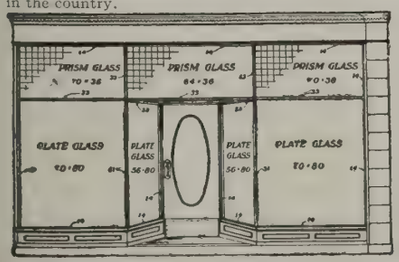
It is a very effective way to advertise and create future business at small cost.

Write for free samples.

AMERICAN VIEW CARD MAKERS
334 Dearborn Street :: :: :: :: CHICAGO

Get a Store Front that Will Stay

Select a bar for the new store front that you will not have to replace in a few years. The Petz Bar has years of satisfactory service to its credit with some of the largest stores in the country.



These concerns found by investigation that the Petz Bar offered the best combination of lightness, strength, ease of installation, safety and beauty. It draws trade because it gives a maximum of light and display space in the window.

Find out about the Petz System by writing at once for our booklet on "Modern Store Front Construction." It contains descriptions, illustrations, prices, and opinions of prominent users.

DETROIT SHOW CASE COMPANY
481 West Fort Street - - DETROIT, MICH.

CUSTOM MADE

FLY SCREENS



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS

Our screens are made from kiln dried lumber and have water-proof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced

Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

A. J. PHILLIPS & CO., Le Roy Street, **Fenton, Mich.**
28 Years Experience. 3½ Acres of Floors

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Material Hoists



For Double Platform Elevators

SIMPLE, STRONG, DURABLE

The most economical method for elevating building material. Two sizes, 4 and 6 horse power.

Contractors send for Bulletin No. 5 and get our proposition.

Also a full line of engines from 1 to 35 horse power.

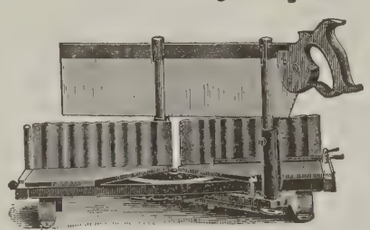
Bates & Edmonds Motor Co.

1146 MILL ST., LANSING, MICH.

GOODELL MITRE BOX

Made of STEEL - Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

THE JAHANT FREE BOOK



Tells all about the different systems of artificial heating for homes and business structures and tells how you can buy the famous Jahant Down Draft Furnace complete all ready to set up, for

$10 Down and $10 Monthly

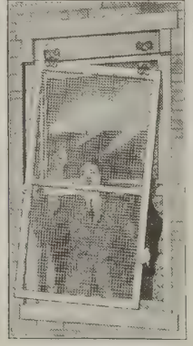
We ship direct and pay the freight. The Jahant is cheaper to buy and cheaper to operate. We give a written guarantee to return your money after a year's trial if not satisfactory. Write for this big book today, it's free.

The Jahant Heating Co.

2 Mill Street, Akron, Ohio

KEES BEATRICE

KEES-GOSSETT DETACHABLE SUSPENSION HINGES



Hanging Screen from inside the building

Try a pair to hang one of your own window screens.

After that you'll always use and recommend them.

Ask on your letter-head and we'll send a sample set free if you mention your hardware dealer.

F.D. KEES MFG. CO. BEATRICE, NEB.

BOX 810



Screen swung out to wash windows

From an Economy Standpoint

STAR HACK SAW BLADES

FOR MACHINE USE 12 x 5/8

Surpass all other Blades. Eliminate carrying in stock Blades of varying widths and thicknesses with different numbers of teeth to the inch. They are made of the best material.

POSSESS GREAT STRENGTH AND DURABILITY.

Ask for and insist upon getting the Blade with the ★

ALL DEALERS KEEP THEM.

Write for leaflet.

MILLERS FALLS CO.

28 Warren St., NEW YORK

ST. LOUIS, MO. BALTIMORE, MD.

F. Weber & Company

1125 Chestnut St., Philadelphia, Pa.

DRAUGHTING AND ENGINEERING SUPPLIES

Drawing Tables and Boards



Filing Cabinets and all Drawing Room Requirements

Detail Drawing, Blue, Brown and Black Print Papers

The "UNIQUE" direct BLACK PRINT PAPER requires only one bath. Best on the market. Write for samples.

BEST MAKES OF BUILDERS' TRANSITS AND LEVELS. Complete catalog Vol. 300B sent on request.

Full Line of Plumbing Supplies



Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bath room outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Largest and Most Complete Stock of

Builders' and General Hardware, Cutlery, Tools, Contractors' Supplies, Etc.

In the Country

High Grade Goods and High Grade Service

ESTABLISHED 1872

ORR & LOCKETT HARDWARE CO.

71-73 Randolph Street

CHICAGO, ILL.

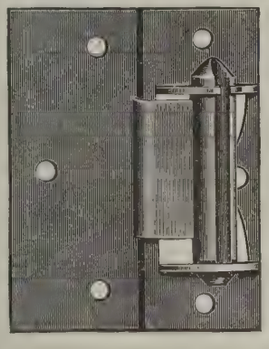


Samson Spot Sash Cord

IS made of extra quality fine yarn, and warranted free from imperfections of braid or finish. It can always be distinguished by our trade mark, the Colored Spot. Carried by all dealers. Send for samples and tests.

Samson Cordage Works

BOSTON, MASS.



Diehl's Separable and Reversible Hinge No. 20

This hinge is designed for storm and screen doors. The door may be swung at right angles and lifted from its bearings without removing the screws, as the shank slides through the small slot in the upper ear so that it makes it very easy to change from storm to screen doors and from screen to storm doors without removing the hinges. Hinge No. 20 is made of open hearth wrought steel, 14 gauge, and finished in black baked japan or oxidized copper.

A Sample Set of Hinges will be sent upon receipt of 25 cents in stamps.

The Diehl Novelty Company SHEBOYGAN, WISCONSIN

Mention National Builder.

LUMBER

DIRECT FROM THE MILL

LUMBER

You Save Half-a-Dozen Profits

Our DIRECT selling plan has solved economy for the man who is going to build. No more exorbitant high prices to pay—Buy Lumber DIRECT from the Timber Country. We have no road-men—no commissions to pay—no retail yards—nor the expense of handling several times. Thus we save YOU the middlemen's profits—several of them. Your money is as good as the big wholesalers' or retailers' if you ship in car lots, and the biggest part of the Lumber sold in your locality comes from this territory. Send for our Lumber Price List.

ESTABLISHED 1894 **SHAW-WELLS CO.** SPOKANE, WASH.

SHAW-WELLS CO.

SPOKANE, WASH.

Address DEPT. L

Please send prices on

Lumber, Sash, Doors and Mouldings

To.....

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Don't be afraid of the freight.

CARLOAD RATE ON LUMBER

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Chicago	52c	per 100
Kansas City	47c	" "
Fargo	37c	" "
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$1.25 Handbooks

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These books in excellence contain in so small space as much information about the trades and professions of which they treat as do these Handbooks. They are little giant encyclopedias of practical knowledge giving data and information that is hard to find in ordinary books. These Handbooks have been prepared by the well-known textbook writers of the International Correspondence Schools whose textbooks are recognized the world over as the most practical treatises on applied sciences ever published. These Handbooks are consulting experts of the highest rank, and are the most powerful force in the world for the promotion of ambitious men. They are an indispensable help to quicker and better work that will command advancement. They are printed on a high-grade book paper in clear type, and durably and handsomely bound in cloth with gilt titles; contain on an average 364 pages and 175 illustrations and are regularly sold for $1.25 each.

SPECIAL OFFER.—We are selling these Handbooks durably bound in cloth with gilt titles, at a special price for each Handbook of **50c**

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Mechanics'—Tables; formulas; measurements; belting; mechanical powers; hydromechanics; strength of materials; shafting; boiler design, care of boilers; power of boilers; chimneys; exhaust heating; machine design; machine tools; slide valve; pulleys; cylinders and steam chests; pistons; gearing; transit surveying; triangulation; curves; radii and deflections; earth work; track work; electricity; etc.

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Telephone and Telegraph—Useful tables; mechanics; electricity; magnetism; primary batteries; storage batteries; electrical measurements; telephony; tests with magneto generator and bell; telegraphy; Morse telegraph systems; multiplex telegraphy; etc.

Plumbers and Fitters'—Arithmetic; involution and evolution; powers, roots, and reciprocals; circles; decimals; geometrical drawing; weights and measures; formulas; mensuration; mechanics; hydromechanics; building construction; heating and ventilation; gas-fitting; plumbing; etc.

Mariners'—Logarithms; trigonometry; navigation; terrestrial navigation; celestial navigation; organization of a man of war; naval ordnance; explosives; torpedoes; ship building; speed, tonnage, and fuel consumption; ropes; wind and weather; signals; nautical memoranda; etc.

Business Man's—Arithmetic; tables; business forms; card systems; measures of extension; weight and capacity; time; value of foreign coins; duties on imports; bookkeeping; stenography; correspondence; postal information; financial terms; money and the money market; brokers and brokerage; patents; copyright and trade marks; corporations; business law; publicity; etc.

Advertiser's—How to plan and write an advertisement; type and type measurements; points on printing style; display; preparation of manuscript; proof reading; engraving and printing methods; electrotypes; matrices; advertisement illustrations; magazines; newspapers; retail, department-store, general, trade-paper, and mail-order advertising; trade marks; circulars; advertising agencies; etc.

Bookkeeper's—Arithmetic; formulas; tables; money; percentage; interest; equation of accounts; money and the money market; business law; financial terms; banks and banking; postal information; distances and time between various places; bookkeeping; business forms; card systems; modern office methods; cost accounting; bank bookkeeping; clearing house methods; etc.

Stenographer's and Correspondent's—Advice to beginners; shorthand speed; letters of application; punctuation; correct and faulty diction; business correspondence; typewriting; abbreviations; addressing; mailing; rates of postage; duplicating work; etc.

International Textbook Company

Box 1332, SCRANTON, PA.

I enclose $_____ for which please send me the books BEFORE which I have marked X.

____Mechanics' Handbook	____Advertiser's Handbook
____Electrical Engineer's Handbook	____Bookkeeper's Handbook
____Building Trades Handbook	____Steno. and Corr. Handbook
____Plumbers and Fitters' Handbook	____Business Man's Handbook
____Tel. and Tel. Handbook	____Mariners' Handbook

Name _____

St. & No. _____

City _____ *State* _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Sample free upon request

A Test of Toughness

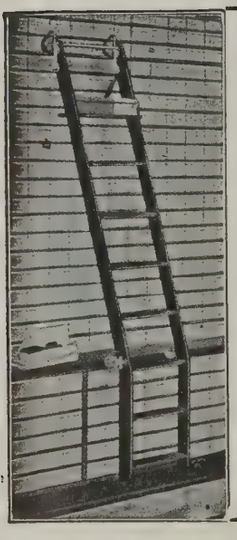
Not that you are expected to use your pencil as a chisel or an awl, but just to prove its toughness, this pencil was *actually driven* through a half inch plank. The illustration was drawn from a photograph.

E. C. S. Carpenter Pencils

are made of straight-grained, seasoned cedar and first quality graphite, toughened to stand rough usage. It is soft, smooth and uniform in use—no hard spots or grit. Beautifully finished in lustrous paint and silver leaf.

If not at your dealer's, write to us for free sample and we will tell you where they may be had. Address Div. No. N. B.,

SIMMONS HARDWARE COMPANY (Incorporated)
ST. LOUIS and NEW YORK, U. S. A.



Mr. Carpenter and Builder

Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY
1442 N. Eighth St., ST. LOUIS, MO.

LET US SEND YOU THIS BOOK FOR

FIVE DAYS FREE TRIAL

Send no money—just mail to us your name and address. Your book will reach you by return mail. Keep it 5 days—use it—then either send One Dollar or return the book.

Standard Handbook of

ESTIMATING DATA

Everg Man in the Building Trade needs it.

READ WHAT OTHERS SAY:

Your Standard Handbook is the best book of its kind ever written. For all the **30** years I have spent in estimating and building I would not be without it for twice the cost.

Name .....

Address .....

THE BUILDERS' AUXILIARY COMPANY, 325 Old South Bldg., Boston, Mass.

The VOLTZ UNIVERSAL SASH BAR



Makes any angle, allows for settling of building—keeps windows from frosting. The most beautiful, practical and durable bar in the world. Made in metal.

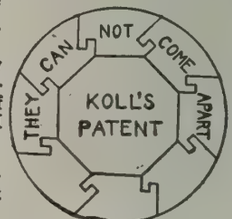
"Holds with a grip of iron, yet with a touch of velvet." Glass set from the outside. More good features explained in our catalog—it's fine—send for a copy before you build or repair. Write today.

VOLTZ MFG. CO.

1101-1103 S. 8th Street, :: St. Joseph, Mo.

60,000 COLUMNS

at an average of $5.00 each or 6,000 at $50.00 each gives you an idea of the annual capacity of our plant.



We own the largest factory building in the world devoted exclusively to the manufacture of high grade COLUMNS and PORCH WORK.

A new and very complete catalogue of COLUMNS will be sent on request. Ask for T-40.

Hartmann-Sanders Company

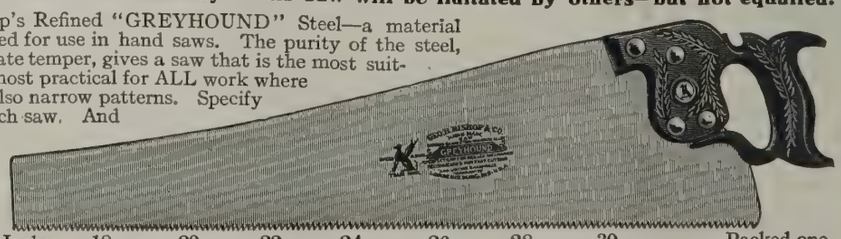
Sole manufacturers of
KOLL'S PATENT LOCK JOINT COLUMNS
Elston and Webster Avenues, CHICAGO
Eastern Office: 1123 Broadway, New York City
The best columns for porches, pergolas or interior use.

GREYHOUND HAND SAWS

SPEED & EASE
TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.

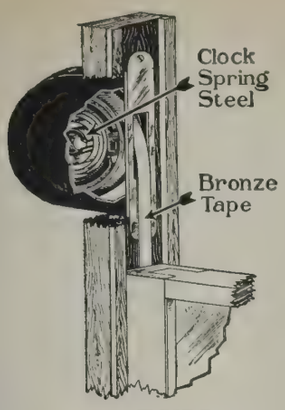


Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana

Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



5,000,000 Pullman Sash Balances

In daily use and less than 100 repairs on all of them in a year. Do you know of anything that is used at all that wears as well? No more expensive than cords and weights, far more modern, neat and smooth working. Can be installed anywhere. Carry any weight window.

Sold by Dealers Everywhere
Send for Circular

PULLMAN MFG. COMPANY
10 Allen Street :: :: :: :: ROCHESTER, N. Y.

WHEN YOU GET TO **SASH CORD** USE
SILVER LAKE

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

Was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. E. BARTON 1832 ROCHESTER, N.Y.

MACK & CO., Sole Makers
Brown's Race Rochester, N. Y.



BAY STATE

Brick and Cement Coating

Is a sure protection to concrete against dampness. It also can be used on stucco and brick where tints are desired.

It does not destroy the desirable texture of either concrete or stucco and is weather proof and has great resisting qualities to acid.

Architects, contractors and engineers everywhere are specifying it.

Address for a book which gives full particulars and shows the class of construction on which it is used, Dept. 12.

Wadsworth, Howland & Co. Inc.
Paint and Varnish Makers and Lead Corroders
82-84 Washington Street Boston, Mass.


Screen Door

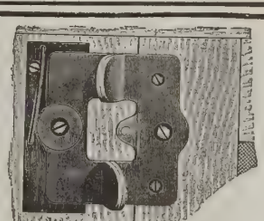
THE SENSIBLE SCREEN DOOR CATCH

A New Idea

The Sensible is the Catch that catches securely but quietly—prevents the door from warping, keeps out the flies, and reduces the noise of slamming to the minimum. Note the simple adjustment. Illustrations in this advertisement show catch one-third of actual size. Write for prices. Sample set mailed upon receipt of 25 cents.

MANUFACTURED BY

R. G. Winter Manufacturing Co.
2104 Vliet Street, : : MILWAUKEE, WIS.


Screen Door

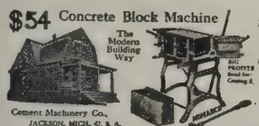
CONCRETE MACHINERY

The greatest mixer made All kinds of styles of the latest cement block and brick machines and molders from $5 and up; in fact **WE MAKE EVERYTHING IN CONCRETE MACHINERY** (low prices but high grade) **GET CATALOG N. FREE.**

SYSTEMATIC CONCRETE MIXER
28 ADVANTAGES



$54 Concrete Block Machine



CEMENT IS CHEAP—BIG PROFITS

making concrete products and building sidewalks Get a mixer. Get started. Prospects brighter than ever; things are going to boom in the cement industry. Get free Catalog "N."

CEMENT MACHINERY CO., Jackson, Michigan

LOW FREIGHT RATES

On Machinery and Household Effects

That's what we can offer SHIPPERS from points east of the Mississippi River destined to Interior and Pacific Coast Points by our plan of shipping in CARLOAD LOTS. Latest maps of any principal western state free on application by addressing Forwarding Department of the

TRANS-CONTINENTAL FREIGHT CO.
215 DEARBORN STREET, CHICAGO

29 Broadway, New York
625 3rd Street, San Francisco
322 West Sixth Street, Los Angeles
305 Main Street, Seattle

The Fox Is Light Running and Fast

We want every Architect, Contractor and Builder to send for a copy of our Book—Free—Showing how anyone in the Building Business can increase their Business by means of a Typewriter.



THE FOX—"THE ONE PERFECT VISIBLE TYPEWRITER"—LIGHT-RUNNING, FAST AND NOISELESS! Sent on **FREE TRIAL** to anyone—anywhere—at our expense—to be returned if not better than the best of other makes. If purchased, you can pay us a little down—after trial—and the balance at the rate of 20 cents per day—no payments on Sundays and Holidays.

The Fox is visible—you do not have to look under a lot of moving typebars to see what is written! It has a Back Space Key Tabulator, Two Color Ribbon with Automatic Movement and Removable Spools, Interchangeable Carriages and Platens, Card Holder, Stencil Cutting Device, Variable Line Spacer and Line Lock with Key Release. Its Speed is fast enough for the speediest operator or slow enough for the beginner. It is extremely Durable and Noiseless.



Date _____ 191___
FOX TYPEWRITER CO.,
4404-4604 Front Street,
GRAND RAPIDS, MICH.

DEAR SIRS—Please send me a copy of your catalog and write me your price and terms on the new Fox Visible Typewriter. It is distinctly understood that the signing of this coupon does not in any way obligate me to purchase, and that no typewritr is to be sent me unless I decide later to order one for free trial.

NAME _____
ADDRESS _____
BUSINESS _____

SEND FOR OUR CATALOG, ANYWAY

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

U. S. Standard Cement Mixers and Block Machines

ARE THE STRONGEST LONGEST AND EASIEST WORKERS ON THE JOB



"U. S. Standard Junior Block Machine.

OUR U.S. Standard Junior and Senior Block Machines are both built upon the same basic principles, the former building a 16", the latter a 24" long block and all fractional lengths thereof. Both of these machines build hollow blocks 6", 8", 10" and 12" thick and veneer blocks 3", 4", 5" and 6" thick. The equipment also provides plates for circular blocks, angle blocks of any desired angles, porch pier blocks, chimney blocks, etc. These machines are capable of producing a greater variety of styles and sizes of blocks without additional investment than any other machine made, and for simplicity, speed, completeness, strength and beauty of blocks cannot be equalled.

THE U. S. Standard are continuous mixers. The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically. With the U. S. Standard measuring is positive, and does not vary with coarse or fine, wet or dry ingredients.

SPECIAL FEATURES—Accuracy in measuring, correctness in proportioning and thoroughness in mixing the ingredients. All these operations are automatic and absolutely reliable. Detailed information will be furnished upon application for our Catalog No. B.



Senior No. A

THE ASHLAND STEEL RANGE & MFG. CO. ASHLAND, OHIO

AT LAST

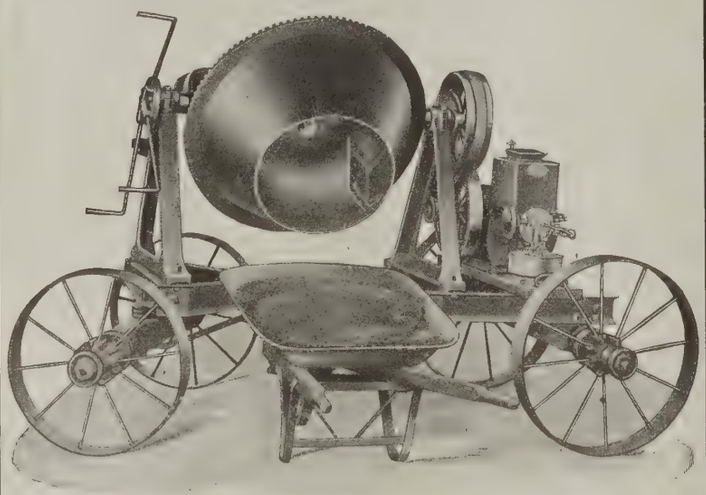
A TILTING BATCH MIXER

FOR LESS THAN THE COST OF A CONTINUOUS

THE LITTLE WONDER

Capacity, three to four feet. Turns out a better quality of concrete than can possibly be obtained by hand mixing and at one-twentieth of the labor cost.

Just the mixer for sidewalk or small foundation work, floors, etc.



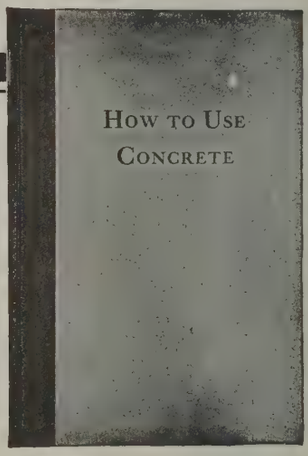
Simplest mixer built. No sharp corners in drum to catch concrete. Convenient side dump. Low charge. Charges or discharges while running at full speed. Mixes wet or dry material equally well. Can be set over sidewalk forms, eliminating wheeling. Equipped with one horse power gasoline engine will turn out more concrete than machines costing twice or three times as much. Can be operated by hand.

Furnished on skids or on trucks with or without power. Write for descriptive literature. Made by the manufacturers of THE GREAT POLYGON LINE.

WATERLOO CEMENT MACHINERY CORPORATION

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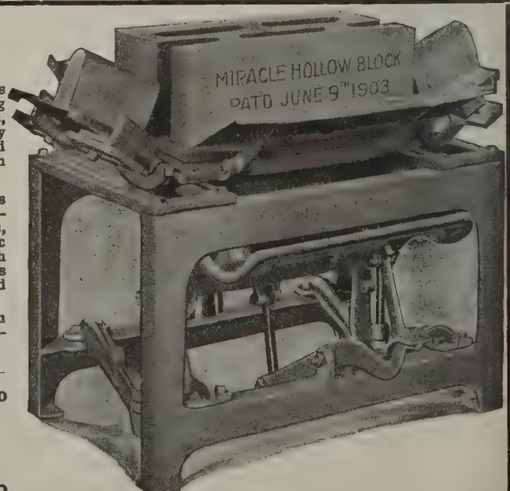
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It is charged two feet from the ground and both platforms and approaches are **portable with** the mixer.

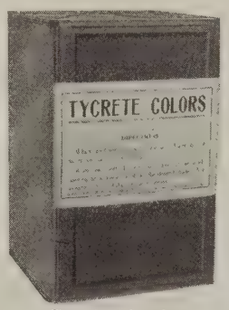
And don't forget we mean exactly what we say and can supply the proof that it saves one-third of the cost—one third of the first cost and one-third of the operative cost.

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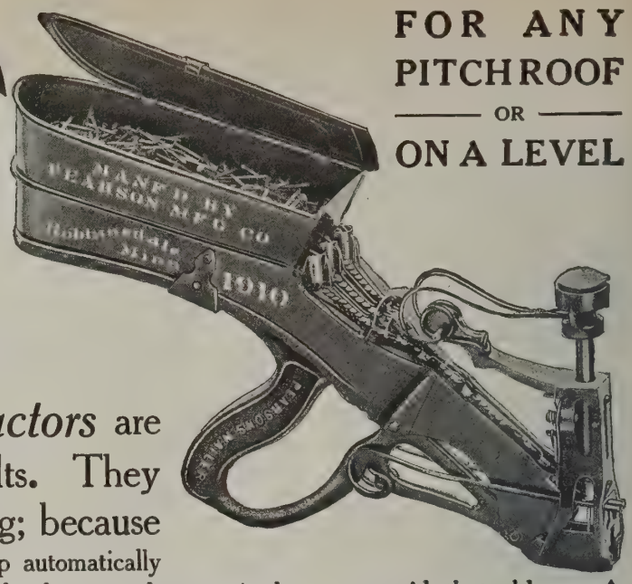
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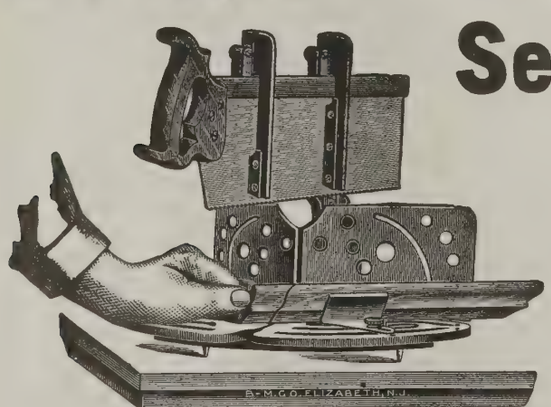
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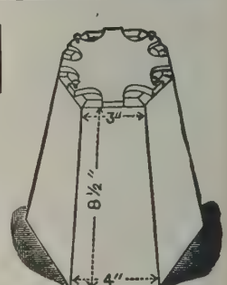
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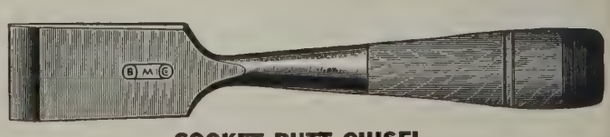
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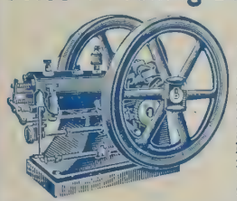
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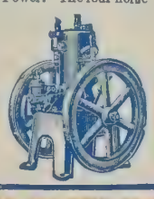
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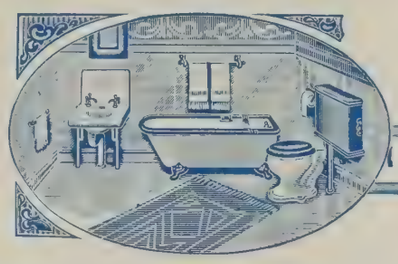
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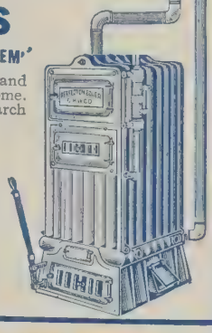
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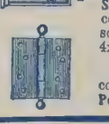
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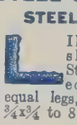


Illustration shows Angle Steel, made with equal and unequal legs, ranging from ¾x¾ to 8x8 inches.

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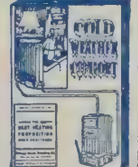
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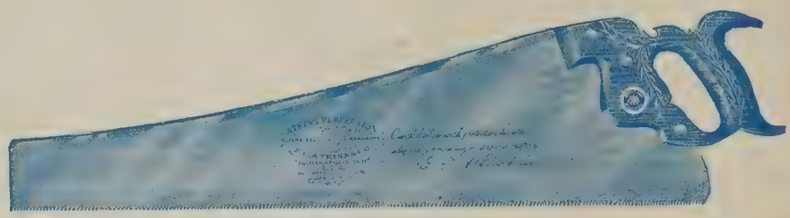


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ATKINS SILVER STEEL SAWS

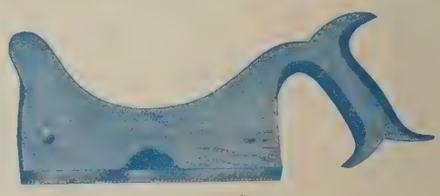
WE HAVE said a great deal about ATKINS SILVER STEEL HAND SAWS. We have told you how they are made and what splendid service they are giving others and what they will do for you. Now, we want to show you a few pictures taken from photographs of the Saws themselves, because we know you will be interested. We can't show you the whole line, for we make hundreds of different kinds of SILVER STEEL SAWS for all purposes.



But look at this Hand Saw. Ain't she a beauty? Is there not something distinctive and individual about it? Look at its graceful lines and the finish and the perfection hardwood handle. Does it not look like a Saw that would give results? This is our No. 53 and it comes in all sizes and points. There are a number of other patterns, styles and finishes, many of which are described in our Saw Sense Book.



Here is one of our finest Back Saws. Does it not look as though it would do the business? The blade is of SILVER STEEL and will, therefore, run a long time without filing the little fine teeth. The back is of heavy stiff steel and clamps the blade like a vise. The handle is of applewood, easy grip pattern. We make several styles of Back and Mitre Saws.



This Stairbuilders' Saw is a mighty handy tool. The blade may be regulated so as to cut any depth, assuring absolute uniformity.



This is one of our most popular styles of Compass Saw. We call it our No. 2. The blade is of SILVER STEEL and is, therefore, very hard and tough, but not brittle, and it is difficult to twist these blades out of shape. The handle is of carved and polished applewood.



This is our No. 3 Nest of Saws with Nail Cutting Blade. They are indispensable to every carpenter. The set consists of a Compass and Keyhole blade, together with a hardened steel metal cutting blade, all of which attach to an adjustable handle. The next time you need a Compass or a keyhole Saw, you had better pay a little more for the No. 3 Nest and thus secure the advantages of the Nail Cutting Blade.

ATKINS ALWAYS AHEAD

HOW TO BUY THEM

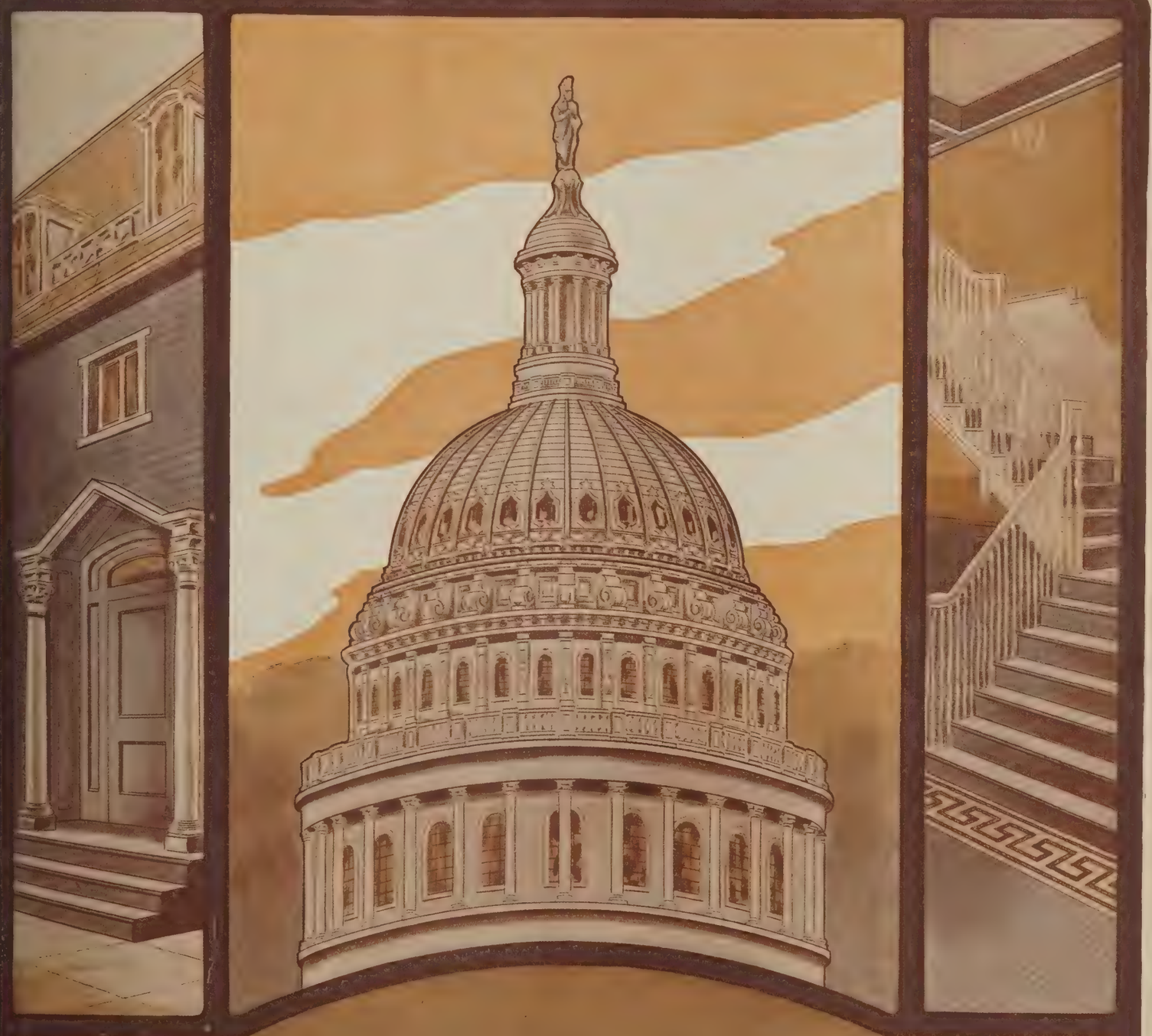
ATKINS SILVER STEEL SAWS are for sale by most first-class Hardware Dealers, but if your dealer does not sell them regularly, he will be glad to order for you from his wholesale house. If you have any difficulty in getting them in this way, please let us have your dealer's name and we will see that you are taken care of.

OUR FREE OFFER We are still compiling our list of carpenters and if you will send us ten cents to pay postage, we will forward with our compliments, a fine strong nail apron, together with our Saw Sense Book or Carpenter's Catalog, our monthly time book with scale of wages and some mighty interesting information in regard to High Grade Saws. Write to-day and secure this valuable package

E. C. ATKINS & CO., Inc. The Silver Steel Saw People **Indianapolis, Ind.**

MORE COPIES
PRINTED AND CIRCULATED THAN ANY BUILDING PAPER IN AMERICA.

THE NATIONAL BUILDER



PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

MAY, 1911

DISSTON



INSULATE SCREW DRIVER

This tool is designed expressly for Electricians' use.
The blade of crucible steel, hardened and tempered, is embedded in a handle of hard rubber of a texture that eliminates brittleness. It *will not* work loose.
The rubber handle is milled grip with projecting rings which prevent the hands from slipping down onto the blade.
The hard rubber handle acts as insulation.
The Disston Insulate Screw Driver is something new.
Most practical electricians' screw driver ever made.

HENRY DISSTON & SONS

INCORPORATED

Keystone Saw, Tool, Steel and File Works

Philadelphia, Pa.

BRANCHES: Chicago Boston Cincinnati New Orleans Memphis San Francisco Seattle Portland Spokane Toronto Vancouver

AUGER BIT ESSENTIALS

The Seventh Feature contributing to the high quality of

RUSSELL JENNINGS BITS



is the care exercised in

INSPECTION AND TESTING

After sharpening, the bits are carefully inspected, so that perfect bits only go on the market. They are then tested individually in all kinds of wood, the bit being motor driven. Electric measuring instruments indicate accurately the power necessary. In this way we know just what our bits will do before they leave our factory. The tests guide us in our constant effort to improve our bits.

RUSSELL JENNINGS MFG. CO.

CHESTER, CONN., U. S. A.

21-30

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

FOR WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut at the factory into 4x4 ft. sheets, which are easily and quickly nailed to studding, ready for immediate application of wall paper, paint, burlap, or other decoration.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary, and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Showing Construction of Bishopric Wall Board

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



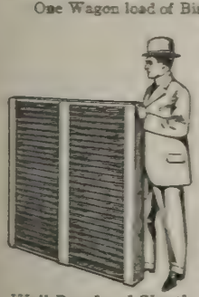
Showing construction of Bishopric Sheathing

Arrows point to Asphalt Mastic into which lath are imbedded

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

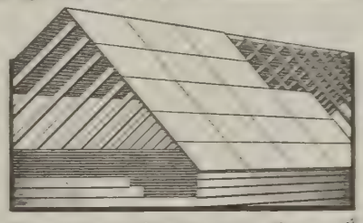
The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bisnopric Sheathing 1,000 square feet covers 1,000 square feet of space

In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required. In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time

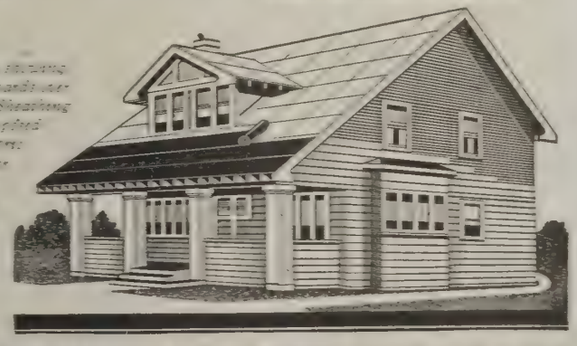
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.



Showing Exterior Sheathing in position ready for Weather Boards or Cement Stucco

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Showing Bishopric Wall Board and Exterior Sheathing both side applied also Bishopric Roofing over Sheathing forming weather and fire resisting roof

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

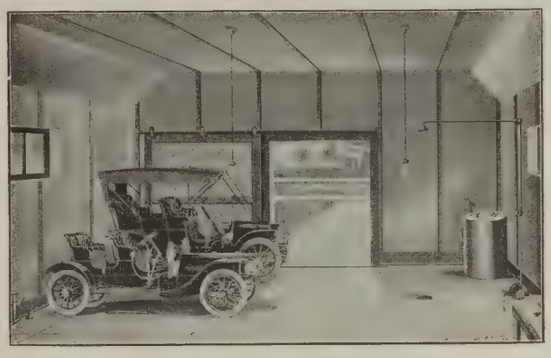
The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UTILITY WALL BOARD

A Fibrous Water-Proof Board Made in Convenient Widths and Lengths

To be Used Instead of Lath and Plaster in New Building or Repair Work



Make your Garage Warm by Lining with UTILITY Wall Board

Mr. Contractor

This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

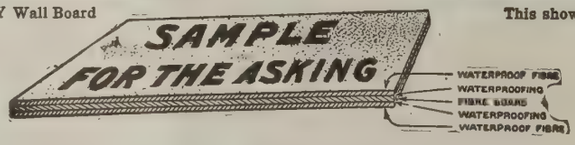
Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern building material.



This shows how an Attic looks after being finished with UTILITY Wall Board.

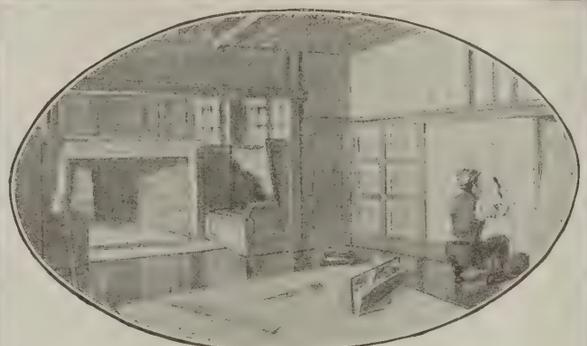
Utility Wall Board is better than lath and plaster. It saves the user a lot of money besides giving him a handsome, durable job. Utility Wall Board can be painted and decorated with the finest results. Utility Wall Board is being used in both small and large buildings. Everyone likes it.



Write Now for FREE Sample and Prices

Utility Wall Board can be applied by the carpenter—nailed right to the studs—easy and clean to handle—cuts with a saw—fits any space and can be put on in winter or summer—no waiting for plaster to dry—no cracked walls—no dirt—no ruined decorations—warm in winter and cool in summer

THE HEPPES COMPANY, 4502 Fillmore Street, Chicago, Ill.



YOU CAN SAFELY RECOMMEND

Compo-Board

It makes the best walls and ceilings. Dry, warm, fire-resisting and moisture proof.

Compo-Board walls will outlast lath and plaster; will not crack, crumble or fall off. Can be easily put on without waste of time waiting for plaster to dry.

They always look well. No ugly blotches where moisture has gathered. No unsightly scars where the walls have been patched. Will take paint, paper or kalsomine perfectly.

In addition to being a perfect wall lining, Compo-Board can be used as a back plaster for partitions, for lining summer cottages, barns and poultry houses. It has many uses around the house and in the office and factory.

Compo-Board is made of strips of thoroughly dried lumber matched together and well glued. These strips are then covered with a specially prepared moisture proof paper, which is cemented under intense heat heavy pressure. This makes a wall lining that will last indefinitely.

Can be had in strips four feet wide and one to eighteen feet long, any length you want in even feet.

SEND FOR SAMPLE AND BOOKLET

Fully describes Compo-Board and its many uses and advantages, and the sample will show you what it is.

NORTHWESTERN COMPO-BOARD CO.

5576 Lyndale Ave. No. MINNEAPOLIS, MINN.

(The border of this advertisement is a cross section view of Compo-Board.)

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

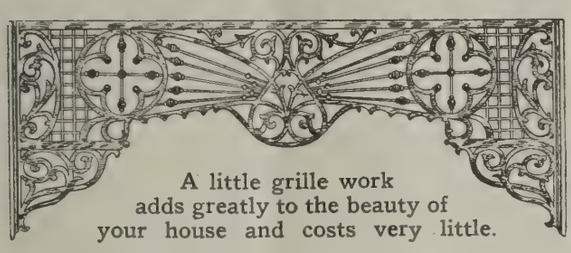
CINCINNATI, OHIO

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IT WILL HELP.

CHICAGO GRILLE WORKS

1892 1911

WHY NOT?



A little grille work adds greatly to the beauty of your house and costs very little.

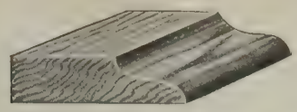
Try the **manufacturer** with your next order of Grille Work Colonnades, Consoles and Interior Columns. You may be agreeably surprised with prices and promptness in shipment. **Why not** send us your next order? We have thousands of well pleased customers; if you are not one of them, **why not** write today for our **Catalog No. Nineteen** and find out what we have to offer you in the way of interior decoration? Every dollar spent with us adds five to the value of your home.

828-838 Wells Street, Chicago, Ill.

Write for Our New Catalog—Mailed Free

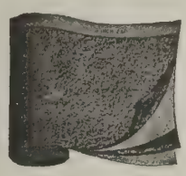


WINDOWS—42c and up



WINDOW BEAD—Best Yellow Pine, 27c per 100 lin. ft.

Quality Guaranteed



ROOFINGS—64c and up

Prompt Shipment Guaranteed



STAIR NEWELS $1.50 and up



DOORS—80c and up

INVESTIGATE

before you buy

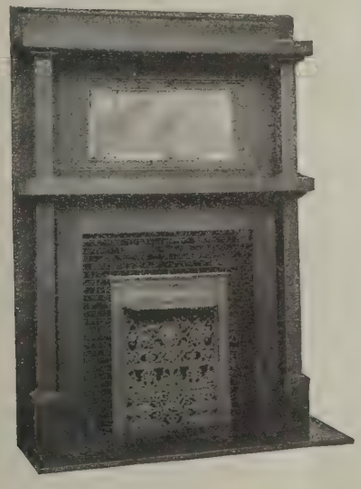
and you will find we can save you lots of money on anything in the line of **HIGH GRADE** sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens, steel ceilings, gutters, shingles, etc.

Our New Catalog Mailed Free Will Convince



PORCH NEWELS 42c and up

The Huber Builders Material Co.
39-43 Vine St. CINCINNATI, O.



$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

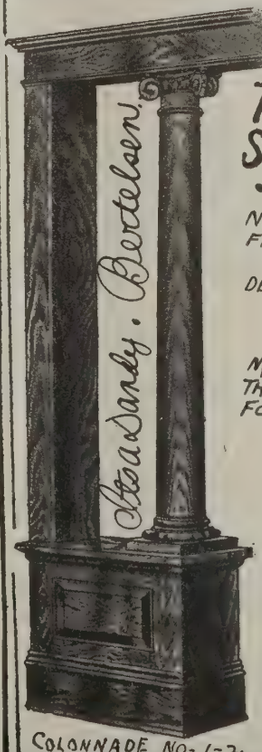
are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

$8.50 FOR THIS COLONNADE



COLONNADE NO. 1-2

A VERY LOW PRICE FOR THIS STRICKING NEW COLONNADE

MATERIALS AND WORKMANSHIP FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUDED
MADE FOR 5¾-INCH JAMBS
MADE IN OAK OR YELLOW PINE, IN THE WHITE, HAND SMOOTHED, READY FOR FINISHING

PRICES
ANY HEIGHT NOT OVER 9 FEET.

Style No. 1-2 EACH $8.50
Columns are 6 inches in diameter, tapering to receive 5-inch compo. cap, pedestals are 20 inches high over all and the width is 24 inches over all, and when set in to receive casings extension from jamb is 18 inches. Top shelf is 10 in. wide.

Style No. 2-2 EACH $9.00
Same measurements as above, only pedestals are 30 inches wide over all and when set in to receive casings extension from jamb is 24 inches.

SEND YOUR ORDER NOW, DONT LET IT GET AWAY FROM YOU.

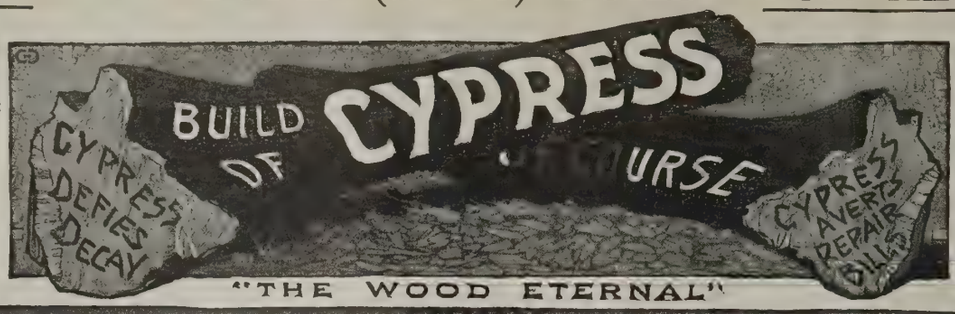
BERTELSEN ADJUSTABLE GRILLE CO. 619. S. CLINTON ST. CHICAGO.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHEN YOU BUILD (WHATEVER YOU BUILD) BUILD "FOR KEEPS"!

It's the Repair Bills that eat Holes in the Bank Account

THIS IS ***BUYING TIME***



"CYPRESS LASTS FOREVER" *TRY IT!*

"NO SUBSTITUTES!"



WRITE TODAY for Vol. 9 of the CYPRESS Pocket Library telling about Cypress siding—*and why.*



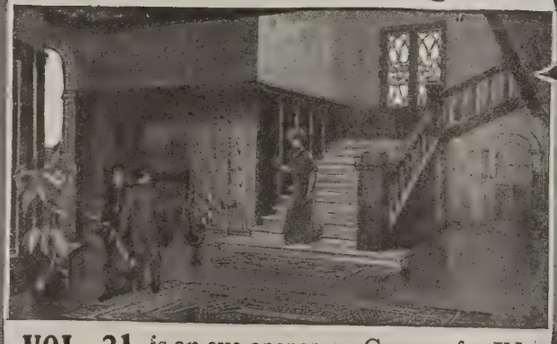
VOL. 7 (Cypress Pocket Library) is "the most valuable SHINGLE book ever printed. Yours by mail on request.



CYPRESS —"the only GREENHOUSE Wood"—or for Pergolas, Trellises, etc. Ask greenhouse men. Get Vol. 3.



FARM and Country Home Improvements of Cypress never "run down." Vol. 22 covers Tanks and Silos also. Get it.



VOL. 31 is an eye-opener on Cypress for INTERIORS. Superb grain. Easy to work. No pitch. The book proves.



EVERY FOOT of every Porch, Sleeping Balcony or Fence should be CYPRESS. Vol. 16 covers it. *Write today.*



Working Plans Free
Write for Vol. 18

When planning a Mansion, a Bungalow, a Farm, a Sleeping-Porch or just a Fence, remember—
"WITH CYPRESS you BUILD BUT ONCE."

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY*

"CYPRESS—AND NO SUBSTITUTES"



Working Plans Free
Write for Vol. 6

CROSBY-CHICAGO



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

RED GUM

(AMERICA'S FINEST HARDWOOD)



A RED GUM BANK AND OFFICE BLDG., THE LINCOLN BANK BLDG., LOUISVILLE, KY.
Messrs. McDonald & Dodd, Architects.

"RED GUM is the logical wood" for a superior result in **Interior Trim** in costly buildings in which ***money is not intended to be wasted*** **AS WELL AS IN MODEST HOMES.** The interior trim of the fine building shown at left is **RED GUM** and the result is a structure notable for its **beautiful and thoroughly satisfactory** woodwork.

SAP GUM

Another Valuable Lead for Wide-Awake Builders

SAP GUM is of course a part of the same tree from which RED GUM comes. As the tree grows the sap changes to red, and SAP GUM has most of the excellent qualities of RED GUM.

SAP GUM, which was formerly used for the manufacture of boxes, in grades that were suitable for much better purposes, is now recognized as a wood which is much too valuable for such purposes, and is being rapidly diverted into its legitimate channels.

SAP GUM is excellent for interior work, as it takes stains and varnish beautifully and there is no exaggeration in the statement that it is the best wood obtainable for

White Enamel Interior Trim for Colonial Houses

SAP GUM finishes with *absolute smoothness*—a rare virtue.

SAP GUM takes glue as well as any wood manufactured.

SAP GUM at present price is a remarkable investment.

Builders desiring to see samples of ***Red and Sap Gum,*** *both rough and finished, or who want prompt quotations on selected* ***Red and Sap Gum,*** *should* ***write at once*** *to any or all of the following firms:*

LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
CARRIER LUMBER & MFG. COMPANY . . . . . Sardis, Mississippi
BAKER LUMBER CO. . . . . Turrell, Arkansas
ANDERSON-TULLY CO. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., St. Louis, Missouri

AT ITS PRESENT PRICE ***GUM*** *IS THE MOST REMARKABLE PURCHASE IN THE ENTIRE HARDWOOD FIELD.*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

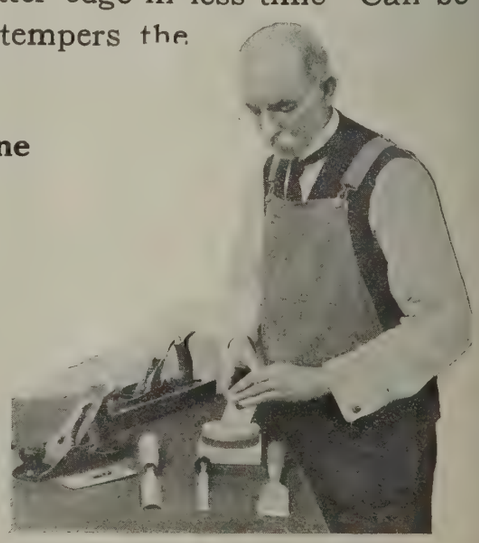
430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

Carborundum Carpenters' Round Combination Bench Stone

You can Use All of the Surface and Put a Clean Smooth Edge on Your Chisels, Plane Bits or Similar Tools—

Note the shape—round so as to give full play for rotary sharpening motion—There is no unused surface—The wear is uniform—Its use means a better edge in less time—Can be used dry or with Carborundum Temperoil, the oil that tempers the cut, smooths the edge, does not gum and has no acid.



Carborundum Round Combination Bench Stone

No. 107 - - - - - - - -	$1.00
With Quartered Oak Box Holder - -	1.50
Carborundum Pocket Stone in Case -	.35
Carborundum Temperoil, 1½ ounce bottle	.10

All from your dealer or by mail direct.

The Carborundum Company

Niagara Falls, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instruction for laying
BAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.

Time-and-weather test is the *real* roofing test.

You want to be sure *before you buy* that your roofing will stand this vital test. The only way you *can* be sure is to know what the roofing is made of.

Genasco

the Trinidad-Lake-Asphalt Roofing

is free from mystery and deception. It has the life that only natural asphalt can give roofing to make it thoroughly and permanently waterproof.

The natural oils in Trinidad Lake Asphalt give it this resisting life; and they do not dry out of Genasco like the volatile oils in artificial asphalt roofings, which leave them to crack, crumble, and leak. Genasco resists rain, snow, sun, wind, heat, and cold—and it lasts.

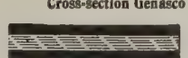
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Trinidad Lake Asphalt
Asphalt-saturated Wool Felt
Trinidad Lake Asphalt



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Made from the highest priced mineral compound known and the purest felt obtainable, in our own mills where we can watch the manufacture from start to finish. We use no paper or cheap filler—just the pick of materials that make roofing durable.

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Complete Ready for Work with 110 ft. Cable, Block and Band Brake.



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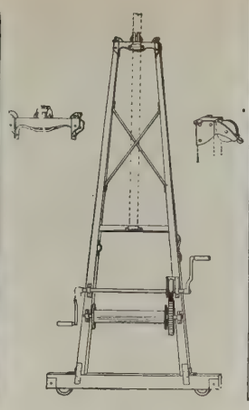
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who are rated or give good references.

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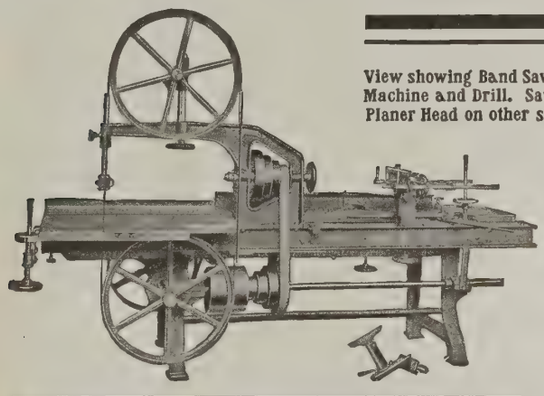
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View showing Band Saw, Lathe, Boring Machine and Drill. Saw Mandrel and Planer Head on other side.

The "Buffalo" Crain Combination Woodworker

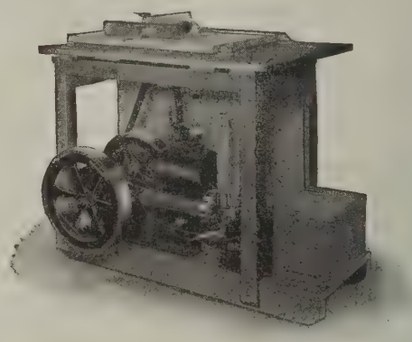
Has **Lathe** 40″ between centers; **Band Saw** taking 12″ under the guide; **Saw Mandrel** taking saws up to 12″ diameter; **Planer Head,** 5″ or 10″ **drill, boring machine, sizer, shaper, tenoner.** Three men can work at it at one time and perform a **Dozen Different Operations.** It is the latest invention and without comparison the simplest, strongest and most efficient machine made at the price. Low power cost; only 4 H. P. required at full load. No extra attachments needed. The facilities for adjusting every working part to suit the work in hand are unequalled.

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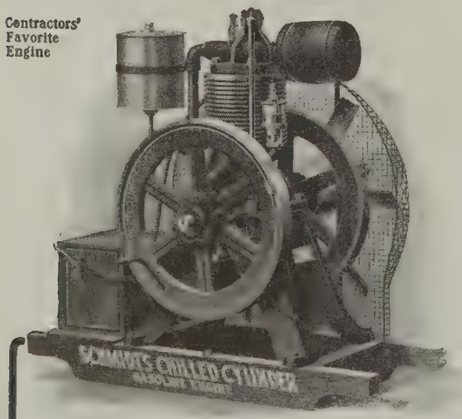
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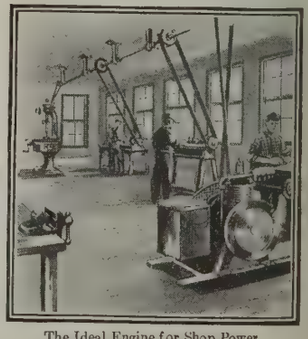
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If you like this engine after trying it out for 10 whole days you can keep it and take long time to pay for it on **easy monthly payments,** or after using it free for 10 days, just send it back at our expense.

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Will Save You Time. No waiting for the planing mill to deliver your work.

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The Grimm Woodworker

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Moulding Knives
Emery Wheels Jig Saw
Boring Attachment

Send for Booklet and Trial Offer

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FOX UNIVERSAL WOOD TRIMMERS



4-A Style

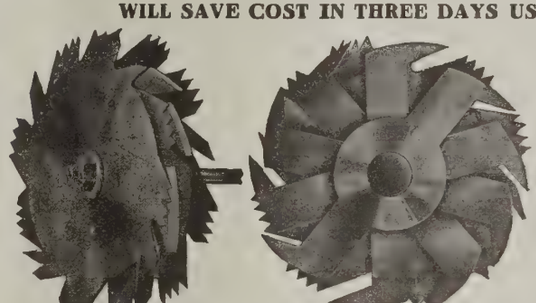
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ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

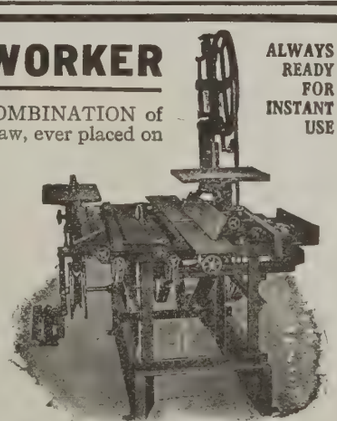
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The long base best arranged for Portable Use with engine attached.

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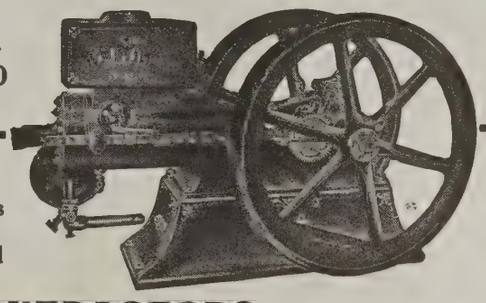
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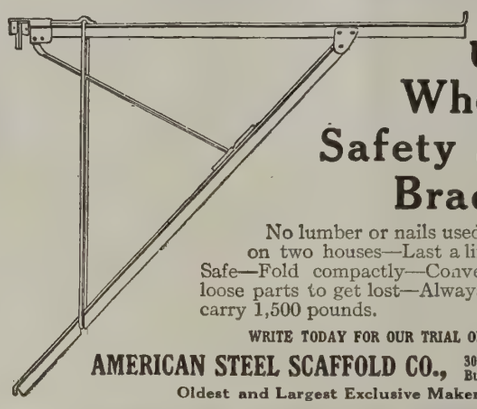
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The price given is for the five-horse power only, but we make these engines in seven sizes.

Ask for free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure. Write today.

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Save Money



Use Wheeler Safety Scaffold Brackets

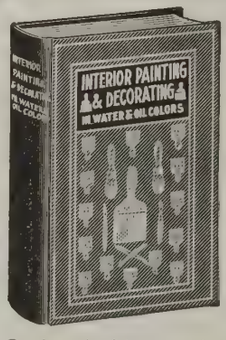
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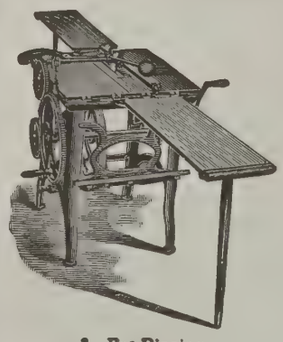
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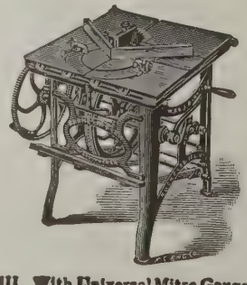
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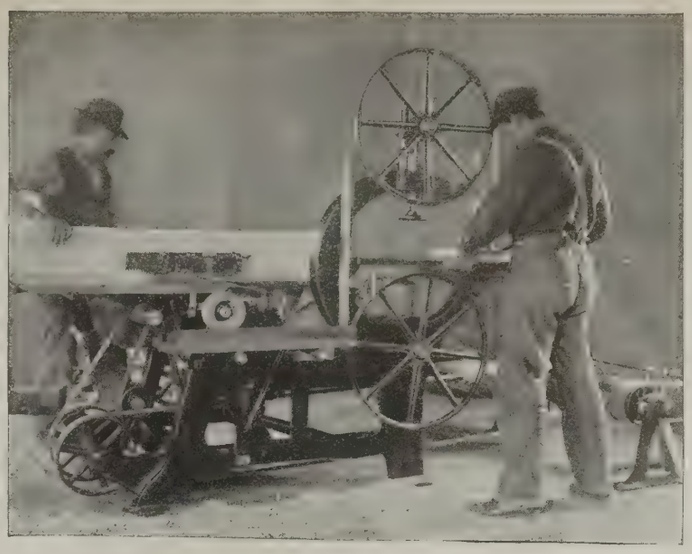
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Charles A. Miller, Jr. } Associate Editors
Wm. C. A. Stevenson }

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FRED. A. HODGSON, President — FRED. D. PORTER, Secretary and Treasurer — GEO. A. FARGHER, V. Pres. and Adv. Mgr.

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Established 1885.

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THE NATIONAL BUILDER seeks the advertising of reliable houses only, and asks that prompt notice be given by any reader who has cause for complaint against an advertiser, that the matter may be investigated, and the advertisement discontinued should the advertiser be proved untrustworthy.

Volume 52 — CHICAGO, MAY, 1911 — Number 5

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COPYRIGHTED, 1909, BY THE STANLEY RULE & LEVEL CO.

Stanley Tools

Among the gauges shown herewith we call particular attention to—No. 94, a new BUTT GAUGE.

It has two steel bars. To one are affixed two steel cutters for use when gauging for doors with rabbeted jambs. This bar may be reversed for gauging from the casing (whether of the moulded form or flat) on doors which have a strike strip nailed on after the door is hung.

The other is fitted with a steel cutter to gauge for the thickness of the butt.

The two ends which are parallel—are at right angles to the bottom, and as one end overhangs the bottom slightly, it can be used as a square from which to mark at right angles to the casing, as shown in the cut.

This tool is convenient for carrying in the pocket, and is so constructed that the bars cannot fall out.

SEND FOR CATALOGUE

STANDARD THE WORLD OVER

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

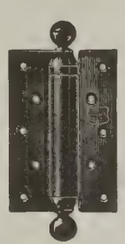
Bommer Spring Hinges are Quality Goods



But cost no more than the inferior kinds

The Springs Never Go Lame

This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge



Reputations are made by consistently giving your customer the best spring hinges and avoiding imitations or substitutes

Bommer Spring Hinges are sold by all Hardware Dealers

HAVE YOU POWER BORING MACHINES?



Quadruple Bit
Price $5.00
Can not be used in a hand brace

IF SO,
No Sash Pulley Can be Classed with the

Grand Rapids No. 12

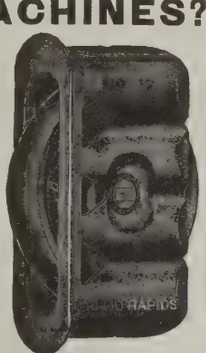
Mortised at one Punch with the

Quadruple Bit

or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money

Write For Free Samples



Grand Rapids Hardware Co., 118 Pearl St. GRAND RAPID MICH.



Hand Power Elevators and Dumb Waiters for all purposes

Cut shows the Improved Sedgwick Hand-Power Invalid Elevator Outfit.

Catalogue upon request

Sedgwick Machine Works

130 Liberty St. New York



Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

TRUS-CON JOIST HANGERS

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

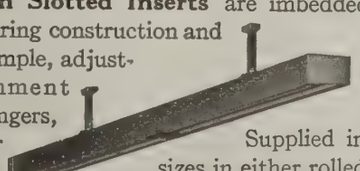
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

Trus-Con Slotted Inserts are imbedded in the concrete during construction and furnish a simple, adjustable attachment for shaft hangers, sprinkler systems, etc.



Supplied in various sizes in either rolled steel or cast iron; also Trus-Con Socket Inserts to receive threaded bolts.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

All Gears Guarded

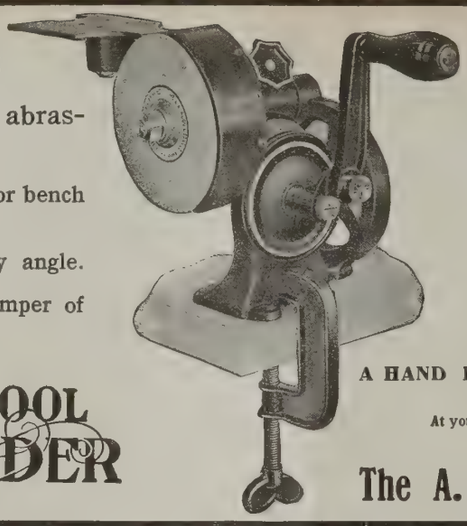
WHEEL—Best known abrasives, 5″ x 1″

Can be clamped on table or bench —Weight 11 lbs.

Rest adjustable to any angle.

Positively will not draw temper of any edge.

ATLANTA TOOL GRINDER



CARPENTERS

Every workman needs sharp tools for good work. You can have yours sharp at all times by owning an "Atlanta" Grinder, an accurate, workmanlike, high-grade machine.

It costs only $7.50—is always handy to sharpen and grind out a nick when you need a tool the most.

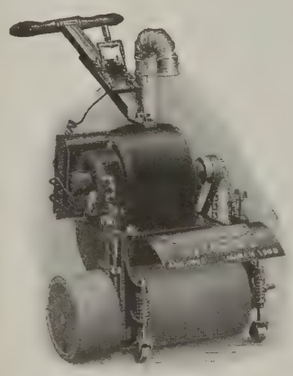
It pays for itself in a short time. Any carpentry or building contractor can save its cost many times over in time saved in grinding tools and in faster and better work due to tools being kept in perfect condition.

A HAND POWER GRINDER THAT MEETS THE MOST EXACTING REQUIREMENTS

At your dealer's—If not, the manufacturers will send by express prepaid on receipt of price.

Manufacturers

The A. A. Wood & Sons Co., -:- Atlanta, Ga.



Made in three sizes:
8x18, 8x15, and 8x12 in. Roller
Edge Roller easily adjusted to either side

Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

The **Schlueter** will remove all joints or warped edges, and oil, wax, lime stains, or the "muck" from skate wheels, in a most satisfactory manner.

Earning Capacity, $20.00 to $35.00 per Day

Send for prices and Free Trial Proposition

M. L. SCHLUETER

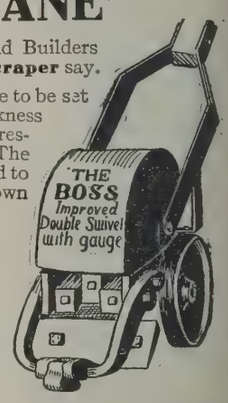
101 N. Canal St., CHICAGO, ILL.
1001 Flatiron Bldg. NEW YORK.

Acme Floor Surfacing, Laying & Finishing Co. Not Inc.

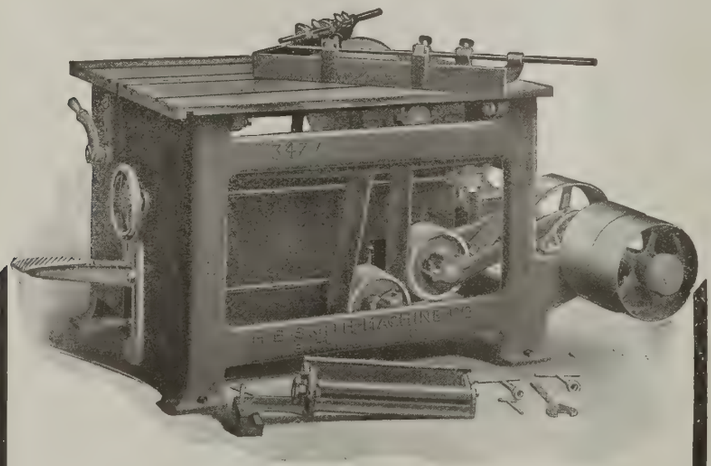
"IT'S A SCRAPER BUT IT WORKS LIKE A PLANE"

That is what the many satisfied Contractors and Builders who are using **The Boss Improved Floor Scraper** say.

THE BOSS has double swivel allowing the knife to be set in any position. Gauge can be set for any thickness of shaving and keeps knife from making depressions in floor. Gives knife double support. The pear-shaped wheel which is in the gauge is attached to the gauge in front so that when the scraper is let down to take shaving, it lets the knife down gradually and prevents the knife from making a deep cut. With this gauge and wheel attachment the knife will leave no mark. Impossible to do poor work. Adjustment simple—positive. Gauge can be removed instantly. Standing attachment cleans wheels and takes off the rosin when working hard pine. Prices very low. Write for descriptive circular "N"



GEORGE J. KEPPLINGER, - Dwight, Illinois



No. 347. Combination Saw and Dado Machine.

Looking for a Modern Saw Bench?

The above cut represents our new Combination Saw and Dado Machine.

The **Frame** is quite substantial, with closed front.

The **Ways** adjust for depth of cut, and

The **Carriage** moves on rollers having ball-bearings.

The **Saw Mandrel** runs in self-oiling boxes, and is brought into the work by a foot treadle, thus leaving both hands free to handle the work.

For further particulars concerning above and other machines, address

H. B. Smith Machine Co., Smithville, N. J., U.S.A.

New York Chicago Atlanta Shreveport



MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"DIAMOND" MORTISER

For Foot Power

Will mortise 1/8 to 1 inch wide, 3 inches deep or 6 inches deep by reversing the work, and with our patent adiustable tenoning tool will cut tenons 1/8 to 1 inch wide. Has rigid iron column, powerful foot motion and accurate action. The table has horizontal, vertical and angle adjustments.

It takes up but little space, is light and can be easily moved about to accommodate your work.

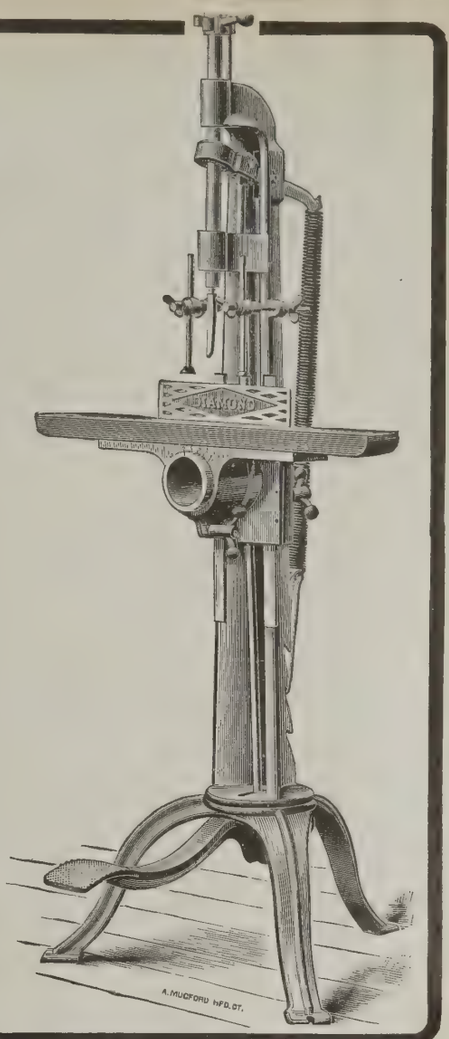
We make a complete line of Foot, Hand and Light Power Wood-working Machinery suitable for Carpenters, Builders, Cabinet Workers and other Wood-workers. It will pay you to investigate their merits.

Send for catalog "A."

The Seneca Falls Manufacturing Co.

629 Water Street

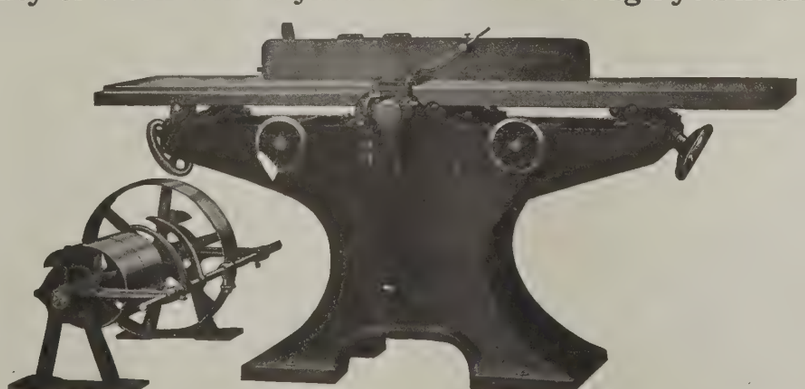
Seneca Falls, N. Y., U. S. A.



PROTECT YOUR FINGERS

by using a CRESCENT Jointer with Safety Head

The knives in CRESCENT Safety Heads are made of high speed steel which will hold an edge longer and turn out better finished and more work than can be done on a common jointer with ordinary knives. You may crowd the machine to the limit and the quality of work will be just the same as though you hadn't crowded it a bit.



The price of these splendid machines is very reasonable considering the very high quality of the machines and the enormous amount of accurate work they are capable of turning out.

Send for catalog giving complete description. It tells about our elegant line of Band Saws, Saw Tables, Jointers, Borers, Shapers, Planers, Planer and Matchers, Pole Rounders, Disk Grinders, Variety Woodworkers.

THE CRESCENT MACHINE COMPANY 10 MAIN STREET LEETONIA, OHIO, U. S. A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

As Sure as 2 and 2 Is 4

A Shearing Cut Gets Best Results in Floor Scraping

Why does a mechanic when scraping a floor by hand use the Shearing Cut? Because he obtains smoothest and quickest work so. When you whittle a piece of wood you use a Shearing Cut.

A Shearing Cut is ALWAYS made with the

"DAISY" FLOOR SCRAPER

With One Ten-Inch Blade Single Shearing Cut is Made
With Two Five-Inch Blades Double Shearing Cut is Made



The "Daisy"

CUTS EITHER WITH OR ACROSS THE GRAIN
CUTS RIGHT UP TO BASE BOARD AND INTO EVERY CORNER
IS EASIER ON THE OPERATOR AS IT REQUIRES ONLY A SLIGHT LIFT TO GET BEST WORK
WILL DO MORE WORK THAN ANY OTHER IN SAME LENGTH OF TIME
WILL DO PERFECT STRAIGHT EDGED WORK AND WILL PLEASE YOU
CLAMPS ARE INSTANTLY FASTENED
FILING DEVICE FILES BLADES TO RIGHT BEVEL
EDGE-TURNING DEVICE IS A WONDER

UNSOLICITED TESTIMONIALS

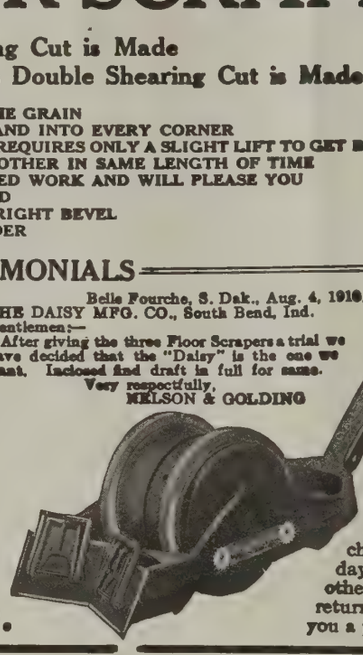
FRED L. WALTERS
CARPENTER AND BUILDER
Jobbing Given Prompt Attention
Estimates Furnished

Gillette, N. J., Oct. 11th, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
The flooring has arrived and we have scraped it with your machine and I find it does all you claim for it. Inclosed you will find check as per agreement.
Thanking you for your kindness in allowing me to try this machine and for extending the time for trial, I am, Yours respectfully,
FRED L. WALTERS.

KUTSCH BROTHERS
CARPENTERS AND CONTRACTORS
Jobbing and Repairing
Promptly Attended to
No. 2043 Washington Street

Dubuque, Iowa, Sept. 1st, 1910.
THE DAISY MFG. CO.,
South Bend, Ind.
Gentlemen:—
Immediately after using the Scraper we have found it to be satisfactory and superior to any we have seen in use.
We herewith inclose draft in full for same.
Yours truly,
KUTSCH BROTHERS
Per J. P. H.

Belle Fourche, S. Dak., Aug. 4, 1910.
THE DAISY MFG. CO., South Bend, Ind.
Gentlemen:—
After giving the three Floor Scrapers a trial we have decided that the "Daisy" is the one we want. Inclosed find draft in full for same.
Very respectfully,
NELSON & GOLDING



Ten Days Free Trial Offer

We will ship a "DAISY" Outfit to any responsible contractor who intends purchasing a floor scraper for a ten days free trial. Test it with others, if you do not find it best return it. The trial will not cost you a penny.

Name .....
Occupation .....
City .....
State .....

Gentlemen: Please send me the new "Daisy" Floor Scraper Booklet free.
The DAISY MFG. CO. South Bend, Ind.

DAISY MFG. CO., SOUTH BEND, IND.

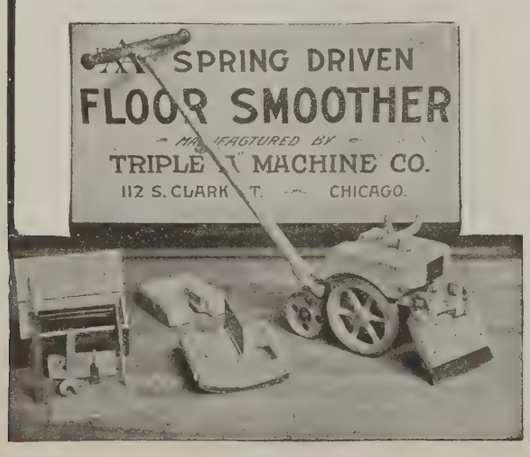
When You Buy a Floor Surfacing Machine
BUY A GOOD ONE—IT PAYS!

The Triple "A" Spring-Driven Floor Smoother combines the advantages of the hand machine and the power machine. No more expense than the former, yet has the capacity and ease of operation of the latter.

No wasted energy pulling a dead weight.

About half of all the Triple "A"s sold have been bought by owners of dead weight machines. What's the answer?

"Get the best first and save extra expense."



The Triple "A" to be appreciated needs only to be seen in operation.

For advertising purposes we will give a special discount on the first machine sold in each town.

SENT ON FREE TRIAL

WRITE FOR FULL INFORMATION

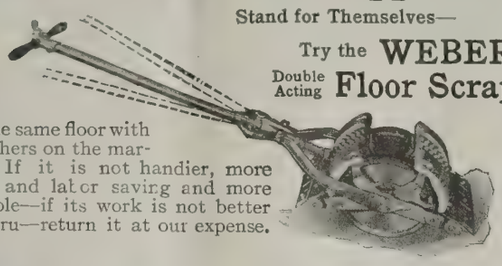
TRIPLE "A" MACHINE COMPANY

34 North Clark Street CHICAGO

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

TRY THEM ALL - KEEP THE BEST
TWILL BE A WEBER IF GIVEN A FAIR TEST

Weber Tools and Appliances
Stand for Themselves—



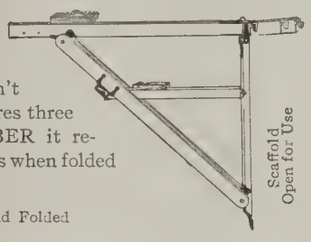
Try the **WEBER** Double Acting **Floor Scraper**

on the same floor with all others on the market. If it is not handier, more time and labor saving and more durable—if its work is not better all thru—return it at our expense.



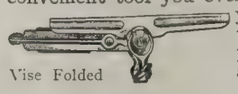
Cabinet Scraper
and sander—a tool which every cabinet maker, carpenter and painter should have. It is recognized as the most valuable article of its kind ever invented. Ask you dealer. If he does not handle it, I will ship direct or thru him.

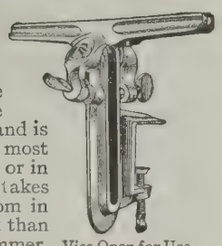
Double-Folding Scaffold Bracket
Is adjustable to any building. Can't swing. Where it ordinarily requires three rows of scaffolding, with the WEBER it requires only two; 12 of these brackets when folded take up space only 3′x4′x6′.




Scaffold Folded

Folding Saw-Filing Vise
Also ask your dealer to show you the WEBER Folding Saw-Filing Vise—the Saw Vise you want. Has a rigid grip and is almost noiseless. You will find it the most convenient tool you ever had on a job, or in your shop. It takes up no more room in your hand box than an ordinary hammer.


Vise Folded


Vise Open for Use

Wax Polishing Brush
and sander. Brush sits square and even and imparts a high gloss. Sand-papering block admits turning paper one-half around, greatly lengthening its life.

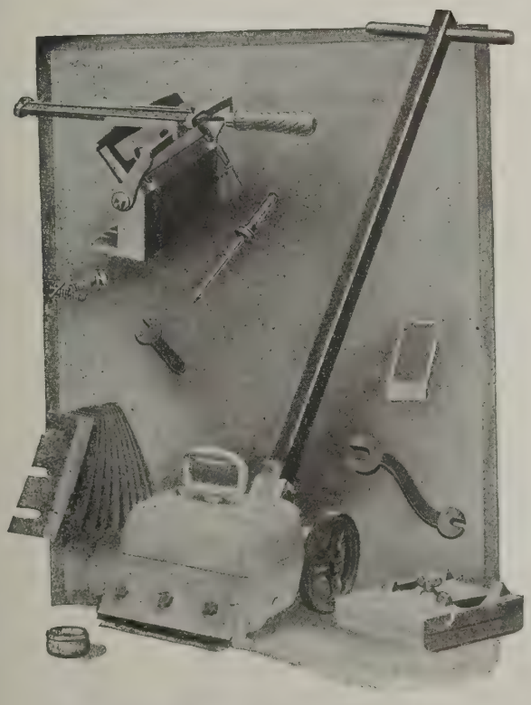


Write for Free Trial
I want you to try the Weber Double Acting Floor Scraper on my 5 to 10 days free trial offer.

JOHN F. WEBER, President

Weber Manufacturing Company
661 71st Ave., West Allis, Wis.

WHAT IS THE ANSWER?



When nearly every mail brings letters such as are reproduced below—what does it signify? Isn't it almost positive proof that the **Acme Floor Scraping Outfit** does the work? Read these letters—they are simple expressions from contractors who have accepted my free trial offer. They aren't old and shopworn letters either. Look at their dates.

Carrollton, Ill., March 18, 1911.

Jos. Miotke.
Dear Sir:—Enclosed find draft in payment for the floor scraping outfit you sent me on trial. I tried the machines and found that they do the work perfectly. I am well pleased with them and if I see anyone looking for a floor scraping outfit I will certainly recommend yours.
Yours very respectfully,
James C. Sackett.

Williamsport, Ind., March 21, 1911.

Joseph Miotke, Milwaukee, Wis.
Dear Sir:—I set the floor scraper to work last Saturday and must say that it is satisfactory in every particular. Inclosed you will please find my check for same.
Respectfully,
B. F. Bush.

Eveleth, Minn., March 29, 1911.

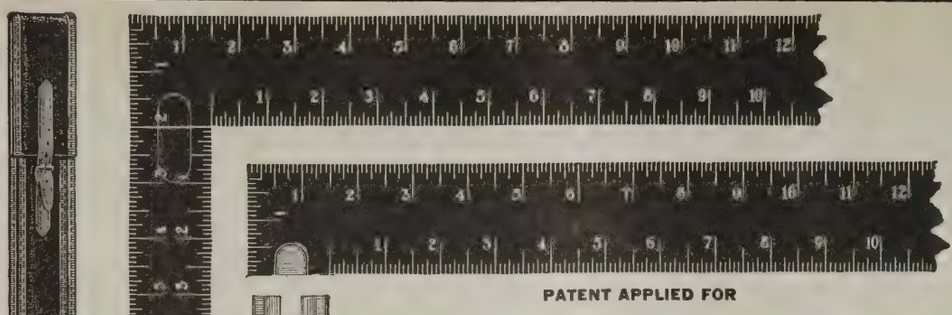
Joseph Miotke, Milwaukee, Wis.
Dear Sir:—Enclosed find check in payment for the floor scraping outfit sent me on trial March 2nd. I gave it a hard trial on both old and new floors and concluded that it was just the outfit that I need for my work.
Respectfully,
Chas. H. Rutty.

Don't you think it advisable for you to give my outfit a trial? It don't cost you anything to try and if the machines are not satisfactory, just send them back after you have used them for one week and I will pay the charges.

Let me send you full details of this offer. It means money to you, so write today.

JOSEPH MIOTKE, 249 Lake Street, MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



PATENT APPLIED FOR

NICHOLLS
NEW TAKE-DOWN
SQUARE

Guaranteed Accurate and Will Remain So

The main feature of our new Take-Down Square is that it will always stay true; it is so constructed that the tongue is held down into beveled bearings by a spring, and these bearings are made so as to take up the constant wear which comes in taking square apart and putting it together, thereby producing constant accuracy.

SOME OF ITS GOOD POINTS:

1. Convenient to carry.
2. Each time Square is taken apart and put together the wear produces a firmer joint, thereby insuring constant accuracy.
3. No screws used; locks automatically.
4. The only Take-Down Square which leaves no part of the Tongue attached to body, when separated,
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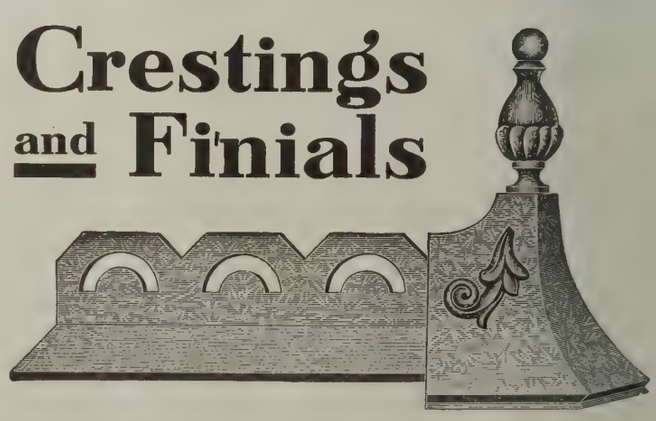
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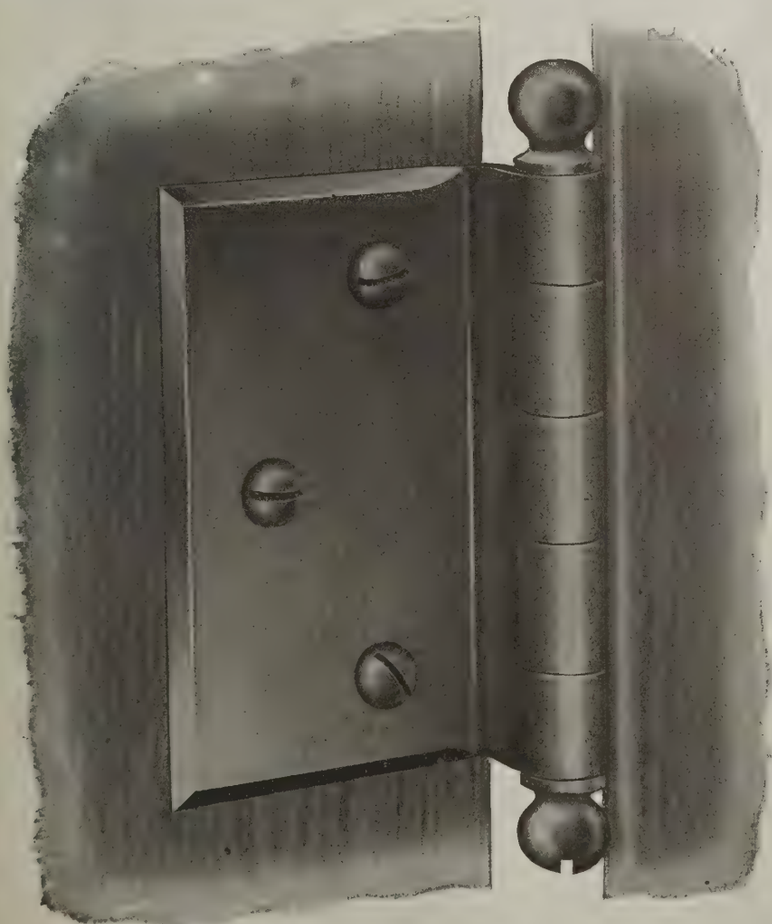
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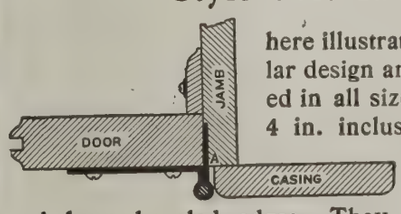
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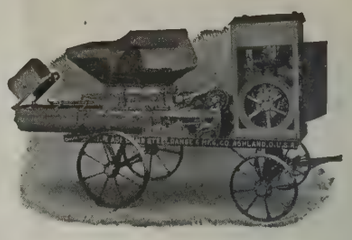


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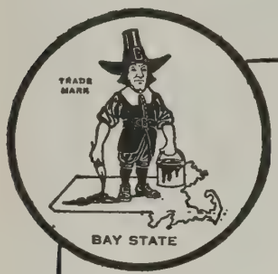
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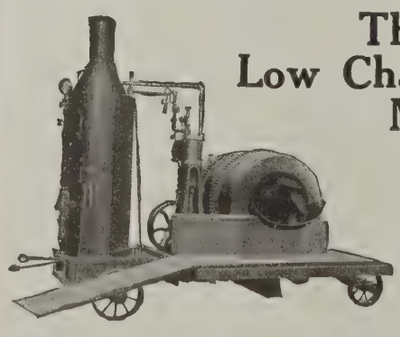
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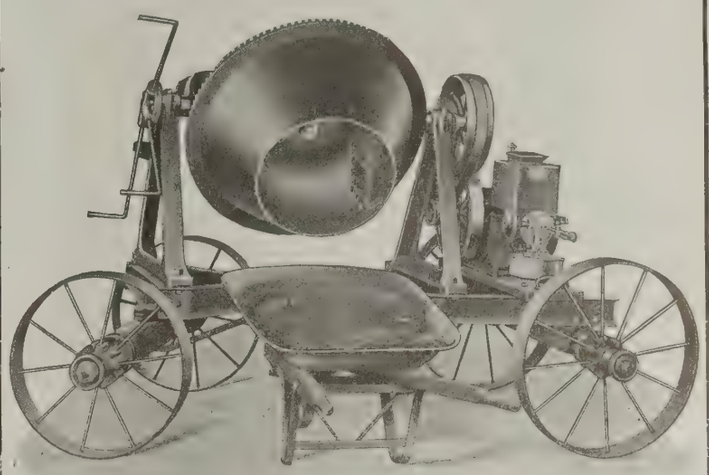
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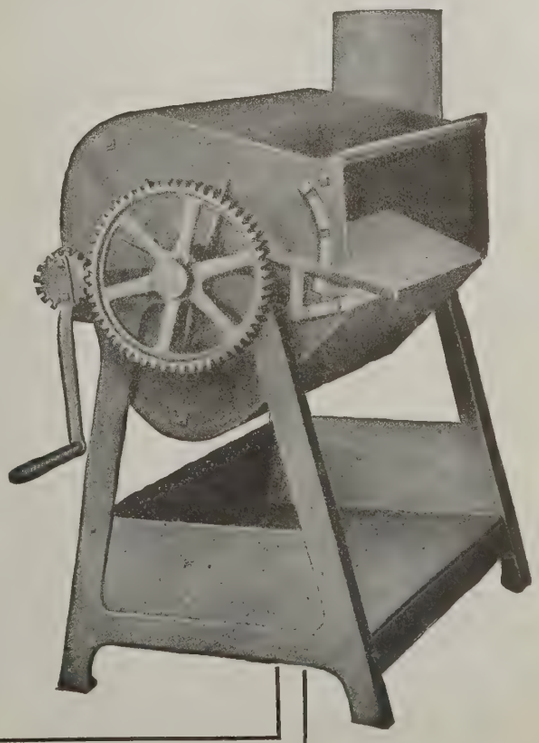
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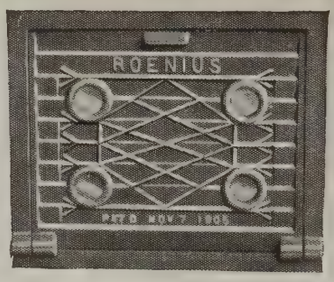
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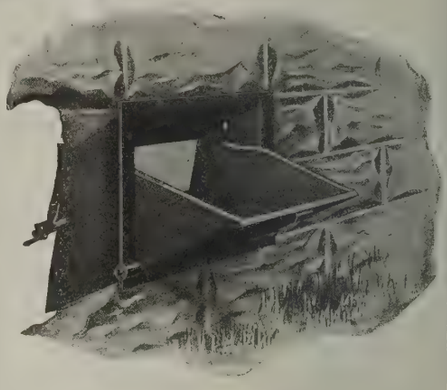


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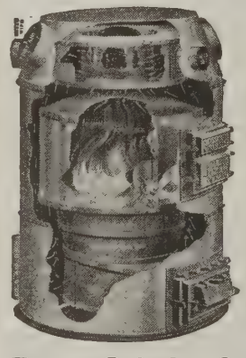
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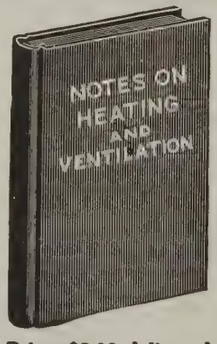
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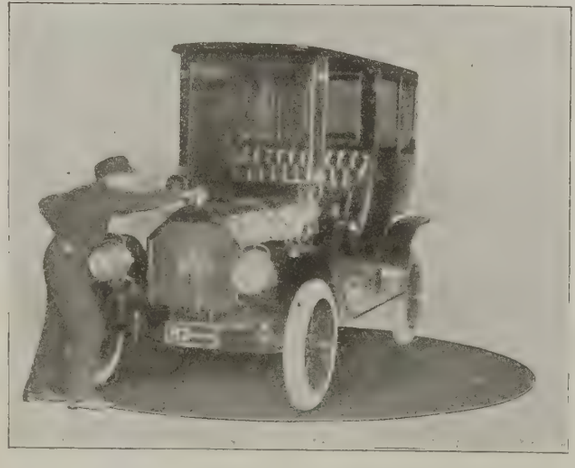
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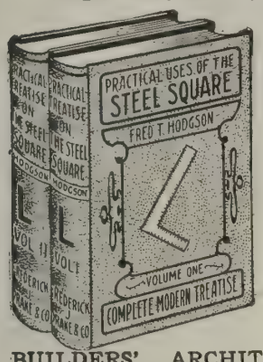
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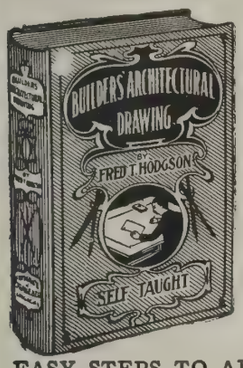
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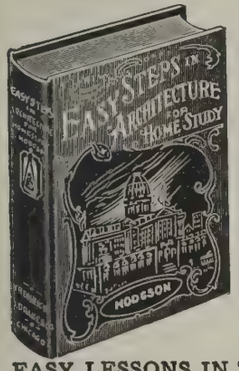
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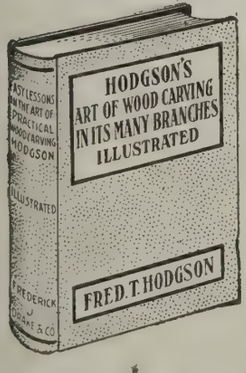
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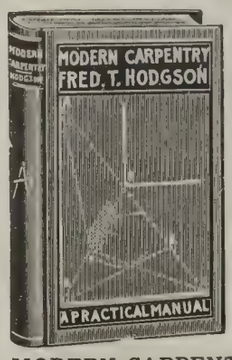
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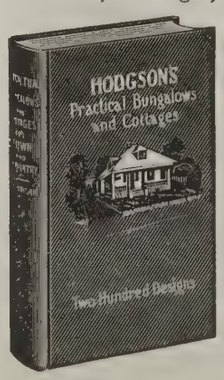
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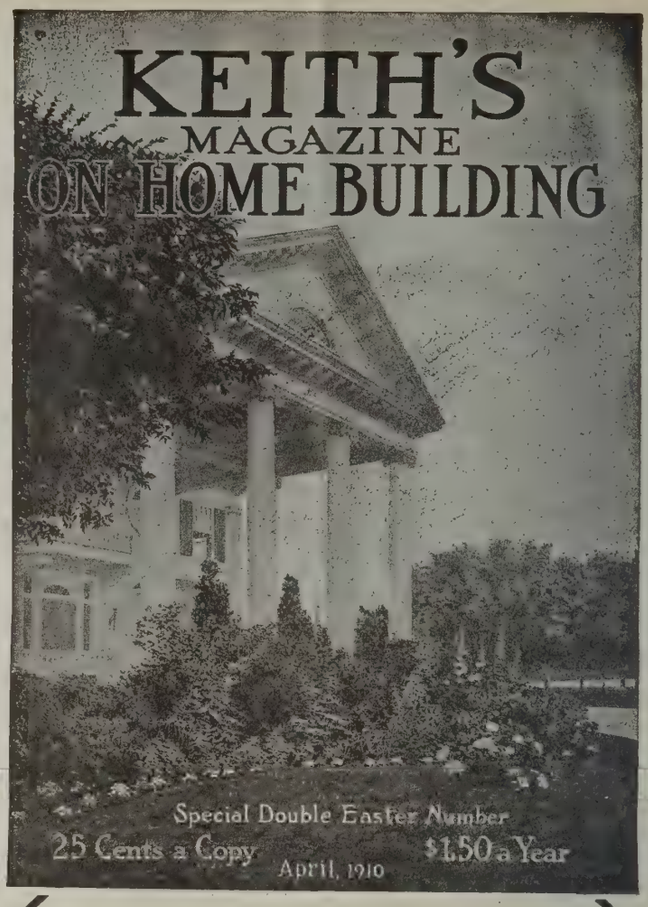
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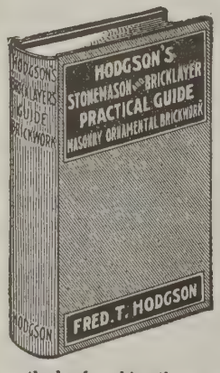
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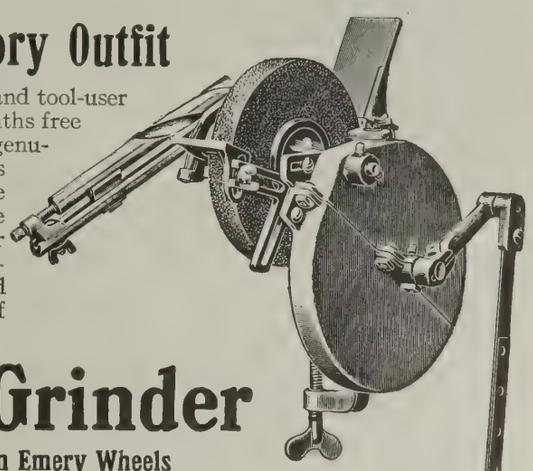
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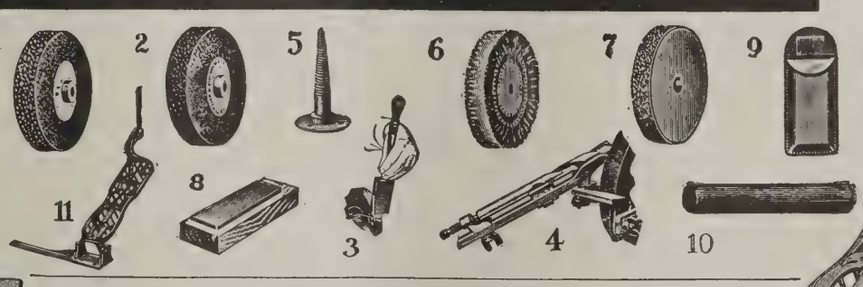
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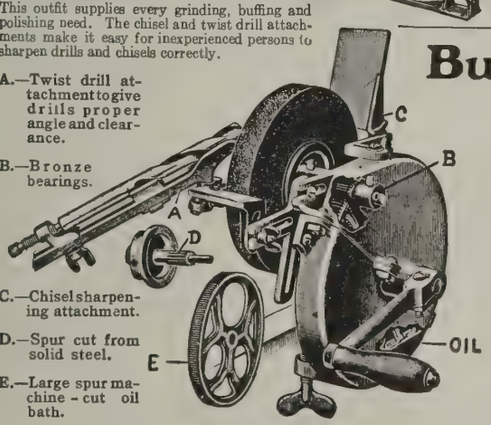
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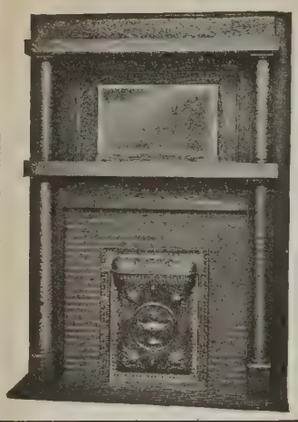
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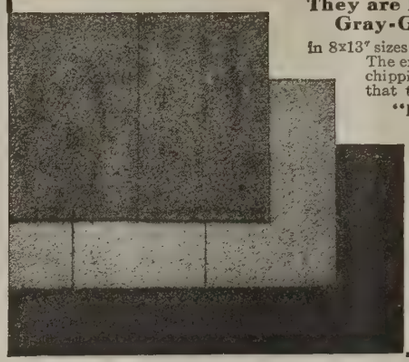


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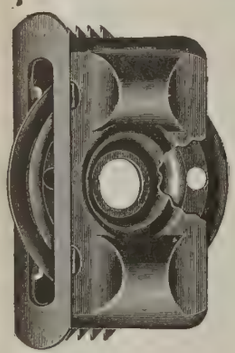
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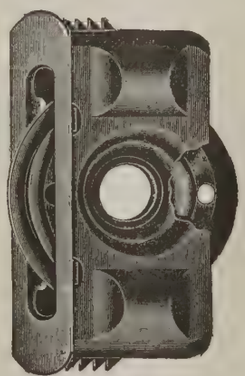


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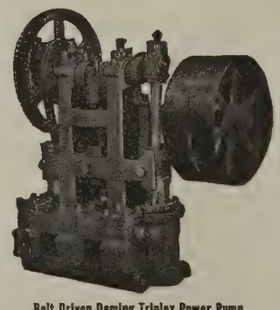
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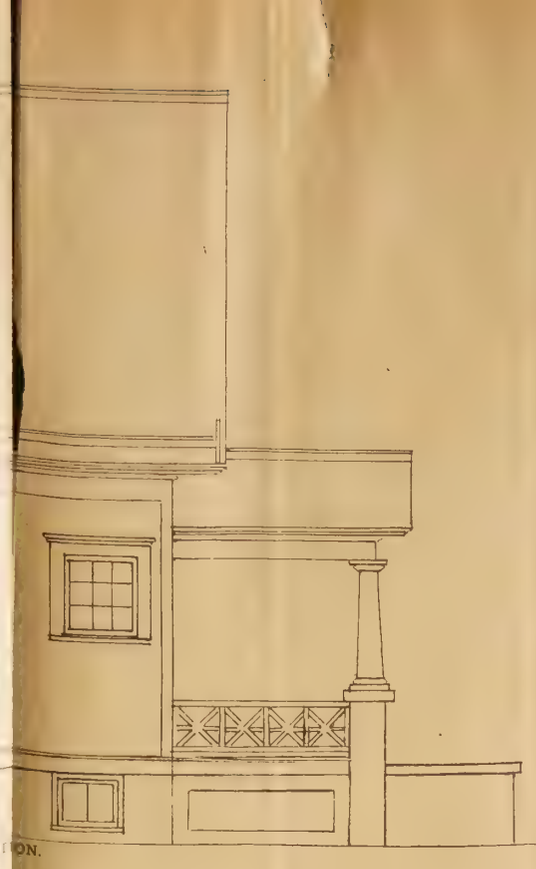
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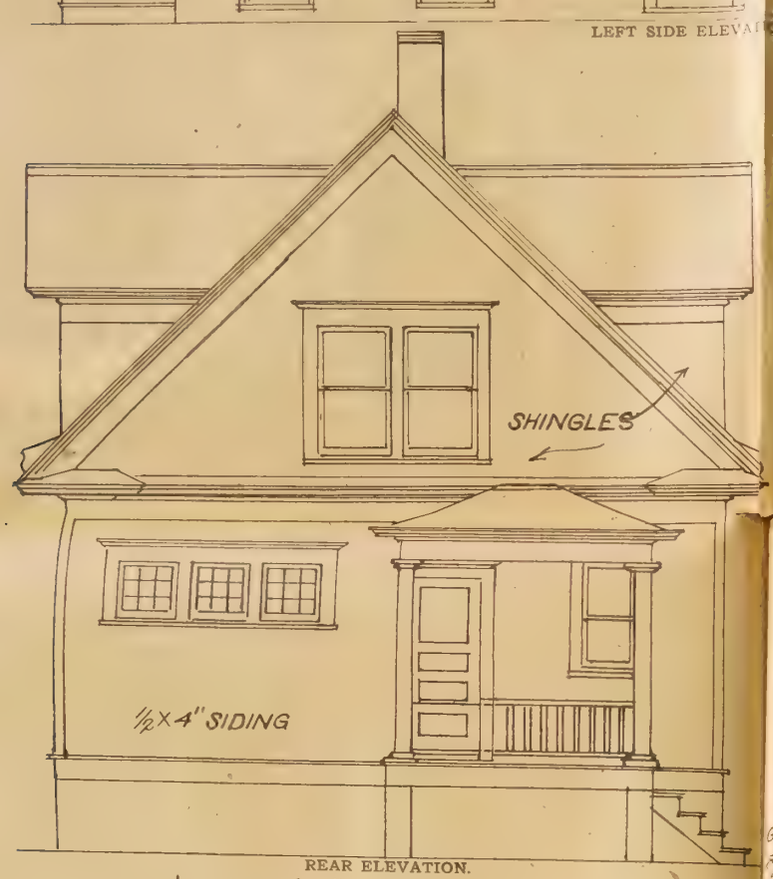
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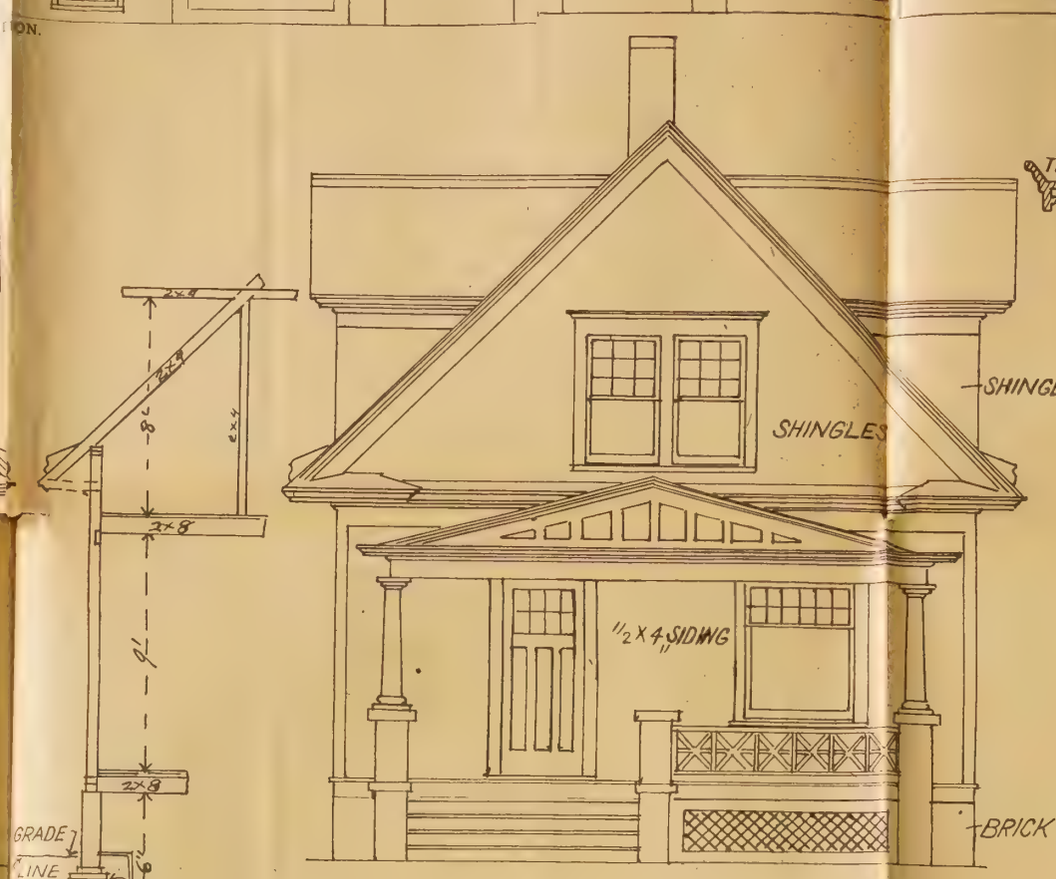




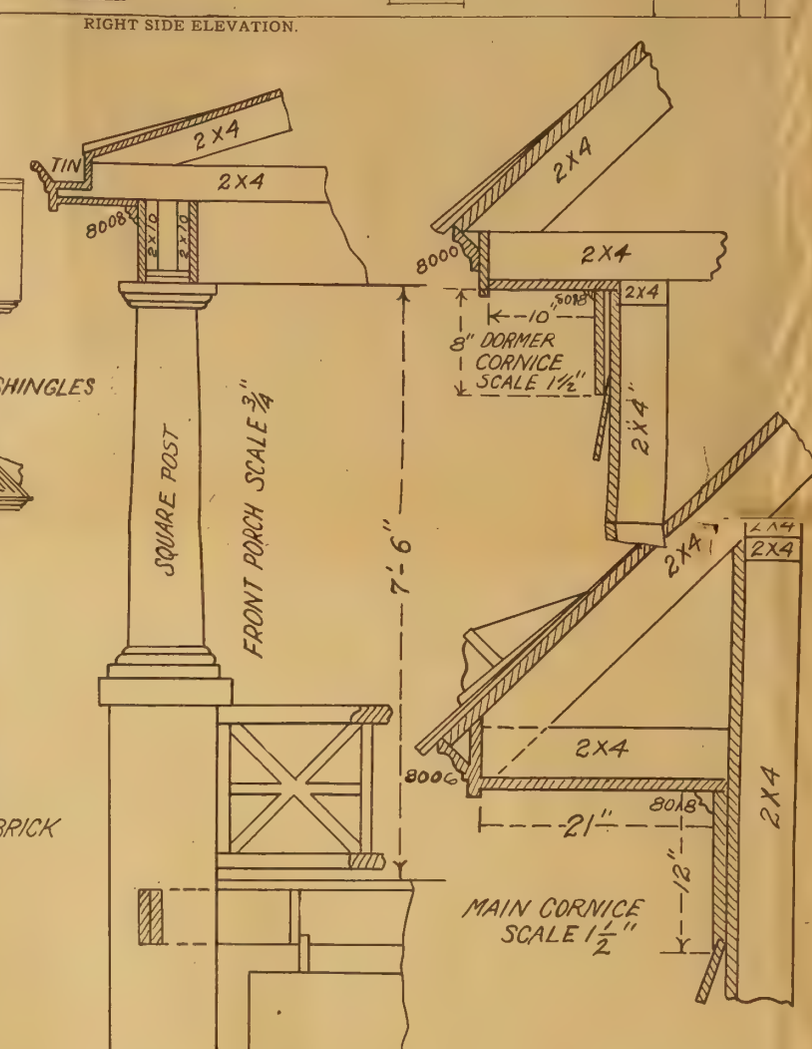
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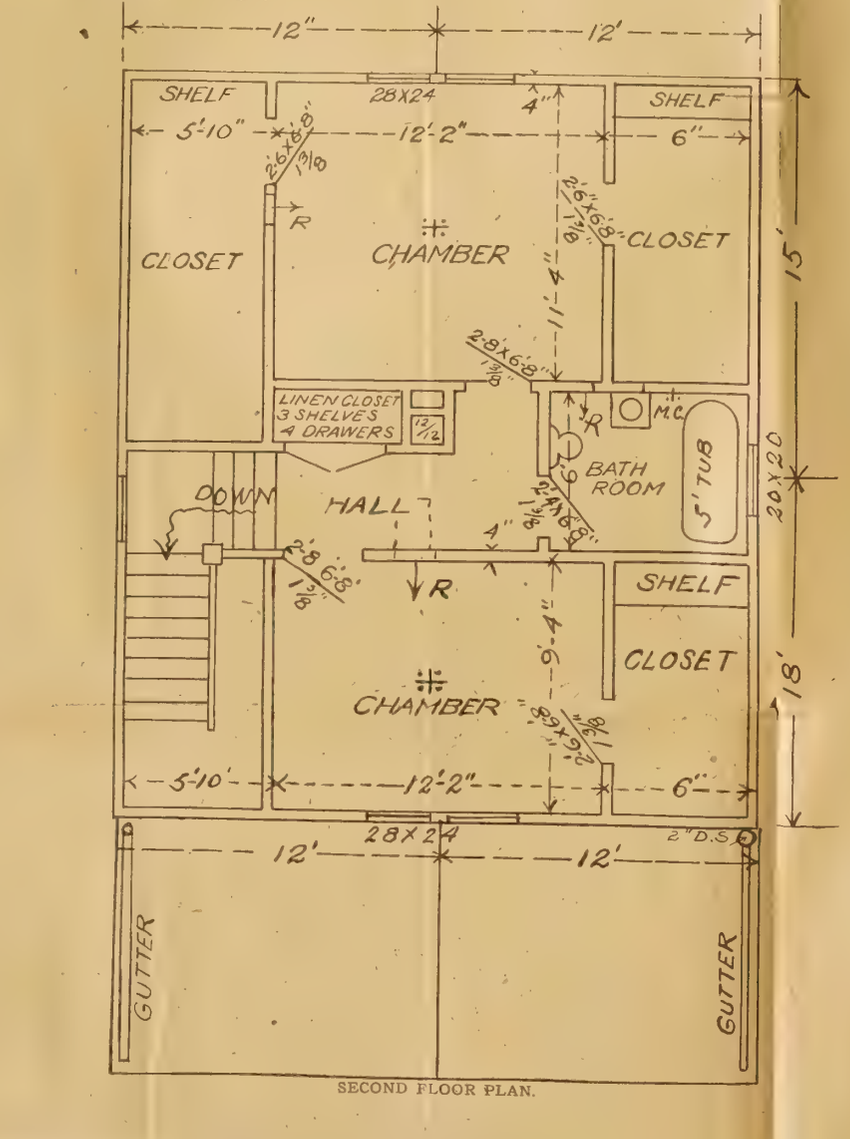
REAR ELEVATION.



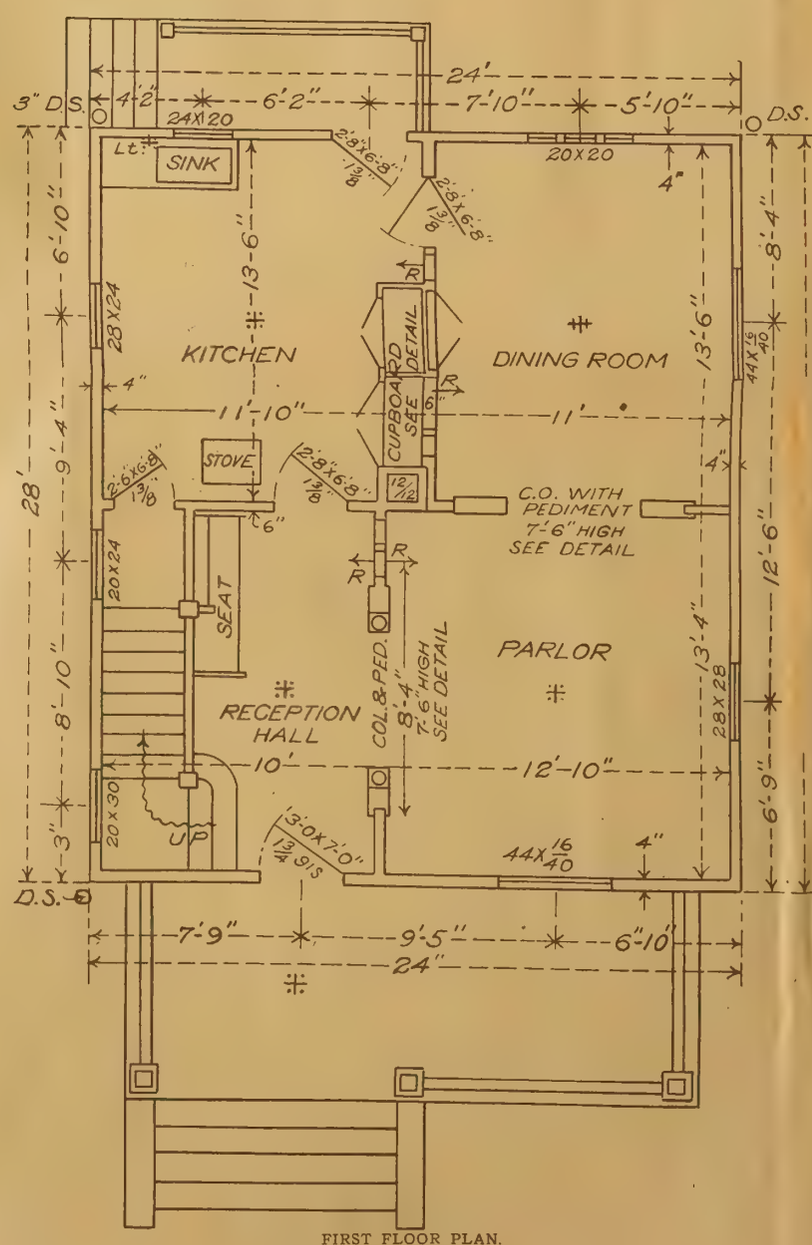
FRONT ELEVATION.



FOUNDATION PLAN



SECOND FLOOR PLAN.



FIRST FLOOR PLAN.



SUPPLEMENT TO

THE NATIONAL BUILDER

MAY, 1911

NATIONAL BUILDER DESIGN No. 341, THE MAYFLOWER FRAME HOUSE

SCALE FOR FLOOR PLANS AND ELEVATIONS, 1 INCH EQUALS 4 FEET. SCALE FOR DETAILS, 3-4 INCH EQUALS 1 FOOT.

FOR ESTIMATE, SEE PAGE 29

THE NATIONAL BUILDER

Vol. 52 CHICAGO, MAY, 1911 No. 5



THE MAYFLOWER FRAME HOUSE, built at Omaha, Nebraska

NATIONAL BUILDER DESIGN No. 341

I. P. Hicks, Architect, Omaha

For Floor Plans, Elevations and Details, See Supplement of this Number. Estimated Cost $1,988.75

THE MAYFLOWER FRAME HOUSE

Our supplement sheet for May shows a $2,000 house of five rooms, reception hall and bath. This house was recently built at Omaha, Nebraska, from the plans of I. P. Hicks, architect. The actual cost as detailed in the adjoining estimate was slightly under the $2,000 mark. In some sections of the country this cost would be changed by local conditions, material and labor, but it should be possible to calculate the changes from the detailed estimate.

A great many inquiries are made regarding cubic foot cost. In this case we have a building 24 ft. wide, 28 ft. long and about 28 ft. from the basement floor to a point two-thirds up on the roof, making 18,816 cu. ft. At the price quoted, the cubic foot cost would be 10.6 cents; about right for this class of building.

Particular attention is called to the grouping of the rooms on the first floor. The parlor and kitchen are entered from the hall, and the dining room from both the parlor and kitchen. On the second floor the sloping roof allows two good bedrooms with ample closet space, which, in a house of this character, is preferable to a third-story attic. The house could be built on a narrow lot, as all the rooms have either a front or rear exposure.

ESTIMATE OF THE MAYFLOWER

By I. P. HICKS

EXCAVATING AND MASONRY.

135	yards excavating, 35c	$ 47.25
6	in. brick laid in wall, $13	78.00
	Cement stone caps, porch piers, etc	6.75
30	lineal feet 8x12 flue chimney, $1	30.00
	Total excavating and masonry	$162.00

LUMBER BILL.

		Feet.
1	6x8x18 ft. girder	72
1	6x8x10 ft. girder	40
1	6x6x14 ft. post	42
4	6x6x14 ft. sills	168
4	6x6x12 ft. sills	144
46	2x8x12 ft. first floor joists	730
23	2x8x24 ft. second floor joists	736
34	2x4x12 ft. collar beams	272
56	2x4x12 ft. outside studding	448
42	2x4x18 ft. rafters	504

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24 2x4x10 ft. dormers	264
12 2x4x14 ft. gable studding	96
16 2x4x16 ft. gable studding	176
20 2x4x18 ft. gable studding	240
36 2x4x18 ft. first story partitions	432
60 2x4x16 ft. second story partitions	660
54 2x4x16 ft. plates	594
7 2x6x22 ft. porch joists	154
5 2x6x16 ft. porch joists, girder, etc	80
12 2x4x12 ft. porch ceilings	96
16 2x4x18 ft. porch rafters	168
16 2x2x18 ft. furring	72
24 1x6x12 ft. braces, No. 1 com	144
14 1x4x12 ft. bridging No. 1 com	56
12 2x4x14 ft. coal bin	108
Total feet framing lumber	6,496
6,496 ft. framing lumber, $27	$175.39
2,700 ft. 8-inch No. 2 Y. P. shiplap, rough floors and outside walls, $27	72.90
1,600 ft. No. 1 Y. P. flg., $40	64.00
1,800 ft. 4-inch siding, $32	48.60
1,350 ft. 1x6 Y. P. sheathing, $26	35.10
13,750 clear shingles, red cedar, $4.50	51.37
5 rolls red rosin paper, 75c	3.75
300 lieal ft. 1x6x12 to 16 ft. fir finish, $45	6.75
180 lineal ft. 1x8x12 to 16 ft. clear fir finish, $45	5.40
140 lineal ft. 1x12x12 to 16 ft. clear fir finish, $45	6.30
310 lineal ft. 1x4x12 to 16 ft. clear fir finish, $45	4.63
11 pieces 1⅛x4x12 ft. clear fir finish, $45	2.47
3 pieces 1⅛x4x16 ft. clear fir finish, $45	.95
2 pieces 1⅛x6x10 ft. clear fir finish, $45	.58
4 pieces 1⅛x12x14 ft. clear fir finish, $45	1.17
220 ft. 1x4x16 ft. fir flg., porch, $45	9.90
180 ft. ⅝x4x14 ft. Y. P. ceiling, porch, $32	5.76
480 ft. ⅝x4x12 to 16 ft. Y. P. ceiling, cornice, $32	15.36
120 ft. 1x12x12 ft. Y. P. finish, shelves, etc., $45	5.40
Total lumber bill	$515.78

MILL WORK.

5 cellar window frames, 12x16, 2 light, $1.75	$ 8.75
5 cellar sash, 12x16, 2 light, $1	5.00
1 door, 2 ft. 6 in. x 6 ft. 6 in., 1⅜, 4 panel	2.00
1 O. S. door frame, 3x7, rab. 1¾ in	2.50
2 O. S. door frame, 2 ft. 8 in. x 6 ft. 8 in., rab. 1¾ in., $2.25	4.50
1 window frame, 44x40x16, 2 light	3.00
1 twin frame, 28x28, 2 light	4.50
1 twin frame, 20x24, 2 light	4.50
1 window frame, 28x28, 2 light	2.25
1 window frame, 20x24, 2 light	2.25
2 window frames, 20x20, 2 light, $2	4.00
1 sash frame, 20x30, 2 light	1.80
1 twin frame, 20x24, 2 light	4.50
1 triple frame, 20x24, 2 light	6.75
1 window, 44x40x16, 2 light	7.00
3 windows, 28x28, 2 light, $2.25	6.75
8 windows, 20x24, 2 light, $2.00	16.00
2 windows, 20x20, 2 light, $1.80	3.60
1 sash, 20x30, 1 light	1.60
1 front door, 3 ft. x 7 ft. x 1¾ in	18.00
2 O. S. doors, 2 ft. 8 in. x 6 ft. 8 in. x 1¾ in., $5	10.00
1 door, 2 ft. 6 in. x 6 ft. 8 in., 5 panel	2.50
4 doors, 2 ft. 8 in. x 6 ft. 8 in., 5 panel, $2.60	10.40
4 doors, 2 ft. 4 in. x 6 ft. 8 in., 5 panel, $2.60	10.40
1 door, 1 ft. 6 in. x 6 ft. 8 in., 5 panel	2.50
1 set jambs, 2 ft. 6 in. x 6 ft. 8 in	.70
4 sets jambs, 2 ft. 8 in. x 6 ft. 8 in., 70c	2.80
4 sets jambs, 2 ft. 4 in. x 6 ft. 8 in	2.80
1 set jambs, 1 ft. 6 in. x 6 ft. 8 in	.70
1 set jambs, 4 ft. x 7 ft. 6 in	.90
1 cased opening col. and pedestals	35.00
68 casings, 6 ft	9.16
20 casings, 5 ft	2.00
180 lineal ft. head casing	3.60
180 lineal ft. cap mold	3.60
180 lineal ft. fillet	.90
64 lineal ft. window stool	1.28
64 lineal ft. apron	1.28
210 lineal ft. window stops, 14 ft	2.10
180 lineal ft. door stops, 14 ft	2.25
50 plinth blocks, 5c	2.50
400 ft. 7½-inch Y. P. base, 3c	12.00
400 ft. floor mold, ½c	2.00
250 ft. picture mold, 1½c	3.75
1 flight stairs	64.00
2 porch columns	6.00
1 piece bottom porch rail, 9 ft	.54
2 pieces bottom porch rail, 7 ft	.84
2 pieces top porch rail, 7 ft	.84
1 piece top porch rail, 9 ft	.54
124 lineal ft. baluster, 2c	2.48
80 ft. quarter round, ½c	.40
150 ft. ⅞-cove mold, ½c	.75
250 ft. 3¼-inch crown mold, 2c	5.00
250 ft. 2-inch bed mold, 1c	2.50
600 ft. lattice, 40c	2.40
2 corner beads	.40
Total mill work	$321.06

CARPENTER LABOR.

6,496 ft. framing lumber at $10	$ 64.96
4,050 ft. sheathing, $10	40.50
1,800 ft. siding, $15	27.00
13¾ M shingles, $2	27.50
1,600 ft. finish floor, $15 per M	24.00
220 ft. porch floor, $15	3.30
180 ft. porch ceiling, $15	2.70
240 ft. cornice, 15c	36.00
68 ft. outside base, 5c	3.40
48 ft. corner boards, 5c	2.40
Setting porch columns	1.00
56 sqr. ft. porch lattice, 8c	4.48
23 lineal ft. balustrade, 30c	6.90
Finishing 4 cellar window frames, $1.25	5.00
Setting 13 frames, 25c	3.25
Finishing 15 windows, $2	30.00
Finishing 1 front door	4.50
Finishing 1 side door	4.00
Finishing 1 rear door	3.50
Finishing 1 double acting door	4.00
Finishing 1 cased opening	2.00
Finishing 10 inside doors, $3	30.00
Finishing 1 colonnade opening	6.00
400 ft. inside base, 5c	20.00
250 ft. picture mold, 1¼c	3.12
Main stairs	26.50
Cellar stairs	8.00
Pantry work	7.00
Closets	3.00
Incidentals, 10%	40.40
Total carpenter labor	$444.41

RECAPITULATION.

Excavating and mason work	$ 162.00
Lumber bill	515.78
Mill work	321.06
Carpenter labor	444.41
Plastering, 550 yards, at 27c	148.50
Nails and hardware	45.00
Tin work	17.00
Painting	95.00
Plumbing	240.00
Total estimate	$1,988.75

TARSUS LIGHTED BY ELECTRICITY

THE ancient city of Tarsus, Asia Minor, has recently been introduced to the modern electric light. The power is taken from the Cydnus river, which has a very rapid flow. About a mile and a half from the city, an eighty horse-power turbine is used to drive a large dynamo, which furnishes sufficient power for sustaining one thousand lamps of sixteen candle-power each. Four hundred and fifty of these are used to illuminate the streets of the city, and the remainder will be furnished to private consumers.



Prayers for the killed by fire and by falling, and the destruction of death-traps are all very well; but the prevention of fires in overcrowded buildings, and efficient provision for the escape of the people cooped up in such buildings would have a better effect on the living.

* * *

The 145 young lives snuffed out by the late fire disaster in New York, following as it did, on the heels of the City of Newark holocaust, almost makes one's blood run cold, and to ask ourselves the question, "Whose turn will it be next?" It seems strange—very strange—that in a country like this, a country that boasts of its great progress in all the arts, sciences, inventions, and improvements, that such life-destroying disasters should be possible. "There is something rotten in Denmark!"

* * *

We are constrained to ask why it is that hundreds—maybe thousands—of working people are crowded into the top stories of cloud-touching structures, when, in this land of magnificent distances, there is plenty of room directly on the face of mother earth, to accommodate all the workers in the universe?

* * *

If we must "hive" the boys and girls in city buildings, why not keep them down on the ground floors, or certainly not higher than the third floor up. Large windows to raise or open as doors, could be provided in the front and rear, or in the sides, if the building permits of such an arrangement would admit of exit under fairly safe conditions. It would be better to construct modern city buildings intended to be used as workshops, so that they could truthfully be called "Life-safe" buildings, instead of fire-proof. The designation would be much more Christian-like, for "fire-proof" spells for the protection of property—dollars and cents—while "life-safe" buildings, covers something much more precious than Mammon's gifts.

* * *

THE NATIONAL BUILDER is of the opinion that so long as workers are hived in upper stories or "lofts," there will be no exemption form these dreadful disasters, and in order to lessen their virulence and frequency, each city or state should enact drastic laws, compelling employers to furnish "safe buildings" for their people to work in, and the authorities should see to it, that all laws regarding the matter of safety are strictly and determinedly enforced. The peoples' lives should not be endangered for either gain or loss in money. In many of our large cities there is much need of profiting by these terrible lessons, for it is reasonable to imagine that many workers are employed under conditions which envolve continuous exposure to danger. Few realize that to say a building is fireproof means nothing more than that the structure itself can pass through a fairly serious fire with only a moderate amount of damage. Such a building really offers little additional security for the goods it contains or the people who occupy it if no other precautions against fire are taken. Safety for the occupants must be sought through other means. This may seem so elementary a fact as to be hardly worth stating, yet the public often fail to comprehend it. No precaution in construction can obviate the necessity for fire escapes. The laws are fairly comprehensive. but the lesson of New York's experience is the need of careful and continuous enforcement.

* * *

The New York *World* says: "1. That there are hundreds of factories, office buildings, storage-warehouses, and lofts without any means of escape from fire provided.

"2. That most of the big hotels are either without any fire escapes, or with totally inadequate provision for escape.

"3. That big, new apartment houses on the upper west side, the last word in buildings of that character, are totally without fire escapes.

"4. That scores of schools, asylums, hospitals, and similar institutions are without proper protection for the inmates in cases of fire."

Of 1,463 cloak and suit factories recently investigated by a committee of the Joint Board of Sanitary Control of the Cloak and Suit Industry, which represents the manufacturers, the unions, and the public, we learn that 1,173, or 97.5 per cent, had hall doors opening inward, instead of outward as the law requires; 491 had no fire-exits except one fire escape; 60 had halls less than three feet wide; 28 had doors leading to halls and stairways locked during the day, and 14 had no fire escapes.

This is a frightful state of affairs, and is simply a forecast of another, and perhaps a worse disaster than that of Washington Place.

* * *

The architects of Chicago seem determined to declare war on the plumbers and steamfitters' unions, if these latter do not agree to submit their difficulties to arbitration. The architects say: "If the men in the trades do not alter their course and settle their difficulties at once, the architects will get the work done outside the unions. They must not expect us to lose thousands of dollars through their quarreling." It is expected trouble will grow out of this matter if the difficulties are not settled and the architects get their work done outside the unions, as violence is threatened. It is to be hoped the matter may be settled before extreme measures are taken. Doubtless there is room for complaint on both sides.

* * *

The basis of all the applications of reinforced concrete is that the two materials entering into its combination—namely, steel and concrete—shall be used to assist and strengthen each other in those properties and directions in which one or the other is deficient. And the most important of these is that concrete, which is a cheap material, shall be used to display its characteristic property of compressive strength, and steel to take the tension in which the concrete is weak. Concrete will bear a larger crushing load, but it is brittle, and will break across if loaded as a beam. However, steel is not only used to resist tension—it is often used to strengthen the concrete in compression. The two materials possess as a combination properties which are seemingly different from those of either alone. It is this result which led some persons to acclaim that reinforced concrete was a novel material, and deserving of a new name. The name "ferro-concrete" is not entirely happy, because it suggests its literal interpretation of iron-concrete, which would imply a concrete in which the aggregate was bound together by a rust-cement, such as that made with iron filings and sulphur, or that the ingredients are united by iron rust simply. The French early called it "*Béton Armé*" or "*Cement Armé.*" The latter is inappropriate for concrete, because it only refers to cement; the former title is better, and its nearest English rendering is "Reinforced Concrete," though another translation sometimes used is "Armoured Concrete," which is quite inadequate, for the concrete is not protected by a sheathing or armour as the name suggests. Then we have the American term, "Concrete-steel." This is, however, a hybrid that does not signify in any degree the nature of the combination—it might means anything to do with concrete or steel. Reinforced concrete is, of course, not quite happy, for it gives undue importance perhaps to the concrete, though that is the most striking feature of the dual material, but still it seems the best we have, so it meets with most favor.

The Third National Conference on City Planning is being held this year at Philadelphia, on the 15th, 16th and 17th of this month. Since the very successful conference at Rochester in May of 1910, the value of such a meeting is becoming more generally recognized not only among architects and engineers, but among city officials of broad view, and business organizations of progressive spirit. The conference is not a sporadic producer of academic papers. It is the forum where those who are handling large city problems exchange views. It achieves for the development of the city what an industrial congress achieves for the development of industry. Since the emphasis is laid on free discussion of city planning ideas, ample opportunity will be given throughout the sessions and at informal round table conferences to bring out these ideas. Prepared papers will serve merely to guide the discussion into specific channels and avoid waste of time in random talk.

YOUR MECHANIC'S LIEN RIGHTS

By AN ONLOOKER

A mechanic's lien is a claim which one person has upon another's property for which materials or labor, or both, have been furnished toward its construction or improvement.

We think there is no good reason that can be given which should allow you to permit your lien rights to expire.

Even though the owner is a perfectly honest man, and declines to pay what is due, it is a sufficient reason for you to protect your rights by placing in due season a lien on the property. After the right to file has passed, you will find it harder to settle and collect what is owing you, should there be a question as to charges made for extra work done.

Where you are fully satisfied of the owner's ability to pay there can be no objection to your taking his note in payment. You would probably find it possible to discount it at the bank and thus have use of the money.

If the building or property is in the name of the wife, be sure and have her sign the note as one of the makers. Should it then be necessary to bring suit on the note for non-payment, you can hold her too, and the property, if not sold in the meantime, is subject to execution.

Get a judgment note if you possibly can. If in taking the note you are waiving your lien rights, you will probably find the owner will not object to signing a judgment note. It simply means that there is power of attorney given, authorizing entry of judgment by confession in default of payment. Thus the means of collection is easier, for judgment can be more quickly had and execution filed without the necessity of first bringing suit on the note.

It would do no harm to become perfectly familiar with the laws of your state covering lien rights. There are probably many things you would not do if you knew the laws, whereas, not being familiar, you tie up money in doing some work and probably never get it back.

A contractor's business is to do the work and get paid for it. It's his duty at the time of taking the work to know where the money comes from to pay for the work to be done. The most successful contractors do not hesitate in turning down work where the money is not already up for payment of the bills. They, therefore, have little occasion to worry about the necessity of filing liens.

Just stop one minute and consider how careful a banker is to get security before loaning money. There is no reason why a contractor should not use as much care in being secured for payment on work done.

To what extent does the Mechanic's Lien Laws of your state protect you? It is part of your business as a contractor to see that you are properly protected as to payment for work you do.

Better look into this, and if your state laws give you no right to place a lien, better take it up with your State representative.

Now is the time to look for spring work. Get what you can at a fair price, but don't be anxious for jobs on which you give all the profits and then some.

A good buyer, not alone considers the price, but quality as well. Then too, the question of delivery enters in, unless you get the goods, no matter what the price may be, it is not a good purchase. Quality is really the first point to consider, then the question of delivery, and lastly the price.

We know of contractors who will take on but one house job at a time, claiming they make more money during the year, than when they have many jobs to do. The reason given is that they are always on hand to personally direct the work, thus hastening its construction and avoiding errors by being there to direct the work. No one knows better than he does what is to be done, and his instructions can be safely followed.

We have quite often heard it said that a carpenter-contractor is a consumer and as such should buy his goods at home. There is plenty of room for a discussion on this subject. What say you?

It has been noticed that the farmer as a whole prefers to buy his own materials for the buildings he puts up, getting carpenters by the day to do the work. He expects, of course, to help out on the job, for at the time he builds he has little to do.

Its a good way of saving money at the expense of the contractor.

And by the way, this same farmer will let his machinery remain out in the open, unprotected from snow, rain, and sun, continually depreciating in value.

A penny wise and a pound foolish—tell him so, you contractors.

Its a good way of spending money at the expense of the contractors, as he ought to build sheds to protect them.

MATERIALS PRACTICALLY FREE

By H.

You have read advertisements wherein you were offered something for nothing, and you got something, thought not what you expected.

You will wonder at one saying that you can build with materials that cost you practically nothing.

It's been done in the past, and is being done every year, and will continue to be done, but only by careful and saving contractors.

There is a man named Jones, who has built a dozen small cottages, and still owns them, from materials saved from new buildings erected by him, and from old buildings torn down to make place for new ones. Nothing goes to waste. His men are trained to save in every way possible. In fact, they profit by it, for their economy gives them winter work, since Jones keeps them busy during the winter building cottages from materials saved.

Of course, he can't build each cottage complete without getting some new materials, but it is a fact, nevertheless, that the actual cost of the materials for the entire building is mighty little, and most of the materials used cost absolutely nothing, for if his men did not know they must be careful, the greater part of what he now used would be waste, carried to the wood-pit and burned up.

Its been these small savings that have made Jones rich and placed him in a position where he takes on old repair jobs most contractors shun. He finds less competition on a built-over house, and makes it plain in taking the job that all materials taken out of the job belong to him.

In order to care for the materials thus saved, he has built up a good sized barn, where he assorts the materials, getting them in shape to be used later.

It will be seen that he loses no time, for every moment he has to spare while at home goes to prepare these for a new house he will soon build for himself.

There are ways and ways to become independent and rich, and here is a way open to most any contractor, who, with care, both by his men and himself, can easily put in all of his time to good advantage, and soon see a reward for his painstaking.

THE CARPENTER'S OPENING

By GEORGE E. WALSH

THERE is no nobler or more important calling today than that of the carpenter, and he who has learned his trade thoroughly can generally depend upon a good living. There will always be lean years and fat years, seasons when business is dull or when strikes interfere with regular work, but taken on the whole over a series of years his average income is pretty satisfactory.

But should a carpenter be satisfied with this? Should he content himself with his daily wage and never aspire to anything higher? Restlessness is said to be the universal characteristic of our nation, and we find in every walk of life men aspiring to something higher. This instead of being condemned as a sign of restlessness should be taken as a sign of honest progress. Every employee wants to become an employer, and the ambition is a worthy one.

Now the young carpenter who has learned his trade thoroughly naturally aspires to become a boss carpenter some day, a builder, a contractor, and a large employer of men. In this field he must meet intense competition, and he must take the consequences of any false step. If he gives up his position working for others he must manage to secure profits sufficient on his contracts to make up for this.

Not all carpenters are fitted by nature to work for themselves except on odd small jobs. Of five ambitious men of this line who started in business for themselves, bidding on contracts, four failed, and are now back at their old job on wages. The fifth man succeeded better than he expected, and is today a big building contractor employing nearly two hundred men. His income some years, he told me, reached $20,000, and other years he lost rather

than made. But he is still forging ahead, profiting by his mistakes. The difference between this man and the other four who failed is not one of skill in carpentry, but one of mental make-up. He knew how to figure on a job, and knew how to handle men.

Another instance of a carpenter who succeeded as a building contractor with no such gifts as the other. What he knew he learned by experience and hard drudgery. He realized this early in life, and was therefore cautious in his work. He mastered his trade and then took small outside jobs that he could do after work hours. He took these not by the day wages, but for a lump sum. He wanted practice in figuring and estimating.

His first outside job was for a big dog house. He figured out the size of this, the cost and amount of material, and the time it would take a man at full day wages to complete it. Then he made his bid. He received the contract and came out even. He received nothing for his time and labor. Then he went over his figures and estimates carefully. His error was apparent to him then. He had made a mistake in one particular item, and that cut out his profit.

His next bid was for a shed attached to the back of a house. He made the same careful estimates, and got the contract. This yielded him a good profit. So from one small thing to another he advanced until finally he made a bid for a house. He was way under the other bidders, and he was afraid he had made some mistake. He had purposely pared down the cost of items to make his bid reasonable. He employed two men to help him. He learned from this experience two things. One was that other carpenters will not rush through work on a wage basis as fast as the man building it. He made just $300 profit on this house, but when he calculated up his time spent on it he found he was not getting much more than half the wages of mechanics. The other point emphasized by this work was that he had based his figures on such a close margin that if there had been any slight delay or interruption in the work he would have lost. He had provided no margin for unforseen accidents and emergencies.

Now it takes a long time to figure and estimaet correctly on a big job. Experience is a great teacher, but sometimes she can be helped out by study and second-hand information; but not always. This man grown confident by his last experience made a bid for a house costing upward of ten thousand dollars. As in the first instance he got the contract because his figures were the lowest of all bidders. This time he thought he would make money and get a good start. But a number of things interfered. The price of lumber took a sudden upward jump before he could get his orders in; there was a strike in town, and he had difficulty in getting competent workmen; an accident occurred when the framework was erected, and a heavy wind storm following close on its heels swept the whole thing down. When finished the man was a thousand dollars in debt, and put out of business. There was no way to pay back the thousand dollars except to work once more at day wages and save up the money.

But there was one thing he was proud of. The house he had built and lost on was a fine piece of work. It was well designed, well put together, and every square foot of lumber in it was first-class. It was a job that a man could point to with pride. Even in the face of failure the man had not skimped it any. Everything had been finished off completely. It was a monument to his undeserved failure.

He went back to his old job, and worked a year at it, saving up as much as he could, and paying a little at a time on the debt. Then one day, after doing an odd job for a wealthy man, he fell into conversation with him about buildings. The man was considering the construction of a fine house for himself. He was anxious to get all the disinterested advice he could. A carpenter working on odd jobs would not attempt to deceive him. By degrees he learned the man's story, and then went over and had a look at the house he had built. He consulted the owner and found that it was indeed a first-class piece of work.

The sequel of the story may sound like fiction, but it was one of those true stories which we occasionally find in real life which helps to prove that facts are often stranger than fiction. The wealthy man on strength of the recommendation that house gave hired the carpenter to build his $25,000 house. They figured on it closely together. The cost of everything was put down in black and white. The agreement was for the carpenter, who had been a contractor, to build the mansion, and receive as his pay ten per cent of the cost. It was a success. The man had a house that he was proud of, and the erstwhile failure was put securely on his feet. He paid off the balance of his debt, and had enough ahead to begin business with.

He had two houses that he could point to with pride as examples of his kind of work. Then he began bidding for work on the cost-plus-a-percentage basis. This was a new idea in that town. Many objected to it because it was new, and others took to it at once. In the end it was a very popular method of building houses. Having learned by previous mistakes and errors, the builder steered clear of pitfalls that await the hasty and careless estimator, and his bids were all of sufficient size to permit of good work and provide against delays and unforeseen accidents. His success was assured almost from the start, but it was well deserved and the result of previous failures.

Many a good carpenter today is kept from advancing because of a fear that he might lose rather than make if a big contract is taken. There are plenty of instances of where too much conservatism keeps good men from becoming good contractors and builders, and by the same token there are too many who have not sufficient conservatism to hold them back from risky speculation. The so-called speculative builder is often less a builder than a speculator. His art consists chiefly in assembling houses at the least possible cost so that they will pass superficial inspection. He is not a carpenter, not even a builder in the strict sense of the word, but simply an "assembler." He employs men of different trades to do the work for him. Sometimes he draws up his own plans, but more often he adapts them from the plans of others. Builders of this class hurt the trade; hurt the honest carpenter who tries to do his work thoroughly, and in the end casts general suspicion upon the whole contracting business.

The best builder is the man who has learned his trade thoroughly at the carpenter's bench, progressing gradually and steadily up to the positions of foreman, assistant contractor and builder, and finally to that of being his own boss and responsible man of affairs. Each step teaches him some lesson that will come in some day to help him out of difficulties. The man without such experience is apt to be a poor builder unless he can associate with him a capable carpenter who has come up through the different grades. His workmanship is bound to show in the quality of the buildings he erects, and these after all are the chief recommendations and certificate of character that tell in the long run.

BIRD'S-EYE MAPLE

THIS beautiful wood is found both in Europe and America, but it is with the American that the present article deals, as being best known in England. Mottled maple is also a native of the latter Continent, and is principally used for picture frames. The grain of the bird's-eye maple varies as the saw divides the eyes transversely or longitudinally, and pieces cut out in circular sweeps, such as chair backs, sometimes exhibit both the bird's-eye and the mottle at different parts. The occurrence of eyes, zones, spots and small curls in the wood gives rise to figures of great beauty. Of the wood so marked, bird's-eye maple, amboyna wood, the roots or butt of the common yew, and the common maple, are, perhaps, the most beautiful. The knobby tubercles that form in the root and trunk of the common elm from the repeated stripping off of the side branches, as is the general practice, afford, occasionally, very fine specimens, which are known by the name of "curled elm."

The maple was highly prized by the Romans, especially that which grew in Istria and Bœotia, and was distinguished by its curled peacock-tail veins. Pliny says it exceeded even the citrus in value, but could be obtained only in small pieces, for writing desks and similar articles. The bird's-eye maple shows, in finished work, the peculiar appearance of small dots or ridges, or of little conical projections, with a small hollow in the center, but without any resemblance to knots, the apparent cause of ornament in woods of similar character, as the burrs of the yew, and kiaboca and the Russian maple (or birch tree), and this led Mr. Holtzapffel to seek a different cause for its formation. He states that, on examination, he found the stem of the bird'seye maple of America, when stripped of its bark, presented little pits or hollows, as if made with a conical punch, others ill-defined and flattened, like the impression of a hob-nail. Suspecting these indentations to arise from internal spines or points in the bark, a piece of the latter was stripped from another block, when the surmise was verified from its appearance. The layers of wood being molded upon these spines, each of their fibers is abruptly curved at the respective places, and when cut through, they give, in the tangential slice, the appearance of projections, the same as some rose-engine patterns, and the more recent medallic engravings, in which the closer approximation of the lines at their curvatures causes these parts to be more black.

SPECIFICATIONS FOR REINFORCEMENT BARS

The American Association of American Steel Manufacturers, a technical body composed of 31 of the principal steel manufacturers, has adopted a standard specification governing the chemical and physical properties of concrete reinforcement bars. A feature of the adoption of this specification is the fact that it represents pioneer work on the part of the association, similar to the standard specifications for structural material and cement.

The present use of reinforced concrete requires an enormous tonnage of steel and the importance of having a standard and reliable quality is apparent. This specification already governs the manufacture of very large quantities of various kinds of concrete bars, and has been adopted by several municipalities and engineering firms, as well as the Isthmian Canal Commission and the U. S. Reclamation Service.

The society, through its secretary, Mr. Jesse J. Shuman, care Jones & Laughlin Steel Company, Pittsburg, Pa., will send additional copies on request.

In order that our readers may be familiar with this specification, we reprint it in full as follows:

STANDARD SPECIFICATIONS FOR CONCRETE REINFORCEMENT BARS—MANUFACTURE.

1. Steel may be made by either the open-hearth or Bessemer process. Bars shall be rolled from billets.

CHEMICAL AND PHYSICAL PROPERTIES.

2. The chemical and physical properties shall conform to the following limits:

PROPERTIES CONSIDERED	STRUCTURAL STEEL GRADE		HARD GRADE		COLD-TWISTED BARS
	PLAIN BARS	DEFORMED BARS	PLAIN BARS	DEFORMED BARS	
Phosphorus, maximum, Bessemer open-hearth	.10 .06	.10 .06	.10 .06	.10 .06	.10 .06
Ultimate tensile strength, pounds per sq. in.	55/70,000	55/70,000	80,000 min.	80,000 min.	Recorded only
Yield point, minimum, pounds per sq. in.	33,000	33,000	50,000	50,000	55,000
Elongation, per cent in 8", minimum	1,400,000 / T. S.	1,250,000 / T. S.	1,200,000 / T. S.	1,000,000 / T. S.	5%
Cold bend without fracture: Bars under ¾" in diameter or thickness	180° d.=1t.	180° d.=1t.	180° d.=3t.	180° d.=4t.	180° d.=2t.
Bars ¾" in diameter or thickness and over	180° d.=1t.	180° d.=2t.	90° d.=3t.	90° d.=4t.	180° d.=3t.
The hard grade will be used only when specified.					

CHEMICAL DETERMINATIONS.

3. In order to determine if the material conforms to the chemical limitations prescribed in paragraph 2 herein, analysis shall be made by the manufacturer from a test ingot taken at the time of the pouring of each melt or blow of steel, and a correct copy of such analysis shall be furnished to the engineer or his inspector.

YIELD POINT.

4. For the purposes of these specifications, the yield point shall be determined by careful observation of the drop of the beam of the testing machine, or by other equally accurate method.

FORM OF SPECIMENS.

5. (a) Tensile and bending test specimens may be cut from the bars as rolled, but tensile and bending test specimens of deformed bars may be planed or turned for a length of at least 9 inches if deemed necessary by the manufacturer in order to obtain uniform cross-section.

(b) Tensile and bending test specimens of cold-twisted bars shall be cut from the bars after twisting, and shall be tested in full size without further treatment, unless otherwise specified as in (c), in which case the conditions therein stipulated shall govern.

(c) If it is desired that the testing and acceptance for cold-twisted bars be made upon the hot rolled bars before being twisted, the hot rolled bars shall meet the requirements of the structural steel grade for plain bars shown in this specification.

NUMBER OF TESTS.

6. At least one tensile and one bending test shall be made from each melt of open-hearth steel rolled, and from each blow or lot of ten tons of Bessemer steel rolled. In case bars differing ⅜ inch and more in diameter or thickness are rolled from one melt or blow, a test shall be made from the thickest and thinnest material rolled. Should either of these test specimens develop flaws, or should the tensile test specimen break outside of the middle third of its gauged length, it may be discarded and another test specimen substituted therefor. In case a tensile test specimen does not meet the specifications, an additional test may be made.

(d) The bending test may be made by pressure or by light blows.

MODIFICATIONS IN ELONGATION FOR THIN AND THICK MATERIAL.

7. For bars less than 7-16 inch and more than ¾ inch nominal diameter or thickness, the following modifications shall be made in the requirements for elongation:

(e) For each increase of ⅛ inch in diameter or thickness above ¾ inch, a deduction of one shall be made from the specified percentage of elongation.

(f) For each decrease of 1-16 inch in diameter or thickness below 7-16 inch, a deduction of one shall be made from the specified percentage of elongation.

(g) The above modifications in elongation shall not apply to cold-twisted bars.

NUMBER OF TWISTS.

8. Cold-twisted bars shall be twisted cold with one complete twist in a length equal to not more than 12 times the thickness of the bar.

FINISH.

9. Material must be free from injurious seams, flaws or cracks, and have a workman-like finish.

VARIATION IN WEIGHT.

10. Bars for reinforcement are subject to rejection if the actual weight of any lot varies more than 5% over or under the theoretical weight of that lot.

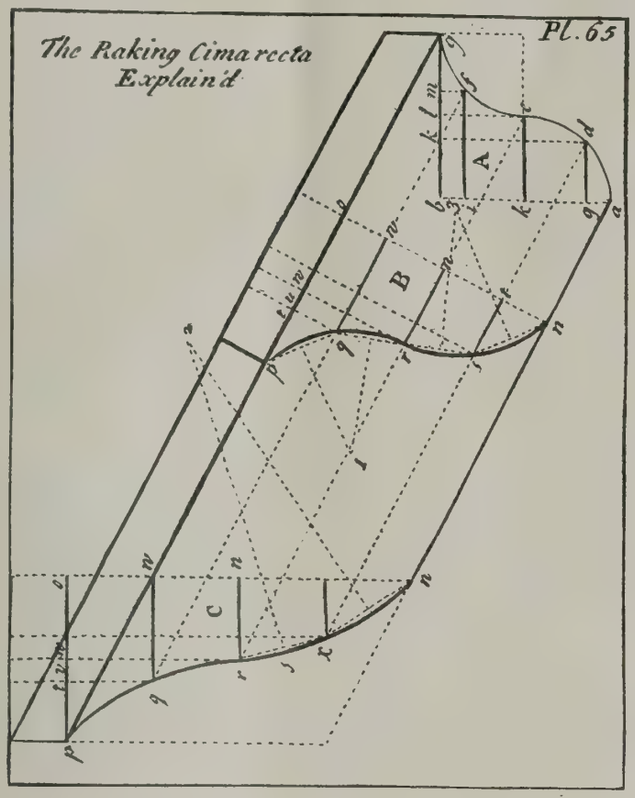
THE MODERN WHETSTONE

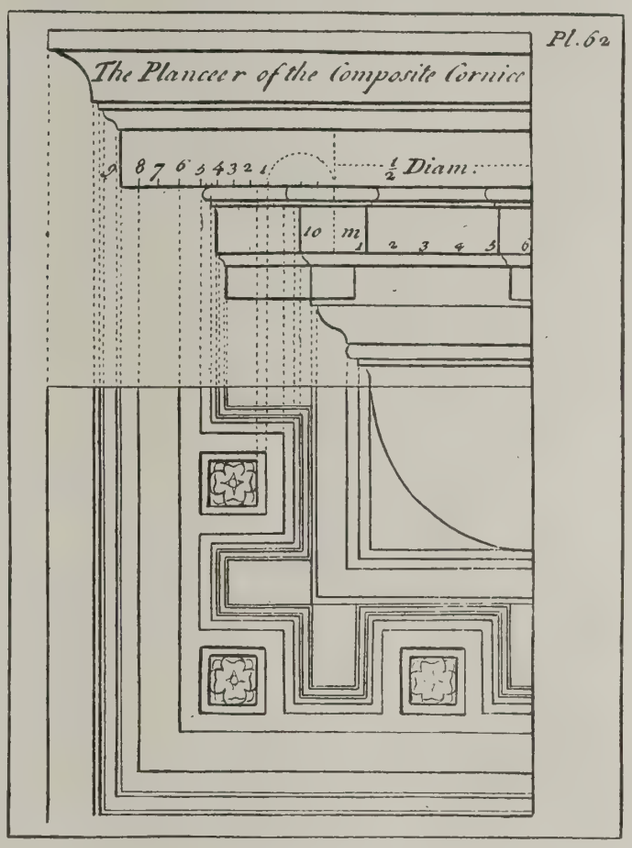
THE modern whetstone is as much an improvement on the old type as the modern automatic grinder is on the old grind stone. There may be, and probably is, many an old workman who has infinite faith in and swears by his old oil stone that has been with him forever, and the grit and whetting qualities which he knows thoroughly, yet with due respect to the good qualities of the old time oil stone, there is no man who will view the matter with a mind open to conviction but what will have to admit that the new offerings in the way of artificial abrasive material in various forms for whetstones is a long way ahead of anything we have ever had before.

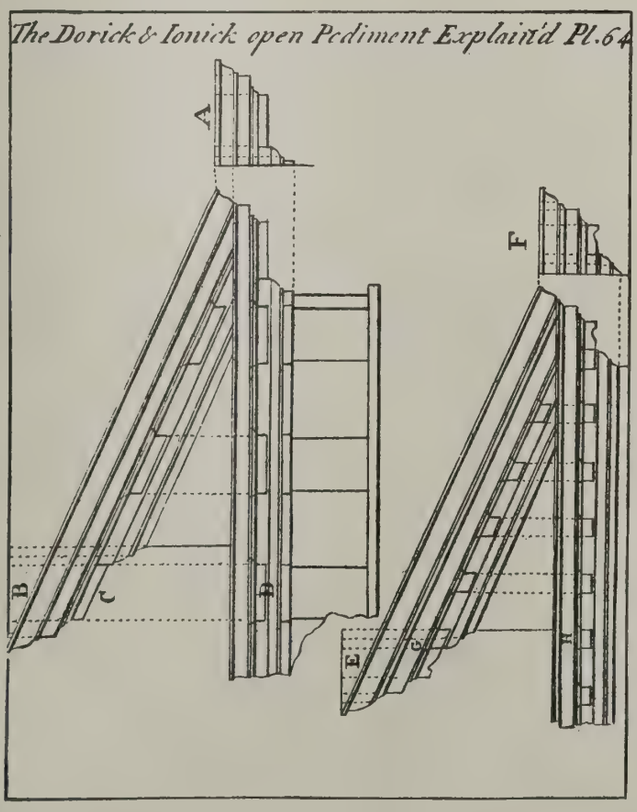
For one thing they are put up more conveniently and in any variety of shapes and sizes wanted, but that is only an incident. They are put up in varieties of fineness and the variations can be made absolute, because the abrasive material is pulverized and then separated into various forms by sieving so that all of that in a given grade is absolutely uniform. And you can buy exactly the number of grit you want and get it duplicated as often as you want it. You can buy a half dozen of different grades of grit as to fineness, or you can buy one stone with one side fine for finishing off and the other side coarse for rapid cutting, and with a stone of this kind you can often save going to the grind stone, do more whetting, and get it finished off in better shape in a little while than was ever possible with the old type of oil stone.

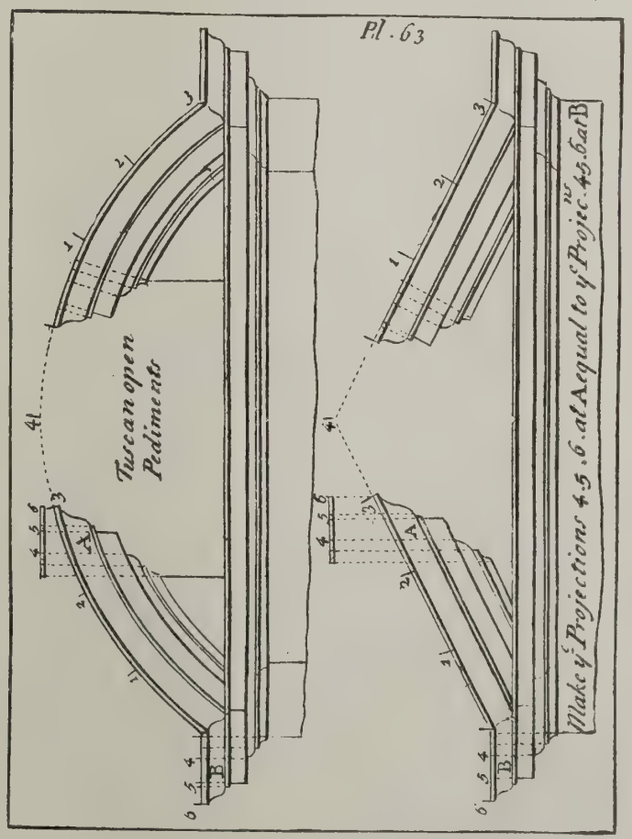
In short, the modern whetstone is designed and put up on a scientific basis, and if selected and used in the same manner is a great aid to smooth and rapid work and should be of such satisfaction to the workman that he will always keep a good equipment with him.

ARCHITECTURAL DETAILS--Reproduced from Batty Langley



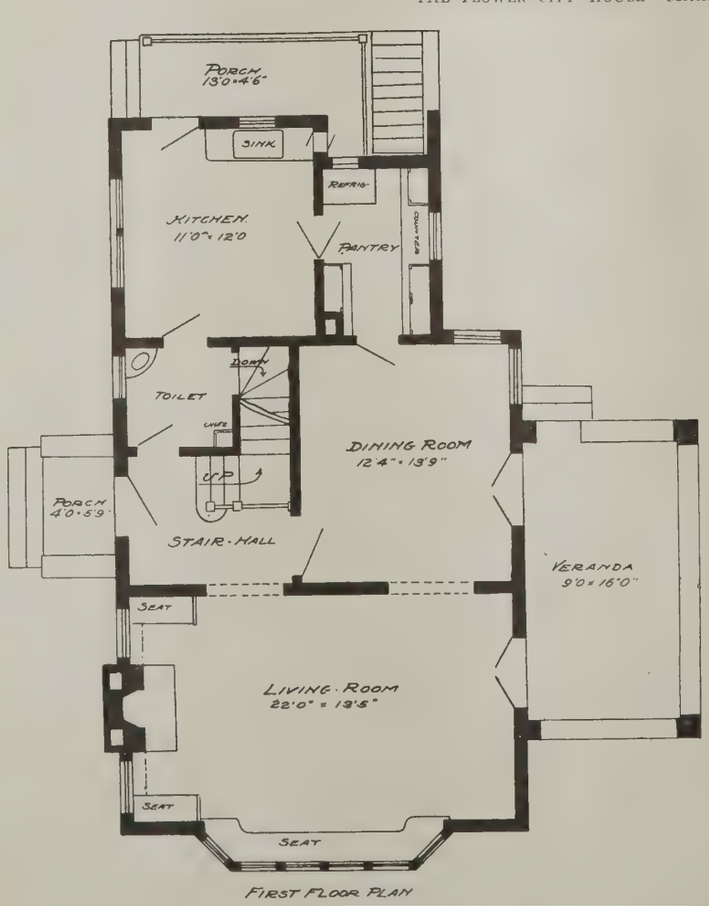




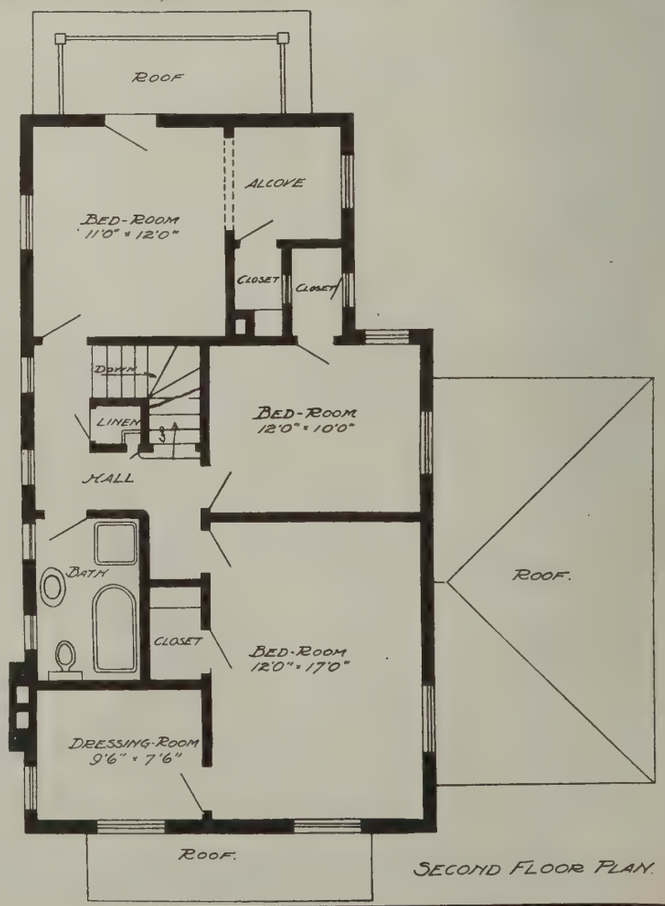




THE FLOWER CITY HOUSE—CHARLES WILLIAM ELDREDGE, ARCHITECT.



FIRST FLOOR PLAN



SECOND FLOOR PLAN.

THE FLOWER CITY HOUSE

By WM. J. DUNN

This house is built at Rochester, N. Y., and is the home of R. A. Joroleman. It is of pleasing design and has many new features in construction.

The exterior walls are of Portland cement pebble dash. The roofing is all of red asbestos shingles.

The roof over bay window, the hood over main entrance with their massive brackets, the dormers with their unique lines and small paned casement windows and the uniform color of the plaster work are among the features of the exterior.

The woodwork in the living room, dining room and hall, including stairs, is red gum finished in a beautiful shade of brown while the floors are of white oak.

In the living room the mantel is of new autumn tile, the hearth of red Welsh tile. On each side are bookcases with double doors having leaded diamond shaped glass while above each book case is a small window with stained glass and by each bookcase is a comfortable seat.

The bay window with its half dozen stained glass windows gives ample light. This window has a large comfortable seat with radiators concealed beneath. The ceiling is heavily beamed.

French windows open from both dining room and living room to a spacious porch which has a red Welsh tile floor, making it cool and inviting on warm days.

Between the stair hall and kitchen is a toilet, and from here is an entrance to basement. This toilet, kitchen and pantry are all finished in white tile. The pantry is large and has commodious cupboards, etc. The kitchen is also of good size and opens on a large porch at the rear. Here is an outside entrance to the basement. The entrance porch has red tile floor.

On the second floor are three large bedrooms. The front room has a large dressing room and closet. The woodwork in this room is of red gum, finished a rich red mahogany. The rear bedroom has a large alcove and closet and the side bedroom has a large closet.

Off the hall is a linen closet, also a clothes chute to basement. Brown tints prevail in the decoration and finish.

The bath is of white tile and has a tub, W. C., lavatory and shower fixtures of standard white porcelain ware with best sanitary plumbing.

All floors are of white oak, natural finish. The bedroom walls are tinted and decorations stenciled and worked out by hand, in oil. Brown tints prevail throughout the house.

There is room for a large room in attic that could be used either for a playroom or servant's room.

The heating is hot water system. The size of this house is 23 feet 6 inches by 41 feet 6 inches exclusive of porches. The cost was $5,800. The architect is Charles William Eldridge, Rochester, N. Y.

AN UNKNOWN TRADE

By HERBERT

Strange as the statement may seem, it is nevertheless true that one of the most important wood-working trades remains practically unknown. When the name is mentioned people look at you in blank astonishment, utterly at a loss to know just what you mean. Either they have never heard the name before, or, if they have, guess you must have in mind a trade totally different from the right one. I refer, of course, to patternmaking. Often have I met persons who, when told my vocation was patternmaking, displayed either total ignorance, or else asked me if my business was cutting paper patterns for ladies' dresses. To meet a person who does actually know is a rare treat.

How to account for this widespread ignorance is no easy task. Still it does seem as if the most satisfactory explanation lies in the fact that the results of patternmaking fail to make a direct and constant appeal to the public eye. Mention a carpenter and everyone knows in a twinkle you mean a man skilled in all sorts of architectural wood work. Wherever they go, his work stands out conspicuously before their eyes. Speak of a cabinetmaker, and a vision of chairs and tables, of bookcases and bedroom sets looms right up before their minds. Furniture is an ever-present witness to his skill. But when we turn to the poor patternmaker, what about his handiwork? Why, you may walk through the length and breadth of a large city and never discover a trace of his work, unless you accidently happen to stumble into a foundry or pattern shop. Outside of these comparatively few places, his direct handiwork remains in obscurity, a fact which accounts largely for the prevailing ignorance of his craft.

And do you know that this important trade is totally ignored in quarters where one would least expect it? When information is required on any unfamiliar subject, where do we turn to look for it? Naturally to an encyclopedia, which is supposed to contain a library of information on almost every conceivable subject. And yet are you aware that if you consult the pages of an encyclopedia, even, you will fail to find an article on patternmaking? Other branches of the wood-working industry, such as carpentry, cabinetmaking, ship-building, etc., are treated in special articles, while no mention whatever of this subject is made.

Within the past few days the writer has taken particular pains to look into two leading standard books of reference, in hopes of finding something on the subject of patternmaking. Not one syllable did he find. Isn't this strange? Rather isn't such an omission inexcusable—to think one of the most useful, skill-requiring trades should be passed over in utter silence? It is difficult to account for such silence, unless we charitably ascribe it to an unintentional oversight on the part of the editors themselves, or at least of their associates, who, as specialists, are supposed to be acquainted with the various branches of manual work. However that may be, it is sad to think that persons turning to these books for light on this subject are doomed to meet with sore disappointment.

Now, I contend that there is no valid reason for relegating the patternmaker's trade to the background after this fashion. It is deserving of far better treatment. In my estimation, it is the most important of all the wood-working trades, because of its intimate relation to the large and ever-widening iron industry, constituting, as it really does, the very foundation of all these activities.

When a draughtsman, for instance, finishes the design of a machine, giving full details of the various parts of a complicated mechanism, what is the first step taken towards the actual realization of his dream or ideal? Why, the drawings are immediately put into the patternmaker's hands, whose painstaking duty it is to make a full-sized wooden pattern of each separate piece. This done, the foundryman can then proceed with his work and furnish the necessary iron castings for the machinist to build the machine. In fact, the whole machine-building process rests largely upon the patternmaker's skill. The same statement holds good also of other lines of the iron industry, notably stove work and bridge construction. In a word, to secure metal castings, whether iron or brass, for any line of work, these must first be put into the form of wooden patterns.

It appears, then, from the foregoing discussion, that the patternmaker fills a most important gap. So essential in character is his work as to merit far wider recognition. Instead of receiving full credit due to his skill, it seems as though the machinist runs away with the lion's share of the glory. When inspecting a finished piece of machinery, whose intricate parts perfectly fit into each other, all moving harmoniously to perform some specific work, the onlooker is apt to recognize only the man whose skill has brought together these various parts, little dreaming of the poor molder, and especially the obscure patternmaker, whose brain-racking task played, after all, the most important part in the drama.

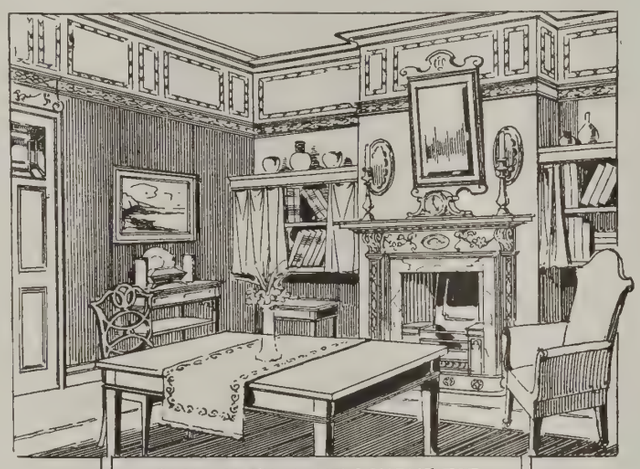
When will we poor fellows, who daily puzzle our heads over blue prints and bewildering numbers, in order to convert lines and figures into tangible, workable forms, be suitably recognized and our work receive its due meed of praise? We have been ignored so long that some of us are really hankering after a little recognition. When shall we receive our rightful heritage?—The Woodworker.

A CHIPPENDALE DINING ROOM

FROM THE CABINET MAKER—ENGLISH

THE TREATMENT OF A COMMON-PLACE INTERIOR.

In using the expression "a common-place" room, we mean to convey the idea of an apartment which has no distinctive features which lend it any interest apart from the furniture and decoration. In such an interior as this the furnisher and decorator is necessarily handicapped. If he has a deep angle or an imposing bay he has the main points of a successful scheme ready to hand, but in the majority of cases in which our readers are called in to give advice the room proves to be an essentially common-place one, and, as often as not, takes a form such as that shown on the small

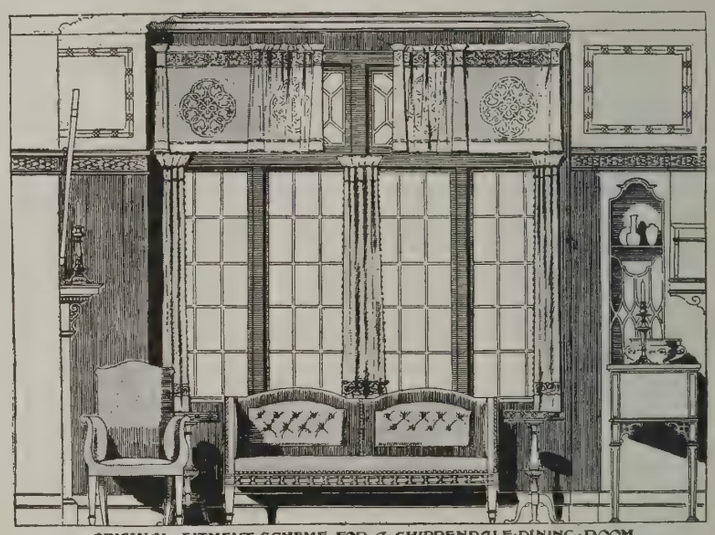


ORIGINAL FITMENT SCHEME FOR A CHIPPENDALE DINING ROOM

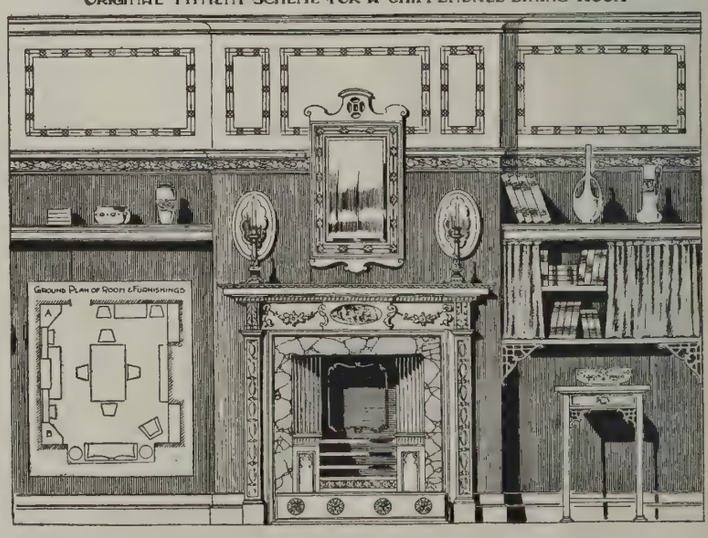


plan at the bottom left-hand corner of Figure 3, a regular rectangular space, with the exception of a chimneybreast, which projects some few inches into the room, and a shallow bay window. There are, of course, thousands of persons who are thoroughly satisfied with this arrangement, and who ask for nothing better, but there are also artistic clients who require a distinctive scheme or fitments which shall give individuality to their daily surroundings. Fitments as ordinarily constructed are very expensive for the man of moderate means, but an attempt has been made in the accompanying sketches to design a fitted room on the simplest possible lines. In order that the dimensions of the bay window may not be further contracted, no elaborate draperies have been used, but simple casement curtains are employed, treated with embroidery in harmony with the general color scheme.

Having thus dealt with the only feature of the room which lends itself to decorative treatment, we must decide as to the handling of the other three walls. The one opposite the bay window does not adapt itself to any fitment scheme, because it is on that side that the room is entered. The designer, therefore, devotes himself to the fire-place side of the room, and that opposite it. At the outset let us draw attention to the number of horizontal lines introduced; this principle of horizontality is one which should never be forgotten, as it adds greatly to the homely appearance of the interior. As a concession to science and hygiene, we have made our rooms higher, and it remains for the artist to contrive a scheme which shall prevent the box-like impression, such as is given by a room of undue height. The proper height at which to fix the intermediate cornice, enriched with the applied fret, is determined by the transom between the upper and lower lights of the window, and if this rule is followed the curtains, and frieze form a continuous band round the upper part of the walls of the room. It is surprising, considering how floor space is contracted in flats and small houses, that furniture designed to stand in corners is not more used, as the amount of room gained in this way is enormous. In many instances the corner of a room is occupied by a jardiniere or some useless ornament, whereas a needful piece of furniture might be placed in it, the customary over-crowding so apparent in small apartments being thereby avoided. This is a course which has been adopted in the scheme under consideration, and, we think our readers will agree, with success. Roomy corner cupboards are placed at A and B. The details of capping, frieze and necking moulding are identical with those of the intermediate cornice already referred to, and the height of the corner cabinets is also governed by the line of the same feature and the mouldings intersect each other. The same remarks apply to the glazed hanging cupboard in the center of the wall, and when the latter is further connected with the corner cupboards by the horizontal lines of the shelves, we have the wall clothed with an inexpensive yet very

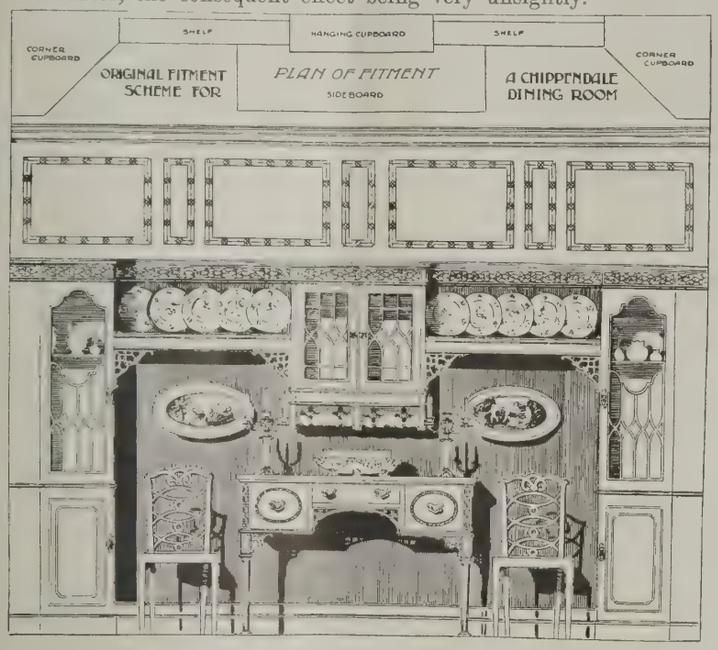


ORIGINAL FITMENT SCHEME FOR A CHIPPENDALE DINING ROOM



effective fitment. The sideboard is small, being more like the side-tables, so dear to the hearts of eighteenth century designers. It may be argued that this arrangement does not give enough accommodation, but the corner cupboards should supply all requirements in this direction; one of them might with advantage be

fitted with a cellarette. Note the triangular brackets in the Chinese taste which support the shelving; these little additions, small as they are, add very much to the character of the whole. These frets are repeated in the angles formed between the legs and drawers of the side-board. It will be seen from the plan of the fitment on this page that both the shelves and hanging cupboard only project very slightly from the wall. The shelves arranged for books in the recesses on either side of the fireplace call for no explanation here, but we might warn readers against the mistake which is often made of using stuff which is too slight for shelves of considerable width, as the weight of the books causes them to sag in the center, the consequent effect being very unsightly.



Lack of space gives little opportunity for a description of appropriate decoration, but many treatments might be suggested. The woodwork, of course, is in mahogany, and a color scheme which would look well would be a wall filling of plain green, the frieze having either a cream ground with pale green stencilled decoration or a buff ground and rather darker green enrichment. If a figured paper were employed, the frieze should be left plain and tinted cream color.

BLUNDERS IN CONSTRUCTION

By OWEN B. MAGINNIS

The continuance of accidents, collapses, and disasters seem to be a feature of building operation indespensible to their progress, and, as many are caused by error, haste or poor judgment, it is the intention of this article to draw attention to some of the hitherto unnoted causes.

In axiomatic form the following are the most to be deprecated:

Before commencing to excavate, or while excavation is in progress, neglecting to make full borings or test-holes to locate quicksand or water pockets into which workmen are liable to sink or disappear.

Fitting and hanging doors to stairway or elevator wells before the stairs or elevators have been placed, and leaving the doors unfastened or unlocked. This is criminal negligence.

Varying the heights of stair risers, causing accidents and falls, and in not providing good, safe treads for the workmen, or iron stairs or fire escapes. This is as risky as omitting to cover every second tier of floor beams, and should be deemed a violation of law.

Insufficient and loose widths of plank scaffolds and runways on uncovered floors. This is a frequent cause of accident.

Neglecting to provide guard rails and printed warning signs around hod-hoist openings, hatchways, etc.

The flagrant and criminal offense of ordering removed or causing to be too soon removed the centering, cribwork or other false-work supporting terra-cotta or concrete arches. The recent collapse in the new apartment house in East 87th street, New York City, was due to this cause. Four lives were lost by the untoward haste, and the foreman was justly held for manslaughter.

Neglecting to properly and thoroughly brace framed posts and walls, cast or wrought iron columns, freshly laid brick walls, window and door frames, etc., with proper timber joists or beams to prevent straining or injury from sudden impact, jar, wind pressure or the like. This bracing should be thorough to preserve the details plumb and level until the whole work has set.

Overloading the floors or floor-beams by accumulations of brick, steel, wood beams, mortar, terra-cotta blocks, and similar heavy materials, concentrating too much weight on any particular spot. Equal distribution over large areas should be insisted upon. This oversight has caused many casualties, both in the demolition and erection of buildings.

Inefficient shoring, needling or bracing in altering or underpinning buildings, and unskilled workmanship in connection with the same are also to be deplored.

The omission of caissons, dams, cofferdams and sheet pilings, especially in deep excavations or in unreliable compositions of soils. It is taking big chances to assume that even the hardest strata are free from pockets of quicksand, quiescent or spring water. Many accidents and fatalities have resulted from bad judgement in this regard, as in some cases they have developed suddenly.

Not draining the site. This neglect jeopardizes the future safety of a building by keeping the soil moist, rotting and injuring the mortar and materials, by frost and thaws, compelling constant and expensive pumping and hindering the use of the space for working men and materials. If possible, all cellars and sites should be drained by connecting with pipes to street sewers or cesspools.

Building on frozen ground which has been water-soaked. This blunder, unfortunately too frequently made, has been the cause of many walls and buildings falling, causing cracks, bulges and collapses.

The recent enactment of Employers' Liability Laws in various states must perforce compel builders and contractors to supervise their work with greater care and strictness than heretofore and will undoubtedly have a good effect on both mechanics and laborers, as they cannot recover damages on account of accidents caused by their own blunders or oversights. The following is an excerpt from New York State's Law, recently put in force:

Chapter 674.—Workmen's compensation in dangerous employments.

Section 1. Chapter * * * thirty-one of the Consolidated Laws is hereby amended by inserting therein a new article, to be article fourteen-a thereof, to read as follows:

Section 215. This article shall apply only to workmen engaged in manual or mechanical labor in the following employments, each of which is hereby determined to be especially dangerous, in which from the nature, conditions or means of prosecution of the work therein, extraordinary risks to the life and limb of workmen engaged therein are inherent, necessary or substantially unavoidable, and as to each of which employments it is deemed necessary to establish a new system of compensation for accidents to workmen.

1. The erection or demolition of any bridge or building in which there is, or in which the plans and specifications require, iron or steel frame-work.

2. The operation of elevators, elevating machines or derricks or hoisting apparatus used within or on the outside of any bridge or building for the conveying of materials in connection with the erection or demolition of such bridge or building.

3. Work on scaffolds of any kind elevated 20 feet or more above the ground, water, or floor beneath in the erection, construction, painting, alteration or repair of buildings, bridges or structures.

4. Construction, operation, alteration or repair of wires, cables, switchboards or apparatus charged with electric currents.

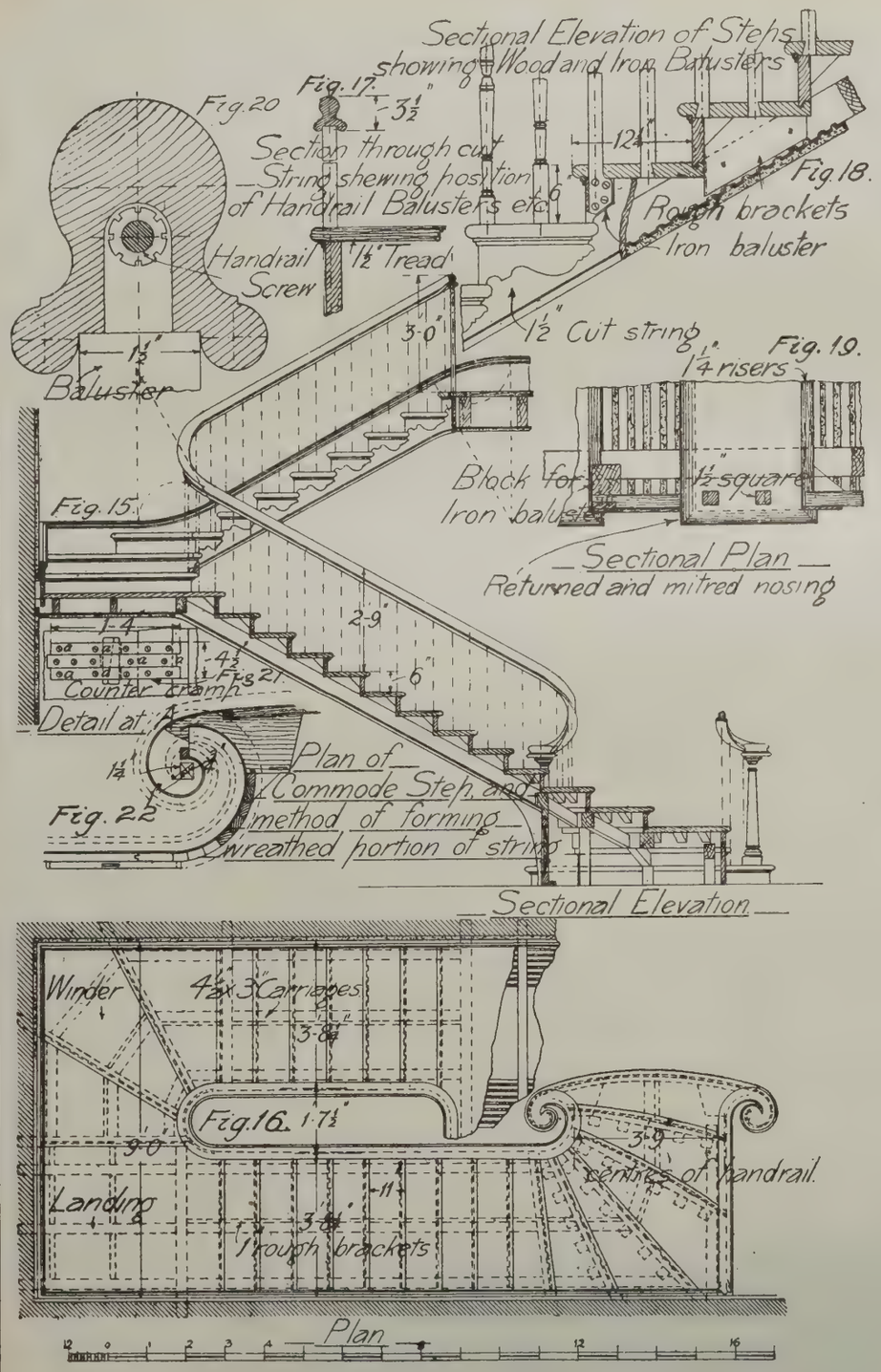
5. All work necessitating dangerous proximity to gunpowder, blasting powder, dynamite or any other explosives, where the same are used as instrumentalities of the industry.

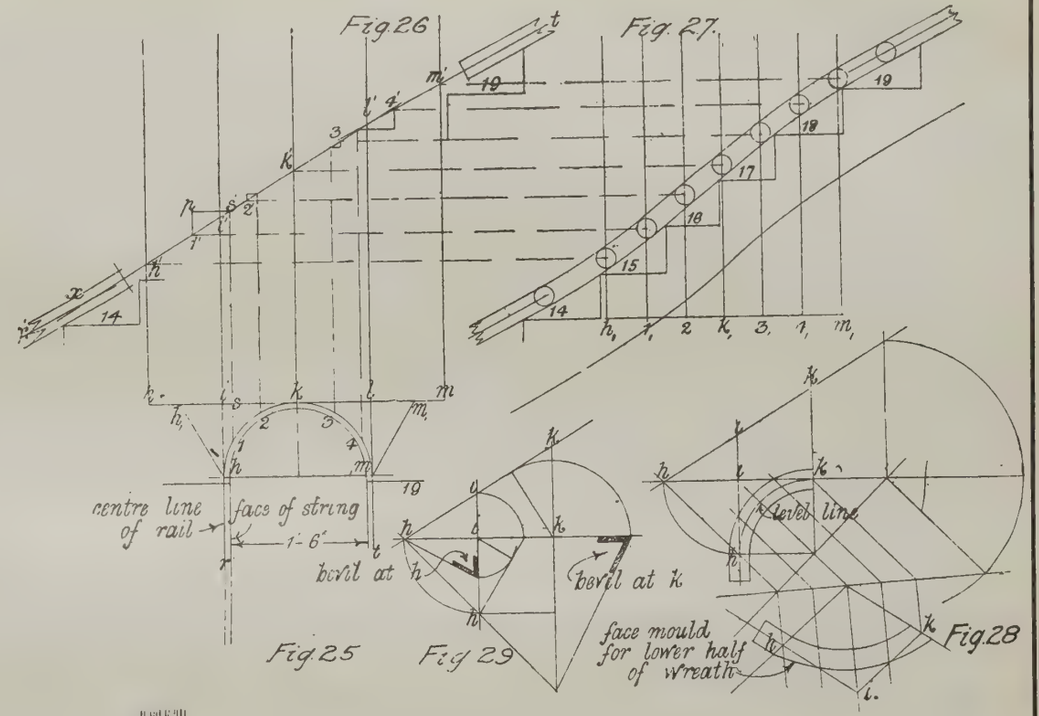
6. The operation on steam railroads of locomotives, engines, trains, motors or cars propelled by gravity or steam, electricity or other mechanical power, or the construction or repair of steam railroad tracks and roadbeds over which such locomotives, engines, trains, motors or cars are operated.

7. The construction of tunnels and subways.

8. All work carried on under compressed air.

Sec. 216. The words, "employer," "workman" and "employment," or their plurals, used in this article, shall be construed to apply to all the employments above described.


Sectional Elevation of Steps showing Wood and Iron Balusters
Fig. 17.
Fig. 20
Section through cut String shewing position of Handrail Balusters etc.
Fig. 18.
Rough brackets
Iron baluster
Handrail Screw
1½" Tread
1½" Cut string
Fig. 19.
1¼ risers
Baluster
Block for Iron baluster
1½" square
Sectional Plan
Returned and mitred nosing
Fig. 15.
Counter tramp
Fig. 21
Detail at A
Plan of Commode Steps and method of forming wreathed portion of string
Fig. 22
Sectional Elevation
Winder
Carriages
Fig. 16.
Landing
Rough brackets
centre of handrail.
Plan


Fig. 26
Fig. 27.
centre line of rail
face of string
1'-6"
bevil at h
bevil at k
Fig. 25
Fig. 29
face mould for lower half of wreath
level line
Fig. 28

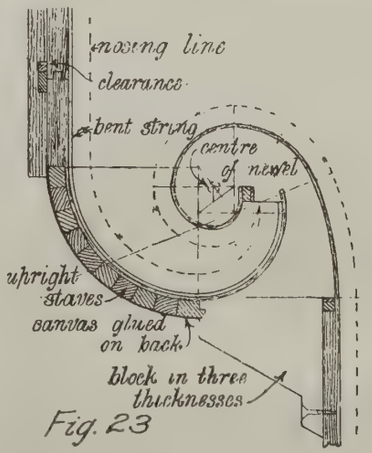
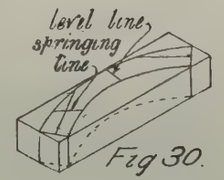
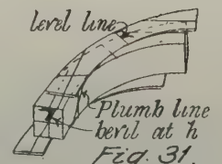
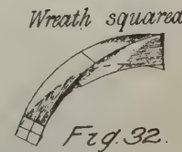

nosing line
clearance
bent string
centre of newel
upright staves
canvas glued on back
block in three thicknesses
Fig. 23


Fig. 24


level line, springing line
Fig. 30.


level line
Plumb line
bevil at h
Fig. 31.


Wreath squared
Fig. 32.

GEOMETRICAL STAIRS

By F. T. HODGSON

Figure 161 shows a plan of a type of geometrical stairs with curtail steps, wreaths about wells, quarter-space landing and winders.

Figures 15 to 32 give all the necessary drawings for such a staircase.

The string wreaths are constructed by making a center upon which the portion of string to form the wreath, which has already set out and sunk, is bent and temporarily fixed, face to the center, to which upright staves with radiating joints are fitted and rubbed with glue, and on the unseen internal face of which canvas is glued to increase the rigidity and tenacity.

This when set is released from the center and is cut to the set out marks and tongued to the grooved string as shown in Figure 23. The straight as well as the curved portions of the string are then secured together by pieces of stuff arranged on the gib and cotter principle.

Figure 21 shows such a joint; the screws lettered are those which are fixed after the wedges have been driven home.

Figure 23 gives the plan showing all the necessary lines to set out a curtail step; the block is made in three thicknesses, glued together with the grain at an angle of about 45° to each adjoining piece, to prevent any tendency to split.

The contour of the curtail follows the outline of the scroll, both being set out from the same centers, which in this case are obtained by first drawing a right angled triangle, the perpendicular sides being one inch and 1¼ inches, the other points being obtained by drawing similar triangles, as shown in Figure 23.

Figures 17 to 19 give the plan and elevation, showing the junction of risers, treads, string and straight balusters of the outer cut string. The lower ends of the iron balusters are sometimes forged and screwed to the string, which has a block to strengthen it and receive the screws at that part. The thin ornamental bracket is planted on the string mitred with the riser and covering the baluster end.

HANDRAILING.

The contour of the handrails in dog-legged stairs follows the line of the string, being ramped, mitred, and fixed to newel caps by double-nutted screws, as shown in Figure 7, or tenoned to newels, as shown in Figure 5.

The handrails for open newel stairs are usually straight, and are tenoned and dowelled to newels, the heads of the latter usually being turned. Where handrails are used on the wall side they may be ramped, as shown in Figure 8.

A ramp with a vertical scroll is shown in Figure 24. In geometrical stairs the handrails should be constructed to present a graceful appearance, which effect is best obtained at a minimum cost by setting out the handrails and stairs on the tangent system.

NECESSARY DRAWINGS.

The following drawings are necessary for the production of a rail on the tangent system:

(1) The plan with center line of handrail and tangents, as shown in Figure 25.

(2) The development of the tangents, as shown in Figure 26.

(3) The development of the vertical plane containing center line of handrail, and the face of the string. These are usually in one and the same vertical plan, as shown in Figure 27.

(4) The face mould, as shown in Figure 28.

(5) The bevels, as shown in Figure 29.

TANGENT SYSTEM.

A suggested plan of the stairs is made showing center lines as *hkm,* Figure 25. Tangents, such as *hi, ikl, lm,* are then drawn in plan. The elevations of these tangents are to be determined, and may be arranged in a number of ways; and there will be one set of tangents better than any other, which will satisfy the following conditions:

(1st) The best position of the tangents when developed is that showing them as being tangential to the development of the center line *hkl,* Figure 25 and will occur when the goings on the straight and about the well are equal.

(2d) The next best position is obtained when the upper tangents, as *t′ m,′* Figure 26 are not interrupted, but produced until the second quarter of the plan of the tangents is reached, as at *l′* Figure 26, and the lower tangent *r′ h,′* Figure 26 (the upper and lower tangents being the center lines of the upper and lower straight handrails), is stopped at *x,* a point about 12 inches from the springing line measured on the pitch, and the intermediate tangent is shown in elevation by a line drawn from this point to the point *l′* of the upper tangent.

To obtain the appearance of the rail it is best to develop and determine the plane section of the rail made by an imaginary vertical plane containing the center line of the handrail; and by doing this any defect or cripple in the curve is more readily detected.

Figure 27 shows the development of the vertical lines, *h, h, i, i,* etc., containing the points *rhi2k34mt,* the stretch out of *hm* being without any great error *hm,* obtained by drawing lines 120° to the line joining springing points *hm* till it cut a line tangent with the center point *k* of the curve, the adjoining part outside of the wreath being the same as the corresponding lines in the development of tangents shown in figure 26; and the points in the development of the curve being determined by drawing ordinates as *s—I* in figure 25 and from the elevation of *s′* draw *s—p* equal to *s—I* is a line on the plane containing *hik,* and parallel to *ih,* therefore, s being known, *I′* is determined as shown in figure 26, and in a like manner any convenient number of heights of points can be obtained, and by projecting these heights on corresponding developed vertical lines of the center plane of handrail, the exact developed positions of points in the center line of the handrail may be obtained. Circles are then struck about these points, as shown in figure 27, which are points in the center of the rail. A continuous curved line is then drawn tangent to the small circles, which if pleasing in form should be approved.

The curve of the rail determines the position of the nosing, which should then be drawn, and from which the lines for the setting out of the string is obtained.

Figure 28 shows the method of setting out the face mould for the lower half of wreath, which is the true shape of a section made by a plane containing the center line of half of the wreath and tangents.

The line marked level line is that part at which the rail may be imagined to commence twisting in the opposite direction.

Figure 29 shows the method of obtaining the bevels at *h,* which is the dihedral angle between the oblique plan containing the tangents *hi, ik,* and a vertical plane containing the lower tangent *hi.* The bevel at *k,* is the dihedral angle between the oblique plane containing both tangents and a vertical plan containing the upper tangent *ik.*

Figures 25 to 29 show the application of the principles to the half-turn landing of the geometrical stairs shown in figures 15 to 22.

The method of setting out rail on the dressed plank is shown in figure 30; and of sliding the duplicated moulds to get the twist is shown in figure 31; and the view of the finished portion of wreath is shown in figure 32.

Fast European Express Trains.—Express speeds in Great Britain and on the Continent are high. In Great Britain there are eleven daily express trains making runs of from 50 to 118⅜ miles without a stop, whose average speed is from 51 to 59.2 miles per hour. The fastest and longest non-stop run is 225¾ miles, from Paddington to Plymouth, made at 54.8 miles per hour. France has seven daily expresses that run from 77¾ to 147½ miles without stop at speeds of from 51.1 to 61.8 miles per hour, and there are nine French trains that run from 102 to 147¾ miles without stop at speeds of from 50.4 to 59.3 miles an hour.

Strength of Wood After Long Service.—Evidence that structural timber, if properly protected, does not deteriorate in ordinary service is afforded by some white pine beams, which formed the chords for a timber bridge during eighteen years of service, the bridge being covered during fourteen of these years. Tests of the timber showed an average elastic limit of 3,966 pounds, and a modulus of rupture of 5,208 pounds per square inch. According to W. K. Hatt, of Purdue University, who records these facts in Engineering News, white pine beams of large size are credited with an average modulus of rupture of 5,000 pounds per square inch.

PLANNING A PRIVATE GARAGE*

By HERBERT L. TOWLE

The Problems Involved in the Design and Construction of One's Own Housing for His Car. Suggested Arrangements, Plans and Exterior Treatment Based on What Has Been Done.

Unless one has already owned and operated a motor car, the planning of the first garage is likely to present a number of problems previously unsuspected. How large should the garage be to house comfortably the car and the necessary equipment? What items should the equipment include? What is the practical value of a pit? Is a turn-table worth its cost? Should the garage be heated, and, if so, by what system? Are any special considerations necessary in arrangement of windows? How should the floor be drained? What materials of construction are most suitable, and under what conditions is a portable garage economical?

Before proceeding to answer these and similar questions, let us consider the question of location. One of the elemental things to remember about a garage is that a car must be run in front foremost, and backed out, unless a turn-table or skids are provided for turning it around. The driveway outside is usually wider than the door, and the consequences of bad steering are not so great where the former is concerned.

If the garage is built on a small plot; it is usually best to locate it near the road, with a straight driveway. This latter will need no explanation to one who has tried to follow a serpentine driveway backward on a moonless night, with only the glimmer from the tail lamp to guide him. A driveway is usually an unsightly thing, but an automobile driveway may have its bareness alleviated by eschewing the usual cinders or crushed stones, and laying two cement wheel tracks, about 2½ feet wide, between which grass or flowers may be planted. Of course the tracks must be straight, as otherwise one could not follow them backward, but even then they are less unsightly than a ten-foot S-shaped cinder drive, such as a mistaken idea of beauty sometimes perpetrates in what are, otherwise, harmonious surroundings.

If the garage is some distance from the road, it is advisable to provide means for turning the car around, and on a large place this can be done without noticeable disfigurement. The simplest arrangement is a Y, for a one-car garage, or a gravel court in front of the garage where three or more cars are housed.

Coming now to the requirements of the garage itself, we find that these are determined in large measure by the conditions under which the car is to be used. If the owner lives in a fairly large town, it is not likely that he will wish to do important overhauling on his own premises. Minor work, however, such as tinkering with ignition and carbureter, replacing brake shoes, and miscellaneous work on attachments and fittings, are usually handled with greater convenience and economy on one's own premises. If, on the other hand, the location is a country seat, and if the car is in constant service, it may be advisable to equip for handling all but the most strenuous jobs, without having to send the car to a distant shop.

If a car is to be used regularly in freezing weather, the garage must be heated, and the means for doing this must have careful consideration, because of the danger of fire, if ordinary open stoves are used.

The equipment may range from a bench, soldering outfit and a few scattering bench tools, up to complete facilities for making new parts, and for repainting. In a large garage, housing several cars, one may find not only pit and turn-table, but forge, lathe, shaper, drill press, chain hoist and trolley for taking the motor and transmission, an arbor press and wheel puller for replacing gears, and a separate dustless room for repainting bodies. The heater will probably be found in the basement, reached by outside stairs; and overhead, reached by a staircase not communicating with either storage room or shop, will be found the chauffeur's quarters. In a small garage the cars must, perforce, be washed where they stand, or outside, if the weather permits; but in the large garage an incoming car may be washed on a turn-table directly inside the door, and sent thence to its proper stall, or to the shop in the rear for looking over.

Before deciding, therefore, on the size and arrangement of the garage, one must settle on the usage which the car is to receive, and the proportion of repair work which is to be done at home. The writer classes among legitimate home repairs all minor tire work, all except the most difficult soldering jobs, and in general everything that can be handled with bench tools and a drill. The making of special parts, however, usually requires a lathe or other machine tools, and the amateur does not know how to use these. Such tools, therefore, should be provided only when an experienced chauffeur is to be employed. An emery wheel, however, driven by foot power or by a small electric motor, is essential and a bench drill press run by hand power is almost equally so. Other useful equipment comprises an anvil, vise, assorted drills, taps and dies, a heavy hammer, hack saw, portable vulcanizer, breast drill frame, assorted files, kerosene torch and soldering outfit. For working under the car a low trundle is useful, although seat cushions will serve. An oil tank, underground fuel tank and pump, hose connection for washing, and lockers for tools and clothing are among the things most commonly needed. If repainting is to be done at home, the two-car garage must have a separate body storage room, to avoid dust settling on the newly painted surfaces. In the one-car garage, however, this is not essential, though side space for staging the body is convenient, both in repainting and in overhauling transmission and rear axle. If floor space is lacking, the body may be drawn back a trifle and propped up above the chassis, thus needing but little additional room.

(To Be Continued.)

*Reprinted, by permission from "Motor," April, 1911.



GARAGE AT "OVERVIEW," VILLA NOVA, PA., BAILEY & BASSETT, ARCHITECTS.



















The owners of the garages shown are: 1—Mr. John Phillip, Glenridge, N. J. 2—Mr. Neal Raubone, Beverly Farms, Mass. 3—Mrs. M. C. Post, Englewood, N. J. Don Barber, Architect. 4—Mr. James McCrea, Ardmore, Pa. Bailey & Basset, Architects. 5—Helen C. Chase, Waterbury, Conn. E. F. Benedict, architect. 6—H. P. Benson, Salem, Mass. 7—Mr. William Blodgett, Chestnut Hill, Mass. 8—Mrs. Irene D. Overy, Oak Lane, Pa. C. E. Schermerhorn, architect. 9—Mr. E. Hamlin, Marion, Mass.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

(Continued from April.)

PLATE X.

LINE SHADING.

In finely finished drawings for exhibition work, catalogues, advertisements, etc., it is often desirable to make the various parts stand out more clearly on the paper. This is especially true of curved surfaces. The effect is obtained by drawing a series of parallel or converging lines on the surface at varying distances from each other. These lines are farther apart on the lighter portion of the surface, and closer together and heavier on the darker part.

Figure A shows a cylinder shaded in this manner, Figure B a hollow cylinder and Figure C a cone. To avoid a large blot at the apex of the cone, each line should be allowed to dry before drawing in another.

Figure D gives us the sphere and it will be noticed that nearly all of the lines on the shaded side are put in the same as shade lines.

Figure E represents the conventional shading of a round, flat surface.

Figure F is given as an example of the use of line shading and it offers excellent practice in the joining of straight lines with curved lines. The curves should be drawn first.

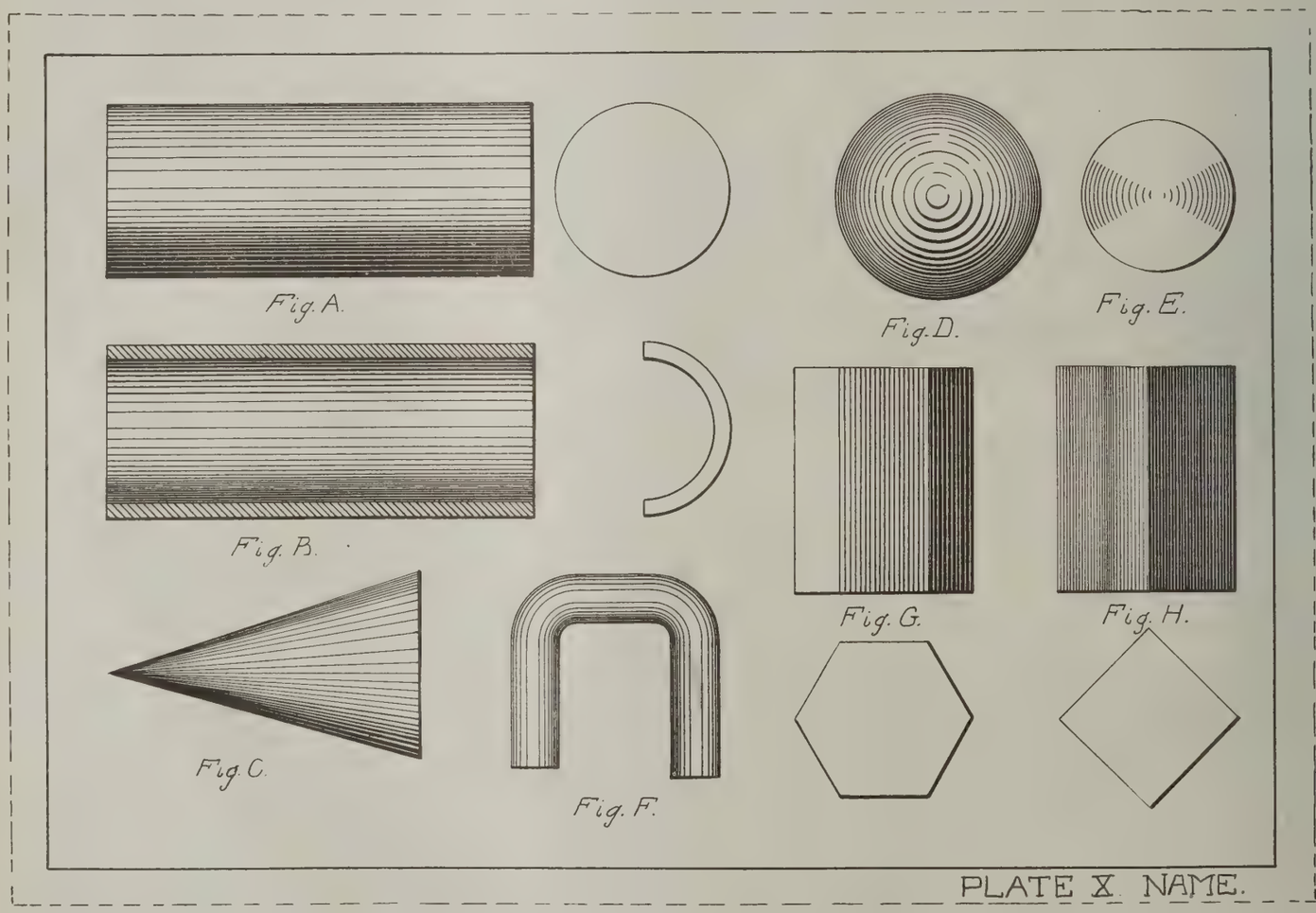
Figure G shows the side elevation of a hexagonal prism, viewed across the flats, and Figure H a square prism viewed across the corners.

If the student has trouble with the plate it is advisable that he redraw it until good results are obtained, as in this, as in other things, perseverance has its reward, and no draftsman can call himself competent unless he is capable of good line shading.

PLATE XI.

PENETRATIONS OR INTERSECTIONS OF SOLIDS.

It frequently occurs in the drawing of details, that one solid is made to intersect, or penetrate, another. There is a line formed at the point of intersection and it is the delineation of this line that will now demand our attention.



In Figure A we have a theoretical fitting for a steam or water pipe. The plan and the elevation are shown. Both parts of the fitting are the same size. To find the line of penetration, proceed as follows:

On the horizontal center line, and a little to the left of the side elevation, construct the semi-circle whose center is o. Divide one-half of it into three equal parts, locating points 1, 2, 3, 4. Project these points up to the horizontal center line of the plan and over to the vertical center line of the elevation. At the intersection of the horizontal center line of the plan with the vertical center line of the semi-circle, place the compass point and draw the arcs as shown. Project these over until they intersect the outside circle of the plan, and locate points 5, 6, 7, 8. Project these downward

until they meet the horizontals projected over from the semi-circle. This locates points 9, 10, 11, 12. Through these points draw a line, which is the line of intersection of two cylinders the same diameter and cutting each other at a right angle. The line a-b is easily located from the above.

In Figure B we have the intersection of two cylinders at right angles but of different diameters. The line of intersection, which in this case is curved, is found in exactly the same manner as the one in Figure A.

It will be remembered then, that if the cylinders are the same size, the line is straight, if of different sizes the line is curved, and that the line of intersection is always found in this way no matter what the size of the cylinders is, or the angle of penetration.

Figure C gives us the plan and elevation of two prisms, of different sizes, which intersect at right angles. It is a very simple problem and no difficulty should be experienced in solving it. Point 2 is the projection of point 1 on the center line of the side elevation. Point 3 is the same with point 4. By connecting these with a and b, the angle of penetration is found. In a manner similar to this nearly every intersection of prisms may be found, no matter what angle of penetration is used.

Figures D, E and F represent the finished elevations of the examples without the construction lines. They afford an excellent opportunity to apply the principles learned from Plate X. They should be drawn about half the size of the elevation above them.

(To be continued.)

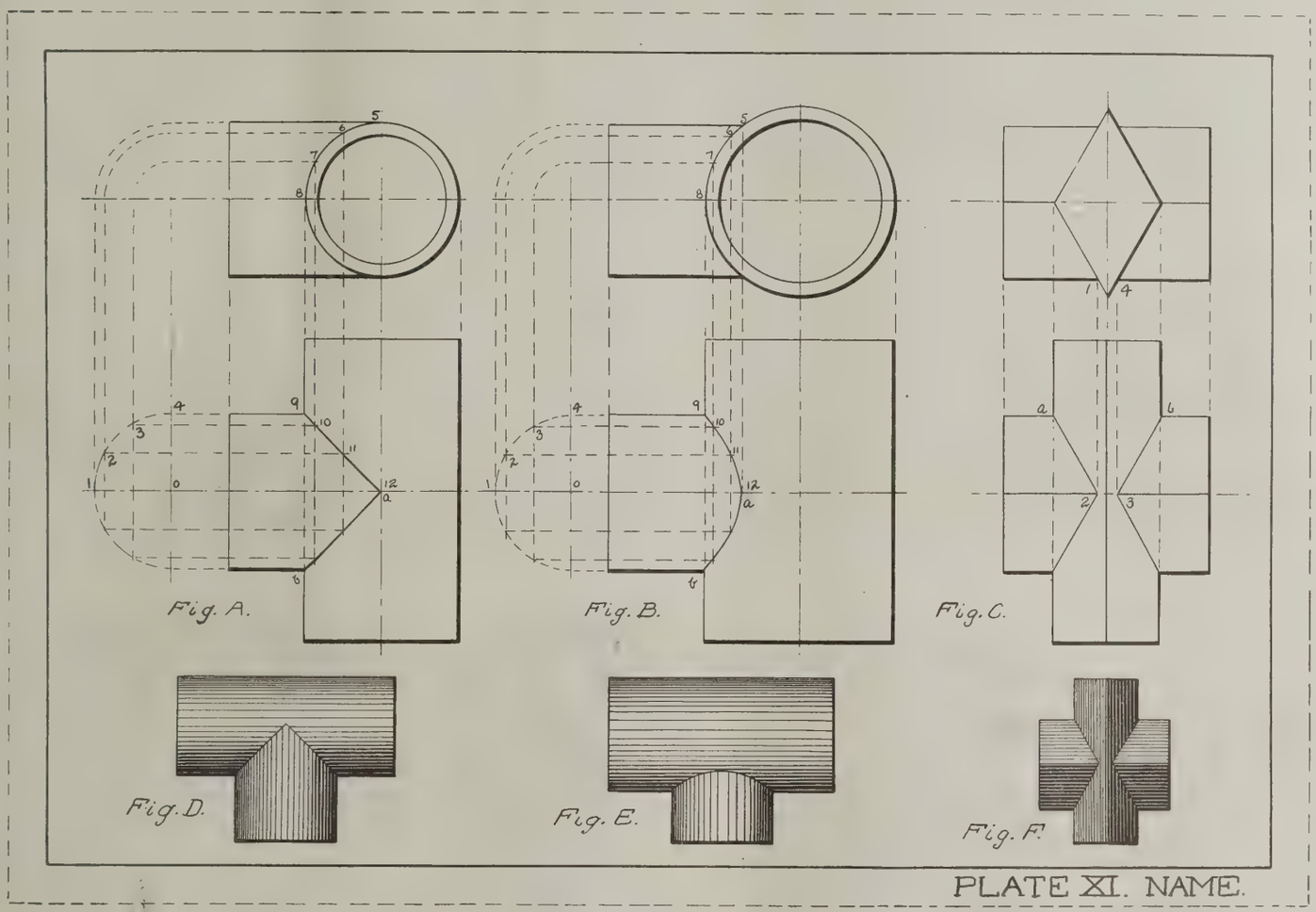


PLATE XI. NAME.

AN EXTRA HAZARDOUS RISK

During the convention of Building Material Supply men, recently held in Chicago, a credit man in quite an extensive talk on credit is quoted as saying, "that the carpenter-contractor should be generally classed as an 'extra hazardous risk.'"

He further stated that the supply man was the contractors' banker, meaning of course, that it was he who supplied the goods or money on long credit which enabled many contractors to do business.

We would understand from this that a consideration is paid to the supply man for this kind act, as he could not himself afford to carry the account on his books for an extended period, which is a risk, unless he got more money for his goods. This may explain why many contractors do not make money, and are always hard up.

It is difficult, we know, to get a banker to advance money on a building contract to a contractor without means, or at least some good collateral; but if it can be done, the contractor will find he is money ahead, and the interest a bank would charge is less by far than the advance price the supply man asks for his goods on an extended credit. Then too, the contractor is foot-loose to shop around to get the best prices for his materials.

To Imitate Old Oak.—To make an exceedingly rich color for the imitation of old oak, the ground is a composition of stone ochre or orange chrome and burnt sienna; the graining color is burnt umber or Vandyke brown, to darken it a little. Observe that the above colors must be used whether the imitation is in oil or distemper. When dry varnish.

Painting on Brickwork.—If you have a wall of brickwork, and the bricks are very soft, then broom down clean and apply a size of acid water, just enough muriatic acid to sour the water. Let this be rinsed off with clear water, let it dry, then apply all the raw oil the wall will take. This is for a first-class job, and the oil will prevent the chipping of the brick afterwards. The oil makes the soft bricks harder, and also waterproof. Hard bricks will not need so much oil. Where the wall has been filled with raw oil the first coat of paint should be of good quality, and according to what the finish is to be; if to be painted like wood, it should be thinned with oil and turpentine until the last coat, which should be done with all oil. But if a dead brick finish, then use all turpentine color, for the finish, though the priming may be all oil, and the next coat or two, half and half, as the dead effect is surer on a partly lustrous ground, or on a perfectly full luster.



WHILE A ONE-STORY HOUSE, THE TOWER-ROOM IS ONE OF THE FEATURES OF THE PLACE.



NEARLY ALL THE ROOMS OPEN INTO THE PATIO, WITH ITS FOUNTAIN AND FLOWERS.



MISSION STYLE TRIM AND FURNITURE ARE AT THEIR BEST IN THE DINING ROOM.



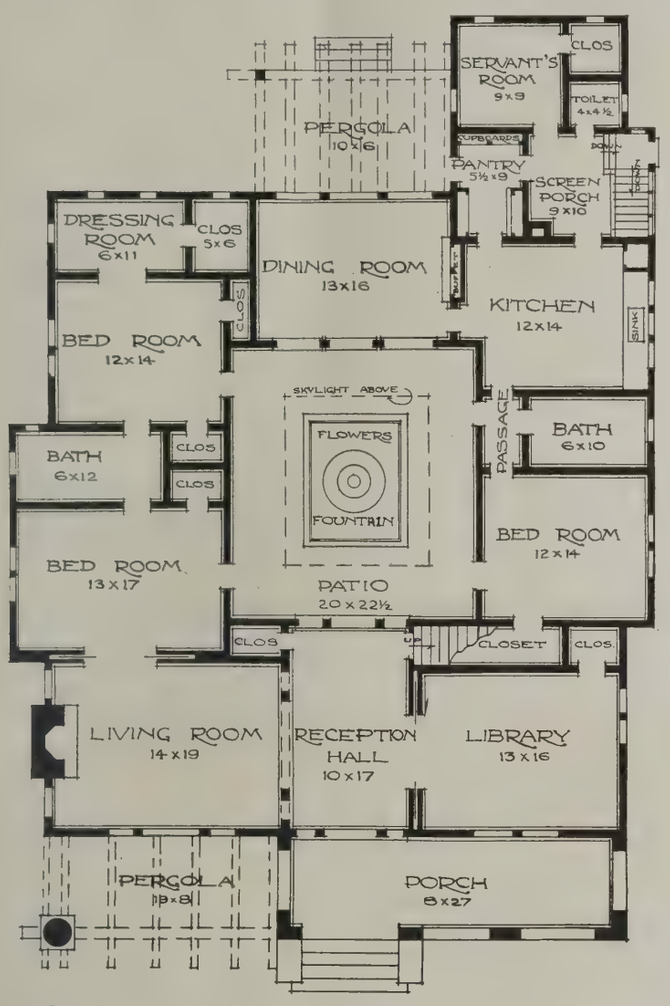
A SIMPLE FIREPLACE IN THE LIVING ROOM CAN BE SEEN FROM THE LIBRARY.

The One Story House—This style is popular in California, and can be adapted to other sections

THE ONE STORY HOUSE

By L. BAURY

While the low rambling one-story type of house is still peculiarly a product of the Pacific Coast architecture, visitors from other parts of this country who have been charmed by this arrangement of rooms that lends itself so appropriately to requirements of life in a warm climate, are adopting this plan of building for their country homes on the mountains, or at the seashore. Even the patio, which was formerly exclusively Californian, now appears not only in some of the newest Southern houses, but even in the summer homes of many northerners of artistic taste. Unsuitable



as such a house might be for city, or even suburban use, all the year round, nothing more attractive could be designed for those who wish to combine the delights of home with the freedom of life out-of-doors.

In such a house the rooms are usually arranged upon the single-floor level. In the case here illustrated, there is a lounging room in the tower. The house is invariably built around the patio, with its garden in the center, and, in which, if desired, a fountain may also be introduced. It is this room that is really the living room of the house, for, covered by a skylight, the interior, while assuming all the aspects of a delightful garden spot is amply protected against any inclemency of weather. In many houses of this character vines are among the plants placed in the center of this apartment, and they are trained to cover the walls and extend completely around the room.

As may be seen by the plans, nearly every room in this house opens upon the patio, the dining room and reception hall being separated from it by glass partitions. In this way the brightness and attractiveness of the patio extends to other parts of the house —bringing a sense of proximity to Nature, with which people of the north and east have long been unacquainted in their homes.

The front of the house is made attractive by a partially enclosed porch and a pergola. The porch opens into a large reception hall from which there are doors to the library and parlor, or living room. Here a large open fireplace, built into the outside chimney, furnishes an artistic touch that is most attractive. The arrangement of the bedrooms in this plan, with the conveniently placed baths, and numerous closets, cannot fail to commend itself to those who are looking for comfort as well as economy of space. The arrangement of the service wing, which shuts the kitchen with the pantry and servants' rooms, completely off from the rest of the house, is a feature that, while typically Californian, might well be duplicated in houses in other parts of the United States.

All the rooms are of good size, have plenty of windows, and, of course, hardwood floors throughout. While the house is not designed especially for year round occupancy, it is provided with a furnace from which heat may be obtained during the few weeks in the year when the ordinary summer home becomes too cold for comfortable habitation. At the same time, there is no reason why such a plan should not be adopted by those desiring to build a permanent home, providing the lot is large enough to accommodate a structure that requires so much land.

The house which the accompanying photographs show is built of stucco and is covered with a red-tile roof. The tower extends to a height of about fifteen feet from the roof-level, and is also covered with red tile. It is reached by a stairway which leads from the reception hall, and this is regarded by the owners as one of the most attractive features of this house.

The detail cost of this building is as follows:

Masonry, cement work and plastering	$1,025.00
Lumber	1,100.00
Doors and sashes	250.00
Hardwood floors	210.00
Skylight for patio	150.00
Carpentering work	640.00
Tile roof	450.00
Plumbing	500.00
Hardware	100.00
Furnace	125.00
Electric wiring	50.00
Painting	300.00
Total	$4,900.00

THE BUILDER AND THE AUTO

THE auto, not so much the big touring automobile for pleasure and for show, but the auto truck and light delivery wagon is going to be a factor in the affairs of the up-to-date builder in the next few years and it is a subject enterprising builders should be taking up. The man that gets into the game first may pay some extra price for having to carry on experiments, but he will get the extra advertising and reputation for enterprise that will give him prestige in the community, so it is worth while sometimes for a man to indulge in a new automobile to ride around in for pleasure is simply to create adverse criticism, but for a man to get an auto wagon of a type fitted to his own work instead of his regular horse and spring wagon is to show a kind of enterprise that will be appreciated. Already in some localities these are being seen and soon it will be builders, plumbers, tinners, and all kinds of trades people who need wagons operating motor wagons of some kind or other.

The automobile people are giving special attention now to the commercial side of the business. That is, to the making of commercial cars, trucks, and lighter vehicles and it is worth while for every builder to give the subject attention, too. They should prove both a convenience and a step in progress. They need not cost much more primarily than a good horse and wagon and no more to operate, and they should be less trouble. So, make inquiries and get literature on the subject and keep up with the times in connection with commercial auto wagons and see if you can be a sort of leader of this progressive movement in your community.

FIGHTING THE HOUSE FLY

By WM. C. A. STEVENSON

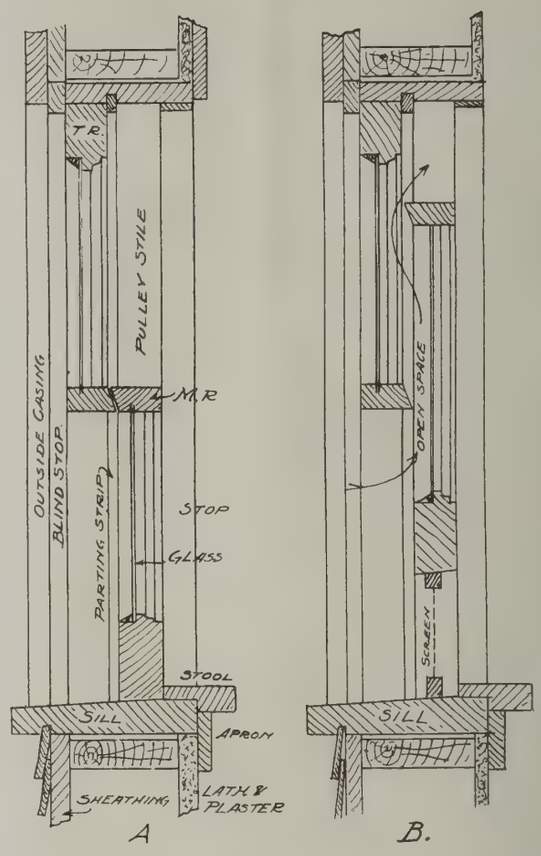
We are now face to face with another season of fighting the house fly. The several Boards of Health have been warning the people of the deadly disease germs carried by the fly from the garbage barrels, etc., into the house and onto the food stuffs.

It is therefore up to the householder to see that his house is properly protected from the invasion of the fly. In order to do this successfully, the screens must be properly fitted; the doors should have good heavy spring hinges on them, so as to throw them shut as soon as a person passes in or out. The door should always spring outward, for this reason: The flies light on the wire on the outside and if the door swings in when it is opened, they leave the door into the house. This is one of the bad features in double swing doors, as sometimes used on store doors, etc.

But when the door swings outward and the flies are on the wire, when the door is opened, the motion of the door scares them away and they do not return before the door has closed if good hinges are used to throw the door promptly shut.

Window screens should be the full size of the window and made to fit in place of the storm sash, if the storm sash are hung with patent hooks, these will also do for the screens. When the screen is made to fit the full size of the window, either sash can be opened at will and you still have screens in the window. A screen that only raises the lower sash up part way and sets under it is about as good as no screen at all. To prove this fact, I will draw attention to the illustrations herewith shown. (A) shows a section of the sash of a window when closed, Br the bottom rail of the lower sash Mr the meetings of the upper and lower sash, Tr the top rail of the top sash.

(B) shows the lower sash raised up part way with a screen set under it: note the space between the meeting rail of the upper sash, allowing the flies to light on the glass and crawl up and over the top of the lower sash as indicated by the arrow points. Carpenters, it is up to you to point out this defect in this narrow screen to your customers, and show them the necessity of having window screens made full size.



HOTEL McALPIN

PUSHING rapidly ahead, work is now under way on the Hotel McAlpin, to be the largest hotel in the world, and to stand at Thirty-fourth street and Broadway, now admittedly the heart of New York City.

The Greely Square Hotel Company, the owners, are promised by the builders, that the giant new structure will be completed within a year, and the present plans are to open it in Setpember, 1912.

Fortunately New York has a solid rock foundation and once the fundamental excavation is ready her great buildings grow up like mushrooms. The new hotel gets its name from the McAlpin estate which owns the ground on which it will stand, the 30,000 foot block fronting Broadway on the east between Thirty-third and Thirty-fourth streets. It will stand twenty-five stories tall including the pent house on the top which will shelter the machinery.

The plans, to quote the architect, Mr. F. M. Andrews, are as follows:

"We are erecting a structure twenty-five stories in height, with a close adherence to the style of the Italian Renaissance in architecture. There will be 1620 guest rooms, 1100 bath rooms, and some two hundred large and small rooms devoted to the use of guests and servants. The dimensions will be 202 feet on Broadway, or the entire western face of the block, running east of Thirty-fourth street 150 feet, and the same distance on Thirty-third street. The material is Bedford stone for the base, and the main shaft of the design in golden brown brick, while the upper portion of the design is to be carried out in this brick and colored terra-cotta. Such are the plans that to every bedroom light and air will have free access, and every room will have its bath or en suite to be connected with a bathroom, and more space is to be allowed to rooms than to any new hotel of large size built in New York for a great many years.

"Taking the various notable public rooms there is first the lobby, the largest of its kind in the world. Its height is fifty feet and its width is 64x96 in length. It is designed in the Italian Renaissance, executed in Paonozza marble and a polychrome terra-cotta that in the model has elicited high praise from the best critics. At the mezzanine floor level will be balconies overlooking the lobby. The entrances will be on Thirty-fourth street, Thirty-third street and Broadway.

"The banquet hall is to have a vaulted ceiling of unsually ornate effect and the length of the room, 80 feet, with the high arch and the extreme narrowness 32 feet, all go to make it very unique and impressive. This room fronts on Broadway and is matched on the south by the ladies' tea room and restaurant, 30 by 65 feet with a ladies' reception room 30 by 30 adjoining, while on to the east is the general writing room and library 30 by 45 feet. To those familiar with the dimensions of similar rooms in American hotels it will be apparent that the public cannot fail to appreciate such generosity in costly space. All of these rooms will be decorated in the style of the North Italian Renaissance with the exception of the ladies' reception rooms which will be carried out in Louis XVI style.

On the second floor are some unusual features, for instance a lounging room for men 65 by 96 feet, and here will be the private dining rooms very handsomely executed. The nearer the guests' table is to the chefs' range the better the service, the hotter and more appetizing the food. This is a truism among hotel men. The kitchen of the McAlpin will not only be the largest in New York City, but it is located immediately under the dining rooms and waiters and trays ascend and descend by escalators, reducing transition time to a minimum.

In order that the right idea of the great size of the Hotel McAlpin may be properly conveyed, permit me to quote some of the startling figures in the specifications. The area of the plot is thirty-thousand square feet, the estimated cost over all is about $14,000,000, the private telephone exchange is the largest ever built, being thirty by 120 feet; there are seven miles of heating risers, mains and returns, and one hundred and fifteen miles of electric lighting wires. The tubing in the hotel will be three and one-fourth miles in length.

A METHOD OF SETTING OUT A CURVE

To set out a curve in a road, footpath or curb gracefully is no easy task. The accompanying drawings illustrate a simple instrument by which a curve of any radius from 10 ft. to 60 ft. can be set out which will not have the irregular effect too often seen. It is based on the platelayer's method of setting out a curve without a theodolite, by offsets from equal chords.

The instrument is constructed similar to a tee-square, and shown complete in Fig. 1: A is an oak lath, ⅝ in. thick, 3 in. wide, and 7 ft. 4 in. long; at one end is fitted the cross-piece B, of oak, ⅝ in. thick, 3 in. wide and 3 ft. long. The two pieces are halved and fixed together with screws, and must be perfectly square. Over the arm B is placed the slider D, with pointer and notch for an ordinary ¼-in. diameter chain arrow. The slider is a band of sheet brass, $\frac{1}{16}$ in. thick, 1½ in. wide, and bent to slide over the arm, and should be a good fit. On the face of the band is soldered a strip of sheet brass 3 in. wide and ⅛ in. thick, the edge on the inside projecting ½ in. beyond the edge of the arm. A square opening, ½ in. wide, is cut in the center of the brass plate, exposing the scale, and at the middle of this opening is soldered a pointer. The notch E for the chain arrow is cut with a ¼-in. diameter round file; the center of the notch must be perfectly in line with the pointer, and cut to a depth to allow the arrow to bear against the edge of the cross-arm B. On the outer edge of the slider is soldered a strip of brass ¾ in. wide, 1 in. long, and ¼ in. thick, and at the center of this strip is drilled and tapped a hole for a ¼-in. clamping screw. This screw is to fix the slider when set for laying out a curve of given radius. On the face of the cross-arm is a scale C, divided into inches and decimals of an inch. The scale is either painted direct on the arm, or on paper pasted on and varnished. The scale is adjusted so that when the slider is close against the long arm, the chain arrow against the long and cross-arm in the angle G, the zero of the scale is immediately under the pointer. A brass plate F, ⅛ in. thick, 1½ in. wide, and 3½ in. long, is fixed with screws on the long arm; the center line of the plate must be exactly 3 ft., and ¼ in. from the inner edge of the cross-arm. On the center line of the brass plate a slot, ¼ in. wide, is cut with a ¼-in. round file. The slot is cut to the edge of the long arm, to allow a chain arrow to rest against the edge of the arm. Great care must be taken that the slots are cut to the dimensions, for on this the accuracy of the instrument depends.

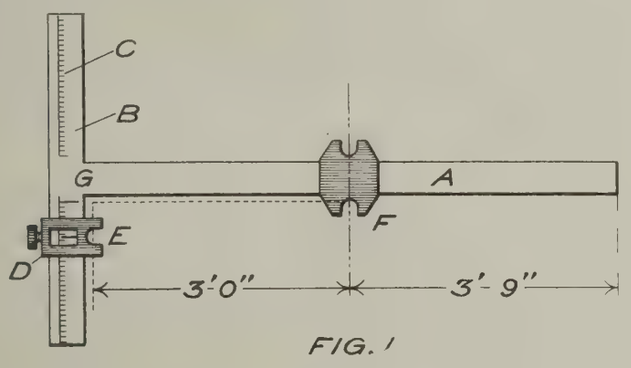


FIG. 1

Before the instrument can be set to lay out a curve, the radius of the curve to be laid out will have to be found by the rule: $\frac{C^2}{v} + v$, where C equals the half of the chord and v the versed sine, or the height of the curve, at the center of the chord.

Fig. 2 will explain the method of finding this data in actual work, H E being an assumed curve to be laid out. Stretch a line from E to H, the commencement of the two ends of the curve; measure this length, the half of which will be C in the rule. From the center of H E, measure to the point L, the highest point of the curve; this height will be v, or versed sine in the rule.

Assuming H E to be 40 ft. long, and the length V L 10 ft., the radius of the curve will be $\frac{20^2}{10} + 10 = 50$ ft. The radius of the curve being known, the half-length of the offset from the tangent will be necessary, which is found by the rule $R - \sqrt{R^2 - L^2}$, where R is the radius of the curve, and L the length of the tangent, or the length of the arm of the instrument from F to G in Fig. 1. The half-length of the offset for a radius of 50 ft. by this rule will be: $600 - \sqrt{600^2 - 36^2} = 1.08$ in. In the working of this rule, all dimensions are reduced either to feet or inches; in the example they are reduced to inches.

The following table of offset lengths is for a 3-ft. tangent, for radii from 10 ft. to 50 ft., calculated by this rule from which an extended chart, giving intermediate radii can be set out on squared paper, thus avoiding calculating offset lengths each time a curve is set out.

Radius ft.	Half Length of Offset in.	Full Length in.
10	5.53	11.06
15	3.64	7.28
20	2.44	4.88
25	2.17	4.34
30	1.8	3.60
35	1.55	3.10
40	1.35	2.7
45	1.20	2.4
50	1.08	2.16

The most convenient chart would be the half-length offset, and for the full length it is simpler to double the values in the chart.

The length of the first offset, P N in Fig. 2, where the curve starts from the straight line, is the length found by the rule, and is half the length of the succeeding offset R Q.

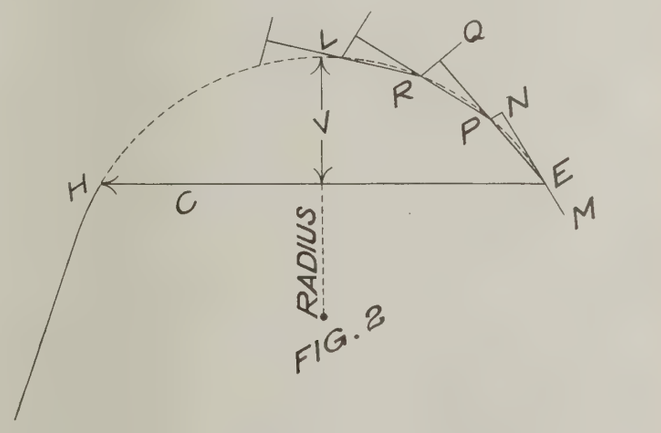


FIG. 2

To set out a curve, an arrow is driven in at the start of the curve at E, and another at M, 3 ft. back on the straight line. The slider on the cross-arm is set with the pointer over the half-length of the offset, corresponding to the radius of the curve. For instance, taking the radius as 50 ft., the pointer is set at 1.08 in. from the edge of the long arm, but if the radius of the curve to be laid out is 10 ft., the pointer is set at 5.53 in. The inside edge of the rod is placed against the outside of the arrow at M, with the arrow E in the slot of the brass plate F (Fig. 1); the arrow must bear tight against the edge of the instrument. A third arrow is now driven through the slot in the slider of the cross-arm; this arrow will be the first point on the curve at P in Fig. 2. The next step is to alter the length of the offset to its full length, which for a 50-ft. radius curve is shown in the table to be 2.16 in., and for a 10-ft. radius 11.06 in. In the next position of the instrument, its edge rests against the outside of the arrow E and the arrow P in the slot F of the instrument. An arrow is inserted in the slot of the slider, which will be the second point, R, of the curve. Proceeding in this way, a series of arrows is driven in until the opposite straight line is met. The arrows being only a little over 3 ft. apart, the curve can easily be completed between the arrows without deviating much from the correct curve. In using the instrument, care must be taken that its edge be tight against the arrows, and the arrow at the cross-arm driven in with its edge touching the cross-arm in the slot of the slider. Instruments for setting out curves of larger radius are constructed by increasing the length of the arm between G and F (Fig. 1) and the other parts proportionately, a table of lengths of offsets being calculated to suit the increased length of arm.—L'Ingenieur in Building World.



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

ESTIMATING.

From Old Reader, Toledo, Ohio.

Replying to H. H. Hoel, Roanoke, Va.

In estimating excavating, a great deal depends on the nature of the soil, both for the unit cost of excavating and for the amount which will have to be taken out. Earth, sand and gravel can be taken out for 25 to 35 cents per yard, clay 30 to 50, while rock will sometimes run to two or three dollars a yard.

A compact soil, such as rock or clay, can be excavated close to the required size, while loose soils will cave in, requiring sheet-piling or extra excavating.

For ordinary work, where the depth is not too great, assuming the excavation to be two feet larger all around will take care of the extra work about the excavation. Thus, for a building 30x50x 10 feet deep would be 34x54x10 = 18,360 cubic feet or 680 yards. For average soil with some clay, at 40 cents per yard = $272.00. This provides for carting only a short distance, any additional cartage to be extra.

In estimating brick work, a wall is always a certain number of brick thick, three brick making a little over twelve inches thick, and called a twelve of thirteen inch wall, according to locality. One of the best methods is to reduce everything to square feet one brick thick and then multiply by the number of brick to the surface foot. This varies from 6 to 8, according to the size of the brick and the method of laying, width of joints, etc., but 6½ or 7 is about the average. Thus a wall for a building 30x50x19 feet high and three brick or 12 inches thick would be 30 + 50 + 30 + 50 = 160 × 19 × 3 × 7 = 63,840 brick.

Weatherboarding is usually sold by the square foot, the unit measurement being the amount required to cover one square foot. Thus for the above building would be 160 × 19 = 3,040 feet to cover. By specifying "to cover 3,040 square feet" the lumberman will know exactly what is required. For flooring, the amount required would be to cover 30 × 50 = 1,500 square feet. As the width of flooring varies, it is usually sold by the "board foot," so that a 6-inch board only covers 5¼ inches and the 6 inch must be paid for. It is therefore necessary to add one-seventh for this width of flooring, so we would have 1,500 + 214 = 1,714 feet board measure. In like manner 2¼-inch face would require one-third to be added. A little should also be added to make up for cutting and matching and waste, and while this sometimes will run as high as ten per cent, the average will be less than five.

CIRCULAR FORM.

From Subscriber, Pittsburg, Pa.

In reply to W. H. Parsons, Miltonvale, Kans.

In building forms for circular work, one of the best methods is to cut templets or centers out of any old pieces of wood or plank, nailing them together to form the approximate curve, and then sawing out as closely as possible to the exact curve. Then take strips of galvanized iron as wide as the height of the step and tack to the face of two of the centers, one for the top and one for the bottom. This will give a good smooth surface for the cement to finish against. The back of the step may be finished the same way, but as much care is not needed where the work will not be exposed when finished.

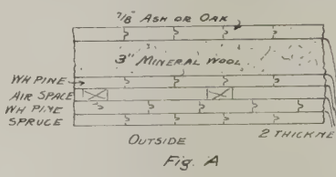
The concrete should be put in rather wet, and carefully trowelled or spaded against the iron so as to remove any stones from the finished surface. As soon as the concrete is set, and before it is too dry the front form should be removed and the surface trowelled and floated off to a smooth finish. When the work is put in in the morning it is sometimes necessary to finish the work the same evening, although it will usually be all ready the next morning. This is a good method to use for putting in curbing where the corners are curved to a rather small radius.

REFRIGERATION.

From C. A. M., New York, N. Y.

Replying to F. X. Laliberts, Southbridge, Mass.

Every manufacturer of refrigerators has his own ideas on the construction of his work. A box about the size mentioned was recently built with walls and top made according to drawing "A." It is to be noted that there are ten thicknesses of paper and 4⅛ thicknesses of wood, besides the mineral, and with regard to mineral wool, the directions of the manufacturers must be followed and care used not to compress the wool too much, or the fibers will be broken and the wool will mat down, leaving an undesirable air space at the top. Neither should it be allowed to get wet after being filled in place, as that also has a tendency to mat it down.



The writer believes cork to be a much better insulator, used as shown in "B." Care must also be taken that all air spaces are divided up into small blocks not over 12 inches square by 1x2 strips. This prevents a circulation of air, which will greatly decrease the insulating qualities. The paper used should be that made especially for insulating.

SKEW BACK.

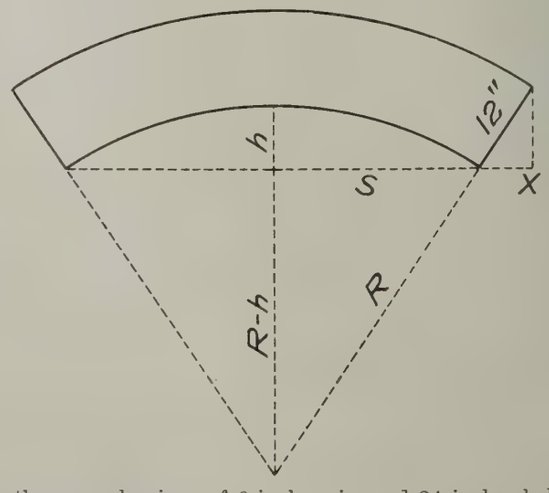
From C. O. P., Fort Barrancas, Fla.

On page 43 of your March number a bricklayer asks for a formula to find inclination of the skew back for a simple arch when span and rise are given. The following formula gives the exact face or horizontal drop-back for an arch 12 inches deep, for any span and any rise.

x = face in inches (see diagram).
s = half span in inches.
h = rise in inches.

$$x = \frac{24\ s\ h}{s^2 + h^2}$$ or in other words multiply the product of the

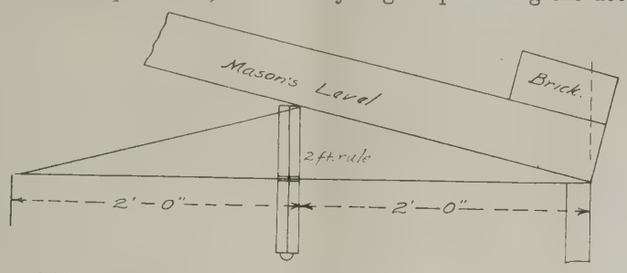
rise and half span by 24 and divide the result by the sum of the squares of the rise and the half span.



In the example given of 6 inches rise and 24 inches half span, the face is 5 2-3 inches.

From E. A. G., Phoenix, Ariz.

In your March issue the question was asked by a brick-layer, how to find a bevel, when rise and run was given—"no time for paper and pencil." The mason always has a two-foot rule in his pocket, and a mason's level at hand. I am a carpenter, but had I been in his place, my solutions would have been as below: Using a rule for obtaining 6" rise, as per drawing; a level for a straight edge, with a square end, and the "eye sight" producing the dotted



lines which appear on this paper. The brick, of course, can be stood on end with the same results. These are not for the draftsman, with his geometry, but are for the "occasion" no paper or pencil, and no geometry, that he realizes.

QUESTIONS

DORMER EYEBROW.

From M. C. K., Ridgefield, Conn.

Could you, through THE NATIONAL BUILDER, give me a working sketch of an eyebrow dormer?

What I would like is to be told the way to construct it to get it perfect in shape. The roof is to be shingled and the ridge of dormer is to be level.

LUMBER SYMBOLS.

H. A. B., Cleveland, Ohio.

Will you kindly inform me what the following expressions in lumber signify:

18,803', 8" 1 VV Siding.

12/10; 30/12; 53/14; 301/16; 687/18; 490/20.

Also this expression: SISIE?

MISSION SETTEE.

From H. Schrott, St. Louis, Mo.

Will some reader be kind enough to give me full particulars of how to make and finish a Mission settee, in the future numbers of "Our Paper"; also, how to solder copper, and oblige a subscriber?

HOW TO CONSTRUCT A FLAT ROOF.

From John N., Rochester, N. Y.

I would like particulars of the proper method or methods of constructing a flat roof for a building 32x48 feet on the plan? Any information on the subject will be gratefully accepted.

STEEL SQUARES.

From "Young Framer," Seattle, Wash.

I would like to hear from my fellow readers, their opinion regarding best make of steel squares? I have an old square, which I bought along with other old tools from the widow of one of the first settlers in this country. The square has stamped on it, "Eagle Square" and seems true and in good order, but has not the figures on it that I have seen on some of the squares East. Does anyone know of this make of tools, and is it reliable for general use? Any information on the "square" and the manner of using it, will be appreciated very much.

INLAYING TABLE.

From R. M. A., Asbury Park, N. J.

Thinking possibly some reader would give me a little information on a task which I am about to begin, I am writing you in regard to where you think is the best place to purchase material?

I belong to the Local Lodge of Knights of the Golden Eagle, and wish to make a table inlaying an eagle, using a variety of woods, or if you could give me a better idea about the same, to bring out the natural color of the eagle as near as possible, or would you think it best to make the eagle of one piece of wood, using some curly wood in preference. My idea was to make the legs and rails of the table of quartered oak, the table to be about 5 ft. long and about 30 in. high, and to lay an under top on the same principle as a double flooring in houses, so as to prevent the under top from shrinking and drawing the inlays apart. The reason I think this way is best is I have made two tables with inlaid tops, using white pine bats tongue grove 6 in., and as they spread through, possibly by laying the double flooring the under one on the diagonal would prevent the top from shrinking, which, of course, draws the inlays apart.

In regard to size of eagle, I borrowed a design from a friend on black and white, which is about 11½ in. wide spread, and 5½ in. high. I thought it would be about the right size in accordance with the size of table.

I received a catalog from Johnson's Wood Dye Trim, which gives some very good border ideas, and I think I can find one to harmonize with the design. My idea is, also, to get as much variety of wood as possible, as I intend to inlay the bottom shelf; the table will be on the order of a library table.

If possible, would like to inlay the letters K. G. E., used in the eagle design, and also the swords if you think it possible.

If you could recommend me as to where I could purchase a variety of woods thoroughly dry for inlaying, would be greatly obliged to you. They need not be over 2 or 3 in. wide and a foot or so long, and ¼ in. thick—such scraps as one would find in a good cabinet shop, etc.?

My idea for inlaying, or at least the way I made the other tables was by cutting most of the inlays in a mitre box and inlaying with a good oaking glue.

Would thank you very much for any suggestions you could offer me. Am going to try and complete same by next December, 1911, if possible, and if it turns out successful, will send you a photo of same for your valuable paper, THE NATIONAL BUILDER.

BUILDING REFRIGERATORS.

From F. X. L., Southbridge, Mass.

I should like to gain information on the building of refrigerators, for instance, say one about 14x18 ft., and about 7 ft. high?

DIVIDING GIVEN ANGLES.

From W. G. L., New Haven, Conn.

I should like to know the most accurate and easiest way of dividing a given angle into a given number of parts as 3 or 5, etc., all equal?

HIP RAFTERS.

From H. C., Mansfield, Mass.

I would like to ask questions on rafters. Now, I have a hip roof house. I can frame all the rafters and get all cuts, but I cannot get the joint on the hip rafter to come right with the common rafter. Would like someone to give me some idea?

ESTIMATING BY THE CUBIC FOOT.

From J. L. K., Staples, Minn.

In the July, 1910, number of THE NATIONAL BUILDER, page 46, you gave an answer to question No. 317, in regard to cubic foot estimating. Am I to understand that in that way of estimating all material is finished, even to cellar walls and the painting of the structure; if so, how many coats of paint. The answer also states that "These figures are from basement floor to ridge." That I take to include cellar and all the foundation. Am I right?

NOTES ON CONSTRUCTION

By WARFIELD WEBB

There are a large number of fires directly due to poor construction, and not, as some are inclined to believe, inadequate fire-proofing building materials. Taken as a general class, burned clay commodities are fireproof materials. The value of these materials naturally vary to a greater or lesser degree, but when we take them as a class, they are far superior to any other class of structural materials.

On the other hand the inferior quality of a building material will often do much to increase its inability to withstand any considerable amount of heat, and will make the structure, of which it is a part, more dangerous on this account. For this single reason, among many others, the manufacturers should endeavor to make their commodities superior in so far as actual quality is concerned. Even an ordinary clay brick is a good fire resister, when it has been properly manufactured. It can withstand a considerable fire

without being materially affected, the only requirement being that it be made with care and burned in like manner.

Good materials in the hands of poor or careless builders will so far deteriorate their actual value as structural materials from almost any point, that their relative value in this respect is reduced a hundred per cent. While this is true, it is also true that moderately fair materials in the hands of expert workmen can be made far more valuable, even surpassing in merit the better qualities when in the hands of the former class. This is a fact that should not be overlooked by all classes, both manufacturers, architects, and contractors. Each one is vitally interested in not only having the best possible clay products obtainable, but there is equally as much concern as to the ability of the men who undertake to construct the buildings with the various clay building materials.

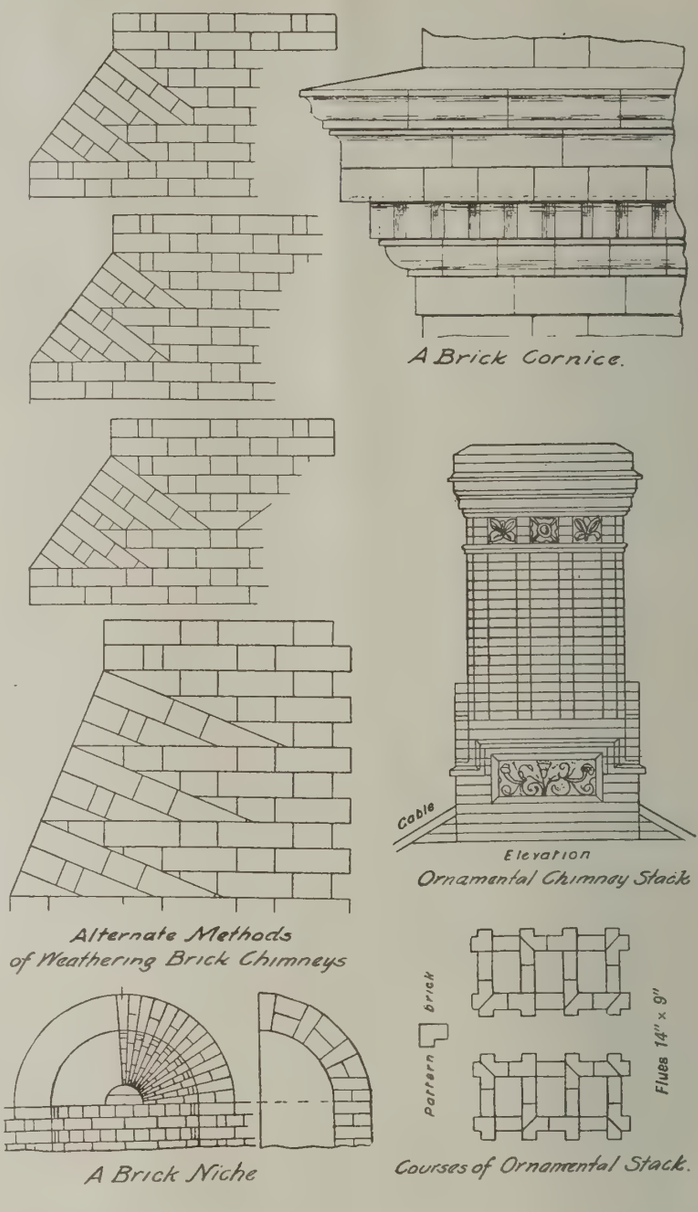
Despite the ever-increasing number and kinds of structural materials, brick, and kindred clay building materials, have not only kept abreast of the increase, but have actually greatly increased in demand. There has been a reason for this, and one of the most notable causes in this respect has been the fact that there are so many clay commodities possessing more than ordinary qualities to withstand fire. Under this head comes fireproofing, as a leader, then terra cotta, flue linings, firebrick, vitrified brick and common brick. These are a few of the many specials, manufactured from clay. The list will not only compare favorably with any list of other structural materials, but will actually surpass it.

The public appreciate the simple fact that there has been hundreds of years service in clay building materials, and that they have withstood the most severe tests, which time alone can engrave on the durability of such commodities. In all these years there has been an upward tendency, and a striving for a higher quality, and a forward march toward the goal of fire resistance and durability under all trying tests. Had burned clay commodities not been able to withstand these time tests, had they been found failing in the crucial trials that the public has demanded, then today we would see a notable retrogression, and not the onward march that has been so noteworthy in the past few years.

How to increase this voluntary approbation should be the highest and foremost aim of the manufacturers of all kinds of clay commodities. They should be encouraged to fight for higher quality, for more enduring materials, for better quality in all that they essay to do. If their equipment is not of the best, and their help of the kind that is a drawback to their more notable achievements, then they should root out these cankers, and start afresh to gain new laurels for themselves and their industry.

The increasing call for fireproof structural materials should act as an incentive to spur them on to higher things. They must understand that while the construction work itself is too often a factor that is detrimental to the cause of the proper development of the fireproof demand, that they should not on this account, become lax in their efforts to improve the conditions that will make for a more trustworthy product from their own plants.

EXAMPLES OF BRICKWORK



NEW BOOKS RECEIVED

(Notice—All books noticed in these columns may be obtained from this office at Publishers' prices. All postage or express prepaid. Money and address must accompany all orders.)

THE LAW OF CONTRACT. VOL. I.—By Alexander Haring, C. E., LL. B., LL. M. Member of The American Society of Civil Engineers; Professor of Bridges and Railway Engineering, New York University; Member of the American Society of Engineering Contractors; Attorney and Counselor at Law.

Bound in Buckram—hard covers. Over 518 pp. Published by The Myron C. Clark Publishing Co., Chicago, Ill.

This will certainly prove a useful work for engineers and engineering students and in fact for all contractors in every line of business. The idea of the work seems to be the presentation in a condensed form, a text of the law of contracts in every form and to give the general theory of the subject as taught in the law schools—while yet evading the reading of endless cases, and as the author states, to give the student an understanding of the subject, sufficient to guide him in meeting the legal phases of whatever branch of engineering he may be engaged in.

The Law of Contract, as presented to the majority of engineering schools at the present time, consists of half a dozen lectures, delivered by an attorney, who aside from these lectures does no further lecturing or teaching. The result is what might be expected, the engineering student graduates with practically no knowledge of the subject. This text is intended for use as a recitation course, which may be supplemented by occasional lectures given by experienced professors of engineering. But, where such advantages are not available, a student may get a fair knowledge from this volume where precedents and the letter of the law are fairly set forth. Indeed, building contractors as well as engineering contractors will find in this work abundant material to set them right in case of doubt, as to the legality of any contract they may have in hand. No building contractor's office can be fully equipped without a copy of this book on its shelves.

METAL WORK AND ETCHING.—By John D. Adams. A complete handbook for art metal workers, giving every detail for making a great variety of useful and ornamental objects, such as book ends, desk sets, arts and crafts jewelry, hinges, drawer pulls, paper knives, letter openers, match boxes, tie and pipe racks, pad corners, etc.—fully illustrated; 96 pp. Well bound in cloth. Size, 5x7. Price, post paid, 25 cents. Published by Popular Mechanics Co., Chicago.

This is one of the series of hand books on Industrial subjects that this company is publishing from time to time and which is proving a great success among amateur and other workers in wood, leather, brass, copper and other metals. We have reason to believe that the sale of these work manuals is very large and meets with considerable favor by all people, of both sexes, who practice amateur work in any of its forms. The authors of these books are mostly practical men who have a thorough knowledge of what they are talking about, and who have the knack of conveying to their readers their ideas in the simplest and plain every day language. It is this quality that makes these manuals so popular.

The William T. Comstock Company of New York City, publishers of The Architects' and Builders' Magazine, announce that the name of the journal will be, after the present issue, Architecture and Building. This is the original name of the magazine when first established in the early 80's, and which did good service for the Architectural and Building world. We congratulate the publishers on the change of name, and hope adequate success, in every respect, may follow.

BUILDING TRADES INTERESTS IN THE COURTS

Technical violations of a building contract, which the contractor corrects on his attention being called thereto, are not "breaches," within the contractor's bond requiring notice to the surety of breaches of the building contract.—Lazelle v. Empire State Surety Co., 109 P. (Wash.) 195.

The mechanic's lien statute does not authorize a personal judgment against a wife for the price of material furnished to her husband under a contract with him and used by him in improving her property.—Robert Garrett Lumber Co. v. Loftus, 109 P. (Kans.) 179.

Where a wrecking contract provided that plaintiff was to remove a certain building "at once," and others at specified times, the words "at once" meant within such time as was reasonable under the attending circumstances.—Wetter v. Kleinert, 123 N. Y. S. 755.

The surety on the bond of a building contractor, providing for notice to the surety of breaches of the contract by the builder, may not complain of failure to give notice of breaches occasioning no loss to the owner; the surety showing no injury from the omission. —Lazelle v. Empire State Surety Co., 109 P. (Wash.) 195.

A contract to furnish materials for a building on leased property was sufficiently performed when the materials were furnished and put into the building, though the premises were not owned by the person contracting for the erection of the building.—Chelmsford Foundry Co. v. Shepard, 92 N. E. (Mass.) 75.

A building contract having provided that, in case the owner should be compelled to take charge of the building and finish the contract, the necessity for which was to be determined by a certificate of the architects, the cost of completion should be audited and certified by the architects, and such audit and certificate should be conclusive on the parties, the certificate of cost is admissible against the surety on the contractor's bond to prove the damages to the owner from the contractor's breach.—Lazelle v. Empire State Surety Co., 109 P. (Wash.) 195.

Where work is stopped on plans of an architect before they are completed, generally speaking, he is entitled to pay for services rendered, but it is otherwise when a condition of his original employment is that the plans shall be for a house not to cost more than a certain sum, and the change in plans is made upon the same condition, and an agreement to pay for extra work caused by the change is with the understanding that the plans, when completed, are to provide for a house costing not to exceed the sum as originally contemplated.—Hullmuth v. Benoist, 129 S. W. (Mo.) 257.

The mechanic's lien law (section 6244, Gen. St. 1909 [Code Civ. Proc. Sec. 649]), allowing a lien on a married woman's real estate for material furnished to her husband under a contract with him and used by him to improve such property, does not violate the mandate of the Constitution (article 15, Sec. 6) that married women shall be protected in acquiring and possessing property separate and apart from their husbands, or conflict with the married women's act (section 4872, Gen. St. 1909), providing that the separate estate of a married woman shall not be subject to the disposal of her husband or liable for his debts.—Robert Garrett Lumber Co. v. Loftus, 109 P. (Kans.) 179.

In a consolidated action by a contractor for the balance due on a building contract, and against the contractor because of the collapse of the structures, a charge that if the jury find that the contractor was to construct the structures under certain plans and specifications, and upon completion the structures gave way and became unfit for the use they were intended, then the contractor would be liable, etc., was properly refused, as incomplete, for failure to state that the giving way of the structure was due to failure to comply with the plans and specifications, and failure to state that the owners were free from fault.—J. W. Bishop Co. v. Curran & Burton, 76 A. (R. I.) 275.

In an action on a wrecking contract, a contention by defendant that the contractor was personal, and that plaintiff broke the contract by selling the building materials to other parties, who were to wreck the buildings and remove the materials, was untenable, since the work was not necessarily to be done by plaintiff in person, and, there being no assignment of the contract by plaintiff, his agreement with the parties to whom he sold the building material simply made them subcontractors in the work of wrecking, and the contract between plaintiff and defendant still remained, for the enforcement of the rights and duties of each other.—Wetter v. Kleinert, 123 N. Y. S. 755.

Defendant, S., after having conducted a store for some years under the style of S. & Co., had it incorporated in February, 1898, as the S. Company, of which he became president and secretary, and to which the firm property was transferred. The corporation decided to erect a new building on the premises which it leased, and at the request of its architect the plaintiff submitted to him a proposal to furnish certain material for the building, "all as per blue print submitted for building for Mr. S." At defendant's request, plaintiff's agent had an interview with defendant and the architect, at which plaintiff's agent consented to reduce the price for the material, which was noted on the written proposal, which was before the parties, and they made an oral agreement by which the plaintiff was to furnish the material required for the building and as called for by the architect's plans, etc. Plaintiff's agent did not then know that the defendant's business had been incorporated, and defendant made no mention thereof in their interview, but acted throughout as if contracting for himself individually; but the evidence showed that, so far as defendant had any intention, he intended to contract for the corporation. Held, that if defendant's conduct misled plaintiff's agent, so that he was justified in believing as a reasonable man that defendant contracted for himself, and not as agent for the corporation, defendant will be bound personally by the contract, and under the circumstances he was so bound.—Chelmsford Foundry Co. v. Shepard, 92 N. E. (Mass.) 75.

There can be no valid judgment of foreclosure of a materialman's lien for material furnished to a contractor upon the real estate improved with such material, in the absence of a valid judgment in favor of the materialman against the contractor for the price of such material. In a suit for the foreclosure of such a lien, where no personal judgment is sought, and the petition fails to allege that the plaintiff has a judgment against the contractor, and where the contractor is not a party to the foreclosure suit, it is erroneous to refuse to dismiss the petition on general demurrer.—Baldwin v. Shields, 67 S. E. (Ga.) 798.

A provision in a construction contract, providing for the allowance of additional time for completion in the event of delays from certain causes, but that no extension should be made unless a claim was presented in writing at the time of the delay, when the owner's superintendent should certify the additional time to be allowed, but permit the contractor to appeal from such award to arbitrators selected as provided, was not contrary to good morals or public policy, even if it made the owner's superintendent the final judge as to the time allowed as extensions, his award being binding if not made through fraud, mistake, or made arbitrarily.—Thompson v. St. Charles County, 126 S. W. (Mo.) 1044.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

978,588. Shutter manipulator and fastener. J. W. Huntley, assignor to R. T. Marsh, Rockhill, S. C.

978,781. Window-glass setting gauge. E. S. Rhoads, Kansas City, Mo.

978,654. Floor surfacing and polishing machine. Peter Sass, San Francisco, Cal.

979,285. Reinforced concrete construction. John Gilligan, Nebraska City, Neb.

978,908. Excavating apparatus. Wm. J. Leary, assignor to W. J. Leary Manufacturing Company, Jersey City, N. J.

979,910. Shutter operating and fastening device. Chas. W. Adams, Putney, Vt.

979,913. Building-block. J. M. Ault, Decatur, Ind.

980,031. Sash-cord pulley. H. G. Boight, assignor to Russell & Erwin Mfg. Co., New Britain, Conn.

979,614. Floor-surfacing machine. Wm. E. Warner, Houston, Tex.

983,115. Floor and ceiling plate. A. J. Beaton, assor. The Beaton & Bradley Co., New Britain, Conn.

983,046. Interior mold or form for concrete structures. F. S. Graef, New York City.

983,011. Locking device for emergency exit doors. H. G. Boight, assor. Russell & Erwin Mfg. Co., New Britain, Conn.

982,916. Comb-cover for corrugated roofs. Wm. E. Williams and K. Roth, Terre Haute, Ind.

983,474. Transom lift. E. E. Bell, assor. Concealed Transom Lift Co., Glen Ridge, N. J.

983,681. Hollow fireproof partition sliding door for fire-walls. R. W. E. Buttlar, Columbus, Ohio.

984,132. Device for cutting slits in brick walls. H. Geyer, Munich, Germany.

984,216. Framing for concrete and cement constructions. W. Henderson, Cleveland, Ohio.

984,034. Cellar-door construction. H. C. Seipp, Coraopolis, Pa.

984,993. Mold for forming concrete silos. C. A. Anderson, St. Charles, Ill.

987,706. Floor scraper. S. Drew, Rochester, N. Y.

988,277. Reversible window. Wm. H. Meizel and J. L., York, Nebr.

987,819. Building block. Wm. H. Osburn, Kokomo, Ind.

988,326. Metal reinforcement for building purposes. H. Ferree, San Francisco, Cal.

989,328. Tiling fo roofs. DeWitt W. Buchanan, Chicago, Ill.

989,344. Building block. E. J. Forbes, Revere, Mass.

989,016. Fireproof building floor construction. E. V. Johnson, Chicago, Ill.

989,219. Hinge construction for doors. R. G. Winter, Milwaukee, Wis.

989,830. Reinforced concrete construction. Fred A. Berne, Birmingham, Ala.

990,029. Fire escape. A. H. Borden, New Bedford, Mass.

989,564. Artificial stone building block. J. Buhler, Zurich, Switzerland.

990,119. Building block. P. D. Diamond, assor. Diamond Concrete Mchy. Co., Chicago, Ill.

990,151. Metal door. Robt. D. Mayo, Grand Rapids, Mich.

989,646. Combined door hanger. A. E. Rupp, Chicago, Ill.

990,437. Concrete block mold. J. Hartley, Gobleville, Mich.

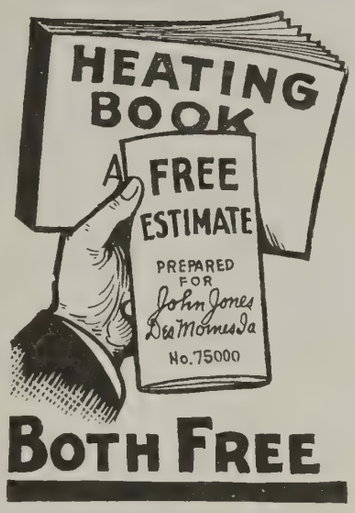
990,358. Emergency exit-door lock. P. W. Hodgkinson, assor. Caldwell Mfg. Co., Rochester, N. Y.

990,750. Device for locking the doors of emergency exits. O. Kublanck, Wittenberge, near Potsdam, Germany.

990,299. Reinforced cardboard and roofing plate. H. Schlisske, Musterlagke, No. 85 Hanover, Germany.

TRADE REVIEW

HOT WATER HEATING.



Not so very long ago, the coming of winter meant bringing out the old "base burner" from the woodshed to occupy the greater part of the parlor. Possibly a similar process took place in the dining room. Night and morning meant carrying coal and ashes through the house. But not even a "turkey wing duster" will clean up all the muss on the carpet nor will the zinc sheet prevent a hot coal burning a hole in the carpet and rug. In many homes every morning meant starting up grate fires in one or more rooms with the attendant labor of chopping up wood, etc., for the cold months.

The introduction of hot water heating was a great step forward toward proper heating of homes. From the discomfort of a local heat from a fireplace (a great part of which went up the chimney) there was the location of radiators under the windows, where the greatest cold came in. Instead of a draft from the window to the fireplace there was the gentle diffusion of heat throughout the room. In place of having a stove in the center of the room taking up the best part of the room, the radiator occupies only a small space in the most unobtrusive manner. Instead of lugging coal up from the basement or outside shed, the coal is piled within easy reach of the heater. Instead of one or two rooms unduly heated and the rest icy cold, the whole house is now evenly heated. In fact so many are the advantages of hot water heating that one who is accustomed to it cannot appreciate the discomforts of the early methods of heating.



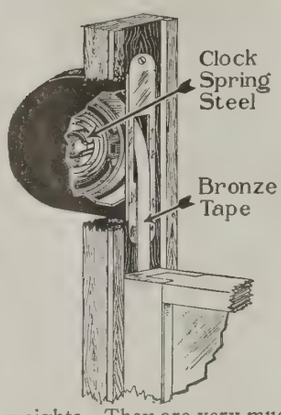
Ready to Ship.

Anticipating the demand for hot water heating for residences, the Andrews Heating Company of Minneapolis, perfected a system by which they could supply complete heating plants in such shape that they could be sent to the job and erected by such labor as was available. Suitable erection plans are sent and all the piping cut to the proper lengths in such a way that no cutting and threading pipe on the job is necessary. A boiler of their own manufacture is used, which the Andrews Company claim is more economical, requires less care and is easier to clean. The directions which they send are so complete that there is little chance to go wrong in the installation. It is only necessary for the prospective purchaser to send a sketch, showing the sizes of the rooms, doors, windows, height of ceilings and general construction and their engineers will prepare an estimate showing the cost of the entire plant at your station, including Boiler Fitting, Piping, Radiator, Expansion Tanks, Regulating Safety Valve, Packing, Bronze, Brushes, etc., in fact everything necessary to complete the job.

On account of the peculiar nature of a heating plant, it is frequently impossible to tell if a plant is satisfactory until it is up against cold weather. A very little heat may suffice for an ordinary spring day when there is only a chill in the air, but a real fire is necessary when it is down to zero and a blizzard raging outside. To provide for this, the Andrews Company give every customer a 360-day Free Trial Guarantee Bond, which allows the trial through the entire winter.

Closely allied to the heating system are the systems for plumbing, water supply and sewage disposal. The Andrews Company design systems for this purpose on practically the same basis as outlined for the heating. As it is more than likely that the Andrews Company can direct the prospective purchaser to a home near him where their systems are in use, they wish everyone contemplating building or putting in any of the systems mentioned above would write for their 72-page book, describing the various systems in much more detail than can be given in these columns. This book is sent free by the Andrews Heating Company, 1188 Heating Building, Minneapolis, Minn.

FIVE MILLION PULLMAN SASH BALANCES SOLD.



The Pullman Mfg. Company, Rochester, N. Y., have made and sold, and there are in use today, over 5,000,000 of their Automatic Sash Balances.

This goes to show that the old fashioned cord and weight for windows is doomed. The Automatic Spring Sash Balance has every advantage over cord and weight, for it is self-contained, neat in appearance and requires no pockets or box frames as cords and weights do.

The Pullman Sash Balance is so constructed that the tension of a spring exactly balances the weights of the sash. The window may be raised and lowered with the greatest facility. The sash will stay wherever it is put with no more tendency to raise and fall of its own accord than with cord and weight.

Pullman Sash Balances cost practically the same to install as cords and weights. They are very much more durable, for the bronze tape which supports the weight of the sash is practically indestructible, and everyone knows how long steel clock springs last.

The Pullman Mfg. Company inform us that notwithstanding the fact that there are now over 5,000,000 of their Balances in use, and that most of the repairs must come from them, the total new tapes supplied do not amount to 100 a year, and most of these new tapes are called for when some careless person in setting a sash or removing one, has accidentally put a kink in the tape.

Architects and builders who hesitated to use the Pullman Sash Balance when it was first put on the market because of a feeling that it might not prove durable, have long since discarded this idea, for experience has shown that no other item of builders' hardware has more lasting qualities than the Pullman Sash Balance.

BUILDERS' HARDWARE.

The National Manufacturing Co., Sterling, Ill., have just issued their 1911 catalogue of Builders' Hardware. Since issuing their last catalogue they have completed and occupied a large addition to their plant. The floor space now covers some 100,000 sq. ft., or approximately two and a half acres.

While making a complete line of regular builders' hardware, the attention of the contractors and builders are centered on their barn door hangers and fittings, sliding door hangers, and special ventilating sash locks, all of which display remarkable ingenuity and are particularly adapted to their purpose.

Contractors and builders will find much more of interest in the catalogue than is indicated above, and we are advised that a copy will be sent on request.

THE WEBER WAX POLISHER AND SANDER

There is great demand for a small wax polisher and sander, if it is handy and effective.

Knowing this, Mr. John F. Weber, who has made almost a life study of contractors' needs, has perfected a polisher on an entirely new principle.



It is composed of three castings, three screws and a handle. The weight is separate and, when a thumb screw is loosened, the sandpaper block can be set at any angle. This gives as many different scraping surfaces as there are angles, and nearly doubles the life of the sandpaper. When the sandpaper does become worn out, a new sheet can be set in place in an instant.

When used as a wax polisher, a tough bristle brush of best quality fits into the place of the sandpaper block. The polisher is then ready for use. Special care has been taken to provide a weight just heavy enough to impart a fine finish without being hard to transport.

Both the sandpaper block and the brush fit into a clamping arrangement in such a way as to bring them flat and even on the floor. This care has resulted in producing a true "lineless" finish all over the floor.

Besides using this polisher themselves, contractors find a ready sale for them. After finishing up a house, it is a simple matter to sell one to the owner, because its utter simplicity and handiness—with its superior work—speaks for itself.

Contractors are asked to write to Weber Mfg. Co., 661 71st Ave., West Allis, Wis., for complete particulars and prices on this polisher and on a number of other modern money-saving devices, including the famous Weber Double Acting Floor Scraper.

CAPT. JOHN SMITH.

A short narrative on the life of this distinguished traveler, whose romantic adventures are more or less traditionary. On the grounds that the statements of manufacturers are true, the biographer bespeaks consideration for his Smith story.

It is a readable piece of history and should appeal to every member of the Smith family, as well as historians, and incidentally the users of Carborundum. The booklet is sent free on application to the Carborundum Co., Niagara Falls, N. Y.

The NORTHWESTERN TERRA COTTA COMPANY

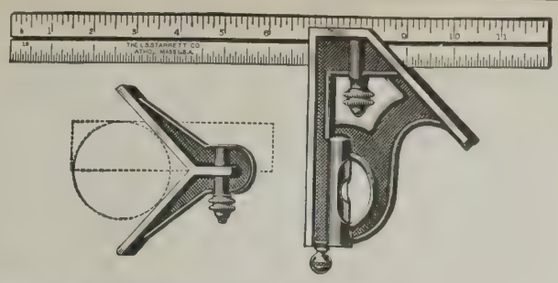
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HESS MEDICINE SANITARY CABINET LOCKER



The Recessed Steel Medicine Cabinet

The Only Modern, Sanitary STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles—four sizes. To recess in wall or to hang outside.

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The Outside Steel Cabinet

HESS, 907 L Tacoma Bldg., CHICAGO

Makers of Steel Furnaces. *Free Booklet.*



The A. W. True Residence, Hinsdale, Ill.

143 Cities USED "Stonekote" ROUGH CAST in 1910

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ASBESTOS "CENTURY" SHINGLES

"THE ROOF THAT OUTLIVES THE BUILDING"

How long your client's pride in the building will last depends on how the roof holds out in the face of exposure to weather and storm. Long after the average roofing begins to show its age, cracked or warped, rotted or rusted, Asbestos "Century" Shingles are bright and fresh as new.

Asbestos "Century" Shingles are the first practical lightweight roofing of reinforced concrete—made of hydraulic cement with interlacing asbestos fibres—compacted by tremendous pressure.



Asbestos "Century" Shingle Roof—Residence of E. W. Twaddell, Devon, Pa.; E. S. Parson, Philadelphia, Pa., Architect; Simon Heister, Wayne, Pa., Contractor

They are weatherproof—fireproof—timeproof. Cannot rot, rust, crack, split or blister. They literally outlive the building—without repairs or painting.

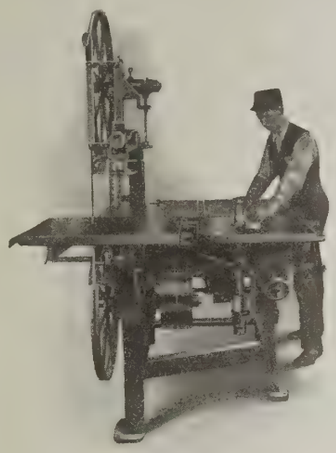
You can get Asbestos "Century" Shingles in shapes and sizes to fit any architectural scheme. Three colors—Newport (silver gray), Slate (blue black), and Indian Red. Ask your Roofer for new quotations. Write for booklet "K. & M. 1911."

The Keasbey & Mattison Company, Factors, Ambler, Pa.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A COMPLETE MACHINE SHOP EMBODIED IN ONE MACHINE.

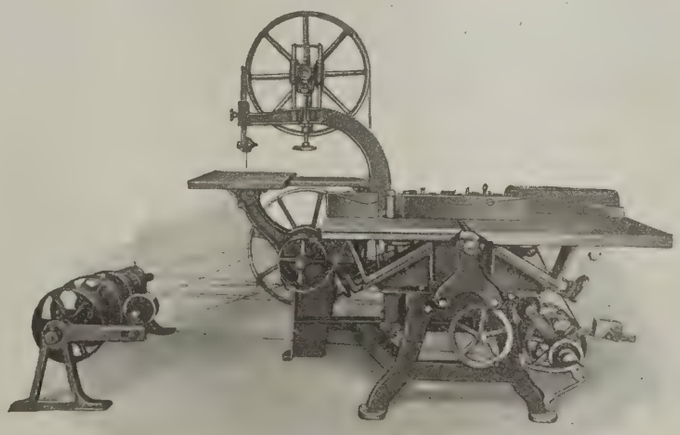
As in every other business competition among carpenters and builders is often keen, and the "little fellows" are often at their wit's end to figure out some scheme whereby they can bid on equal terms with their rivals and stand a better show of capturing the contract. After all it is only a matter of lessening the costs of production, and any proposition proving a means to this end should be thoroughly investigated.



But how to cut the costs! Various ways and means may be suggested, but the most prominent is that of cheaper millwork. Local planing mills can charge high prices and get away with it; you can not save anything in that direction. Clearly the only thing to do is to install your own planing mill; in other words, operate your own machine shop. This can be done by installing just one machine.



You may argue: "What's the good of one machine when I have a dozen different kinds of work to perform? Is it possible to use one machine as a band-saw, as a joiner, as a planer, as a mortiser and tenoner, as a sander, etc., etc.? I cannot afford to buy separate machines; furthermore, I have not sufficient floor space to install them or men to operate them."



Our answer to this argument would be to refer them to the No. 14 Famous Universal Woodworker, made by the Sidney Tool Co., of Sidney, Ohio, which does sixteen different kinds of work, each of which is performed by making a few simple adjustments. That carpenters and builders have been quick to realize the possibilities offered by this machine is proven by the fact that six hundred have been sold during the past two years, and that it is satisfactory is demonstrated by their all being in use today; not one has ever been returned or reported unsatisfactory.

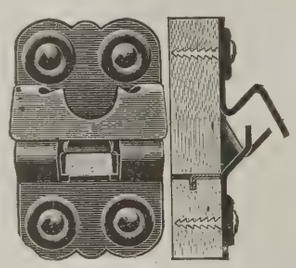
The principle of constructing one machine to take the place of several is not new, but only one firm (the above named) have perfected it to the extent that it actually displaces over a dozen, without deteriorating from the quality of work to which the trade have become accustomed. Each of the various kinds of work can be performed as good, as quick and as clean on the Famous woodworker as on a machine built to do just one thing.

The No. 14 comprises the following sixteen machines: 27-in. Band Saw; 12-in. Joiner; Saw Table (with raising and lowering arbor); Single Spindle Shaper; Boring Attachment (arranged on special boring spindle); Pony Planer; Tongue and Pole Rounder; Hollow Chisel; Mortiser; Single End Tenoner; Drum Sander; Disc Sander; Knife Grinder; Emery Grinder; Band-Resaw; Spoke Tenoner; Rim Borer and Wheel Equalizer; Adjustable Felloe Rounder.

Consider the advantages of this method. Consider that you are doing your own millwork in your own shop, free from the delays and high charges of planing mills, putting their profits in your own pocket, and cutting down production costs that much. And remember there are no machines lying idle, practically no extra floor space required, no high-priced labor to pay, as anyone can operate the Famous. The Sidney Tool Co. will gladly send their catalogue, prices and terms upon request. Further information is given in their advertisement in this number.

WATROUS "SAFETY" SASH HANGERS.

The E. L. Watrous Mfg. Co. of Des Moines, Iowa, are offering to the trade the new No. 18 Safety Sash Hanger, as shown in the accompanying illustration. The makers claim for it the following points of superiority.



1. Always works perfectly. Impossible to set it wrong.
2. Quicker and easier to set, saves labor and money for carpenter and householder.
3. Will not blow off or be dropped by children or careless servants. The projecting guard will not let the sash come off till it is pushed out about half arm's length, where a little lift and pull unhooks it easily.

This hanger is packed with barbed car nails instead of screws. Nine carpenters out of ten drive the screws on these jobs with a hammer anyway, and a barbed nail will hold more than a driven screw, besides being easier to drive straight, and less likely to split the wood.

The guiding lug which locates the lower section of the sash prevents mistakes and insures perfect working of the hinge.

Anyone familiar with the sash trade knows the weird mistakes even a good carpenter will make in hanging screens and sash, and how often angry customers will condemn a sash hanger as "no good" when it is only set wrong, perhaps even upside down. Full directions are printed on the wrapper of each set of the "Watrous No. 18."

METAL CEILINGS AND METAL CONSTRUCTION IN SOUTH AMERICA.

Advices have been received from South America of the progress of Yankee-made products in that section of the globe. Manufacturers have been able to secure a reliable line on the likes, dislikes and demands of the public as a result of the wide range of exhibits shown at the Railways and Land Transport Exhibition, held in Buenos Ayres, Argentine, last August.

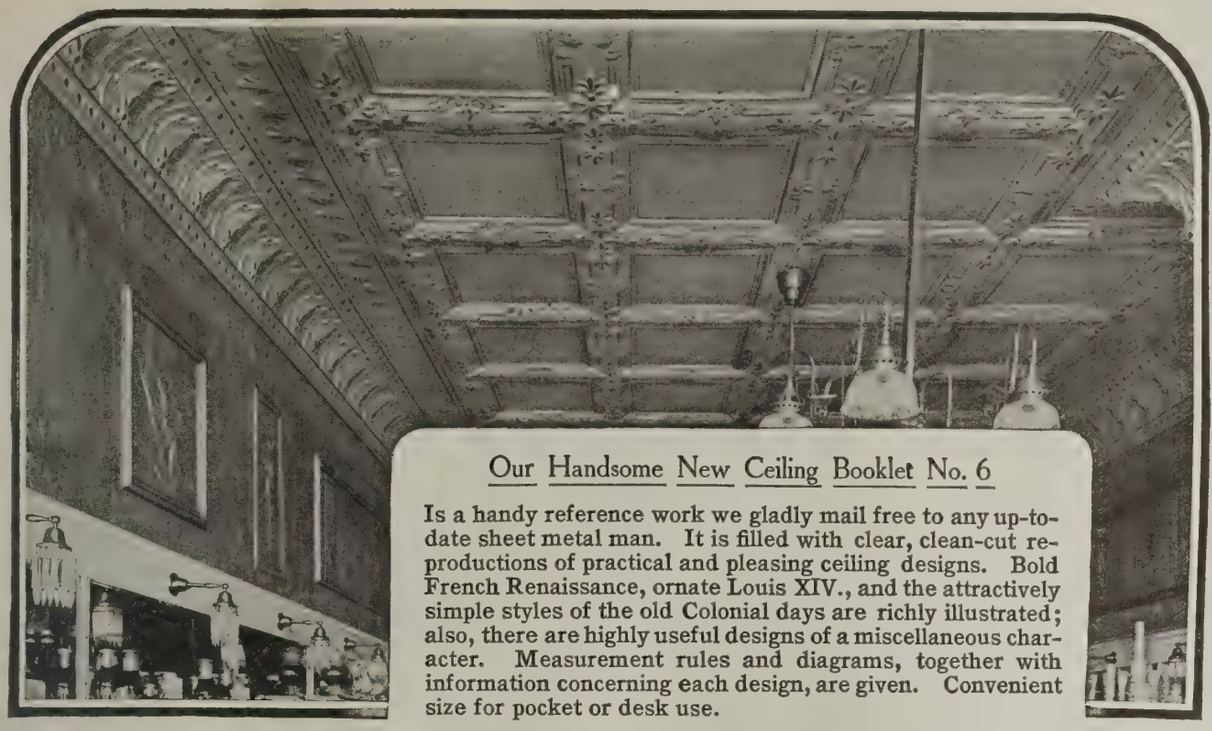
As representatives of American, German and British manufacturers of all kinds of articles, Ritchie Hermanos y Cia reserved much space at the exhibition and an entire page of the weekly edition of the Buenos Ayres Herald was given over to a discussion of the articles.

Among those mentioned as taking a firm hold in Argentine and other South American countries were the metal construction specialties, the metal ceilings and the steel furniture made by the Berger Manufacturing Company of Canton, Ohio. One of the exhibits was a small railway station building erected to show the advantages of the metal specialties. Its chief feature was its framework of metal lumber, which is designed to eliminate timber from the frames of light buildings.

This was hailed as something new and highly advantageous by Argentine contractors and builders. This new form of quick and light building construction is made of steel pressed into various shapes to form joists, studs, rafters, channels and many other members in general use. All these parts have prongs projecting every four inches when it is desired to fix expanded metal lath, so that the troublesome process of wiring the lath is done away with, it only being necessary to clinch the prongs to hold the lath.

Part of the building arranged for the exhibit was finished in Portland cement, showing solid partitions and hollow walls, both with expanded metal lath. A part was left as a skeleton to show the details of construction.

The Argentine Company, Ritchie Hermanos y Cia, has been doing a big business among contractors and builders as the result of the display at the exhibition, while they have installed a great deal of metal furniture and contracted for metal ceilings in many public and private buildings, particularly in Buenos Ayres.



Our Handsome New Ceiling Booklet No. 6

Is a handy reference work we gladly mail free to any up-to-date sheet metal man. It is filled with clear, clean-cut reproductions of practical and pleasing ceiling designs. Bold French Renaissance, ornate Louis XIV., and the attractively simple styles of the old Colonial days are richly illustrated; also, there are highly useful designs of a miscellaneous character. Measurement rules and diagrams, together with information concerning each design, are given. Convenient size for pocket or desk use.

We will mail your copy tomorrow if your address reaches us by that time.

THE EMPIRE IRON & STEEL CO.

64 East Lake St., Chicago, Ill. NILES, OHIO 345 Fifth Ave., New York, N. Y.



YOUR SUCCESS IS OUR NECESSITY

We Want to Show You Why

Your success is our necessity, because you will not buy our ceilings unless there is profit in them for you and satisfaction for your customers.

The great variety of our Art Metal Ceiling and Sidewall Designs insure the customer's preference when shown our Catalogue. Send us plans with measurements and we will prepare drawings of appropriate ceilings, without charge, and name you low price on all material, F. O. B. your station.

Get our Catalogue B and agency proposition

THE TIFFIN ART METAL COMPANY

TIFFIN, OHIO

Manufacturers of Metal Shingles, V Crimp and Corrugated Roofings and Sidings, Eaves Trough, Conductor Pipe, Ridging, etc.



The Home Beautiful

can also be made the home durable by erecting

"BERGER'S Classik" METAL CEILINGS

which have been developed by twenty years of constant manufacturing by The Berger Mfg. Co., the largest sheet metal works in the world.

Get one of our handsome illustrated catalogues and show your customers what artistic, durable, sanitary, fire-proof steel ceilings you can furnish.

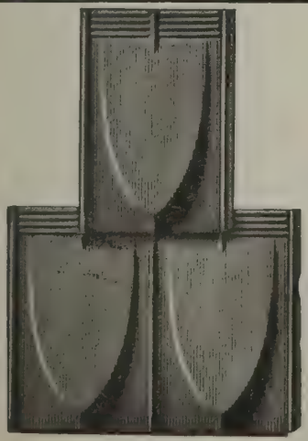
New York Boston Philadelphia St. Louis

There's profit in it. Write today.

The Berger Mfg., Canton, O.

Chicago San Francisco Atlanta Minneapolis

We also manufacture Black and Galvanized Roofing, Eaves Trough and Conductor Pipe, Sidewalk Forms, Sidewalk Lights, Tin Plate, etc.



STYLE B.
Showing Method of Laying

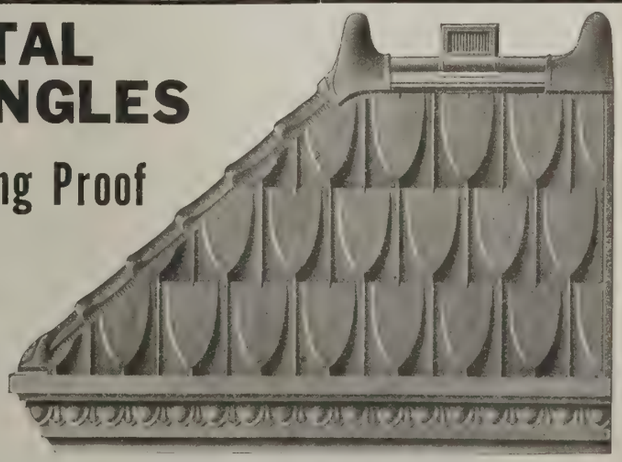
"TITELOCK" TRADE MARK METAL SHINGLES

Fire, Water and Lightning Proof

ASK FOR SAMPLES AND CATALOG

Milwaukee Corrugating Co.

MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

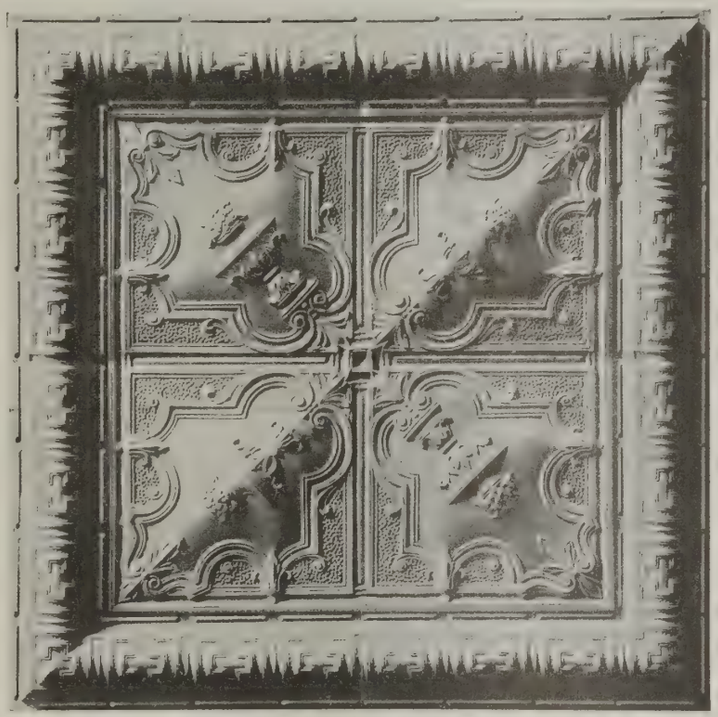
METAL CEILINGS.

The Edwards Manufacturing Co., of Cincinnati, Ohio, are sending out their 1911 catalogue of Embossed Metal Ceilings and Side Walls. They have recently completed extensive new factories with specially designed machinery, and are in a position to turn out work of the best grade in construction, quality and appearance.

The advantage of Metal over other forms of decoration are many, most of them obvious to the thinking contractor and builder. It is healthier and drier than plaster and of course undergoes no risk of coming down accidentally. The saving on Fire Insurance is an item, while it is as ornamental as plaster or wood carving at a fraction of the cost.

In some locations it is necessary to clean the surface frequently and here the advantage of metal over wood or plaster is immediately apparent. As the metal takes paint readily any desired decoration may be applied. As a rule, it is recommended that a flat finish be applied as this will better bring out the detail of the stamping.

With every metal ceiling sold, the Edwards Company furnish a drawing showing the arrangement of the metal, which will enable the builders to erect the work without loss of time for laying out, fitting, etc.



While it is manifestly impossible to review all the advantages of metal over other forms of decoration a glance at the cut at the top of this article will convey an impression of the beauty of the finished work and the purity of style with which the designers have worked. The catalogue contains nearly 200 10x14 pages and shows a great variety of styles in plates, moldings, cornice, fillers, panels, wainscoting, etc., for every purpose. A great variety of finished rooms are shown including halls, stores, theaters, restaurants, banks, residence interiors, bath rooms, etc. The Edwards Mfg. Co., are placing their goods through local representatives as far as possible, and we understand that there are a number of excellent opportunities for contractors and builders to represent them in their locality.

INVESTIGATE THIS LEVEL.

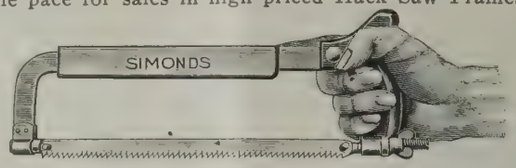
To those of our readers who are not already familiar with the merits of the Bostrom Level, or those who have been a bit skeptical on account of the very moderate price fixed by the manufacturers, we make a special request that a careful reading and consideration be given to the manufacturers' new announcement in this issue.

While a large number of our readers have already taken advantage of the opportunity of equipping themselves with one or more of these moderate priced, but thoroughly dependable Levels, there are those who have assumed since it has heretofore been necessary to pay much more to obtain a satisfactory Level, that it is still so, but the best proof of the incorrectness of this reasoning is the fact that those who have put their money in a Bostrom Level are the ones who have, by their unreserved and unqualified endorsements, established the fact that Bostrom's Improved $25.00 and $30.00 Builders' Levels accomplish all that is required or expected of Levels costing double the price, and in many instances meet individual requirements as completely as instruments costing several times as much.

You will find the manufacturers, Bostrom-Brady Manufacturing Company, of Atlanta, Ga., thoroughly reliable in their dealings, and we hope a large number of our readers will carefully read and accept their offer, as it is certainly as liberal as one could ask, the manufacturers assuming all risk, they requesting simply an investigation, thus allowing the instrument to make its own sale or not, you being the judge.

NEW HACK SAW FRAME.

The Simonds No. 41, Straight-Cut Hack Saw Frame, patented February 11, 1908, and just lately put on the market, is said to be setting the pace for sales in high priced Hack Saw Frames.

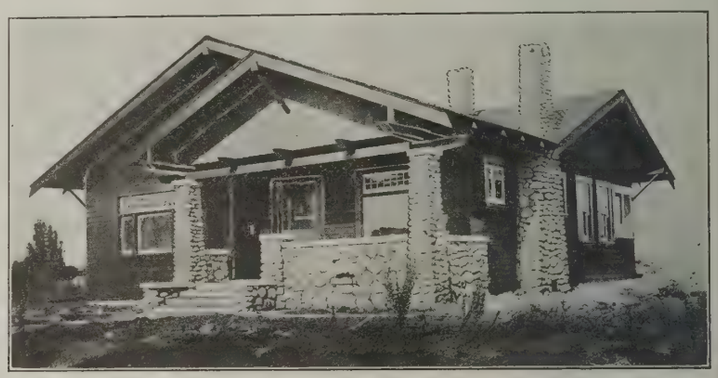


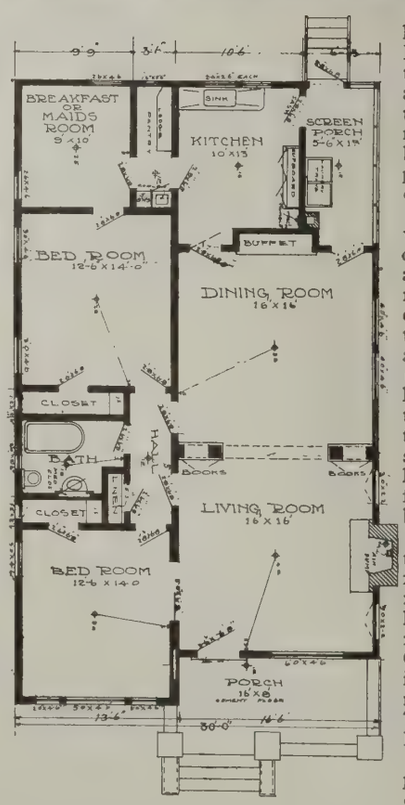
The straight-cut idea is decidedly novel and the Simonds' adaptation of that idea is one of the most simple and practical ones so far presented. The mechanic will readily appreciate the advantages of using a Straight-Cut Hack Saw Frame since with one hand he gets a better control over his work when using a Straight-Cut Frame than he had with both hands when using the old style frame.

The Simonds No. 41 is adjustable to blades from 8 to 12 inches long. It is manufactured exclusively by Simonds Mfg. Company, Fitchburg, Mass., and Chicago, Ill.

A CONVENIENTLY ARRANGED SIX-ROOM BUNGALOW.

By The Bungalowcraft Co., 407 Chamber of Commerce, Los Angeles, Cal.





This attractive little house has just been completed in Los Angeles at a cost less than $2,500, with oak floors and paneled wainscoting in the living room and dining room; built-in buffet, pressed brick mantel, large open fireplace, built-in bookcases, etc.

The exterior presents a well balanced and artistic combination of cobble stones and wood with a low pitched roof of simple but attractive design. The floor plan shows the arrangement of rooms and the many attractive and convenient features of the house. The endeavor throughout the planning of this house has been to save steps and labor for the housekeeper and a full measure of success has been attained.

As built in Los Angeles there was no cellar and no furnace, but this could readily be arranged if the house is built in a cold climate. The inside trim is of Oregon Pine, stained, except in the bathroom and bedrooms, where it is enameled. The walls are plastered with hardwall plaster and tinted.

The Bungalowcraft Company state that any inquiries regarding bungalows or bungalow building will receive prompt and detailed replies without charge.

ECLIPSE CONCRETE MIXERS.

In Bulletin Y 40, The Standard Scale & Supply Co., 1345 Wabash Ave., Chicago, illustrate a very complete line of Batch Mixers.

To be of practical use a Mixer must have wide usability. It should mix grout or dry plaster, top finish, or heavy gravel from the pit for massive foundation. For speed it must be loaded and discharged quickly, and above all, must be portable, for concrete must be mixed on the job under the eye of the superintendent, who has his other eye on the placing of the concrete. The experienced contractor will be quick to see the advantages of the Eclipse as shown and described in the above mentioned bulletin, which will be sent on request.



HOW THE MOTORCYCLE
INCREASED ONE CONTRACTOR'S EFFICIENCY

NOT long ago a prominent contractor (name and address on request) said to us. "I simply couldn't get along without my 'Harley-Davidson.' I find I am able to gather data, estimates, etc., much more quickly than I could when using my automobile. I have to-day several large contracts in different parts of the city which I could not superintend profitably without my motorcycle. It brings me the nearest to being in two places at once of any means of transportation I know of."

How many times Mr. Contractor, have things gone wrong because you were not there? How many times the cost of a good motorcycle have you lost by such absence? You can be there and five miles away to see a prospect and back in 15 minutes.

How many times have you found yourself unable to make the personal calls you should have? How many times have you found yourself tired out from long walks or car rides before the day's work was scarcely begun?

A Harley-Davidson motorcycle will do the road work of five horses and permit you to do the work of two men with less labor than at present. It means hot lunches at home, pleasant evenings, no tiring walk and long car delays.

Let us tell you how a Harley-Davidson will increase your earning power. Send for booklet 185.

HARLEY-DAVIDSON MOTOR COMPANY

707 L Street, MILWAUKEE, WIS.

"THE SILENT GRAY FELLOW"



Quick Transportation of Tools
Light Finishings and Other Materials

Carpenters, contractors and builders can save time by using an International Commercial Car. You know from experience that you require some means for the quick, cheap transportation of hundreds of "little things" that otherwise cause delay. Our International Commercial Car is what you need. It works whenever you want it to—in all weather, over all roads.

INTERNATIONAL COMMERCIAL CARS

never "tire," never go "lame," never "eat" except when in actual use. They travel three times as far as a horse, at less cost, with heavier loads. They take up less barn space, are clean, simple, strong and durable.

This car can also be converted into a double seated pleasure car if desired.

Write us for all the facts. You will be interested in what we have to tell you about International Commercial Cars.

International Harvester Company of America
(Incorporated)

81 HARVESTER BUILDING, CHICAGO, U. S. A.

A Roof of Slate is the Best Roof You Can Buy



On Churches, Schools, Public Buildings, Dwellings, Barns or Buildings of any kind—a roof of slate improves property values and lowers fire insurance costs; and where drinking water is collected off the roof, it **is the safest roofing obtainable.**

—As a roofing material of solid rock slate still stands supreme; not because it **costs** less, for the **first** cost is a trifle more than for shingles, iron or felt, but because it **never** wears out nor requires repairs.

Sea Green or Purple
Roofing Slate

is absolutely impervious to climatic conditions. It resists the action of air, water, snow, ice, fire, sun and lightning; it cannot warp, crack, splinter, or decay. It is perfectly water-tight, and once laid—will outlast the building it covers.

Write to Us for Delivered Prices

on all sizes and grades of roofing slate delivered at your nearest railroad station. Also prices on Slater's tools and supplies.

Ask for FREE Book of Instructions

We solicit correspondence—even if you won't require the slate until later. Write to us today—now.

American Sea Green Slate Company

"Roofs that Never Wear Out"

Box 150 **GRANVILLE, NEW YORK**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



GEORGE H. BISHOP.

The many friends of Geo. H. Bishop were shocked to hear of his sudden death on April 14th, at French Lick Springs, where he had gone to recuperate after an extensive Western trip. Mr. Bishop was president of Geo. H. Bishop & Co., of Lawrenceburg, Ind., and made friends, and retained them, through his genial disposition and kindly manner, which endeared him to all his acquaintances. While of a most kindly spirit, Mr. Bishop was at all times an exceedingly aggressive man. At an early age he left his home in Southern Indiana and made his way to Cincinnati, Ohio, where his first business experience was gained in the jewelry establishment of Duhme & Company. Late in the '80s he became connected with the National Saw Company, representing them on the Pacific Coast and in Canada and British Columbia, until their absorption by another manufacturer.

Mr. Bishop then purchased a factory at Lawrenceburg, Ind., the present location of the Bishop Saw Works. He was a 32nd degree Mason, Knight Templar and Shriner. The funeral services were conducted by Trinity Commandery No. 44 of Cincinnati, in the Scottish Rites Cathedral.

HARDWARE SPECIALTIES.

At the time the Wilcox Manufacturing Company, of Aurora, Ill., consolidated with the Richards Manufacturing Company of the same city, to be known as the Richards-Wilcox Manufacturing Company, the former company had in the press an extensive catalogue of their hardware specialties.

This catalogue, which is now in our hands, shows a very complete line of well known Wilcox Door Hangers, and also their specialties, among which are Bench Vises, Wrenches, Store Ladders, Grindstones, etc. Particular attention is called to their Auditorium Hanger, by means of which two rooms may be thrown in one, or a large room as quickly made into two or more. This hanger is used extensively in schools, churches, lodge rooms, etc.

Aside from making the goods of the materials best suited to their use, the most important qualities should be adjustability, that it may overcome inequalities in the floor, settlement, etc., and permanence, requiring no repairs or adjustments in the hardware itself, due to working loose or wearing unevenly. The appearance of the goods illustrated and described would indicate that the Richards-Wilcox Manufacturing Company had brought the goods to a high standard of perfection. A catalogue of all these interesting speciatlties will be sent to the carpenters and builders who write to the Richards-Wilcox Manufacturing Company, Aurora, Ill.

GALVANIZED WALL TIES.

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., are mailing a folder descriptive of their 12-in. Galvanized Wall Ties. These ties are invaluable for stone and concrete block walls, where there is a danger of cracks or openings occurring in the walls due to faulty foundations or imperfections in mortar or laying. Every tie that is sent out from the factory is thoroughly well made, and the fact that many of the leading architects are including them in their specifications speaks well for the quality of the product. Concrete block walls have quite as much tendency to crack as brick walls, and probably more, and the ties, whether single or double width, properly placed and used in sufficient numbers are proof against cracks. Builders and contractors desiring samples should write the manufacturers, as they are glad to send samples free to any one interested.

INCREASING DEMAND FOR BRICK FIREPLACES.

The growing interest in brick mantels and fire places renders it imperative that the architect and builder should have close knowledge of the subject, for while nothing is less attractive than a crude arrangement of poor bricks poorly arranged, and called a fireplace, the sold dignity and elegant simplicity of a real brick mantel appeals to every person of good taste. Brick fireplaces were formerly thought only appropriate for clubs, hotels, large residences and other places where space and money were abundant. At present, many plans for moderate sized and cost homes are arranged for several brick mantels. The magazines devoted to home building have steadily created a strong desire for the right kind of brick mantels in a nation rapidly growing in culture as well as wealth.

The Bradford Pressed Brick Company of Bradford, Pa., have produced for sixteen years the highest type of face brick. Their reds gave the rich, warm color of the natural shale peculiar to that part of Pennsylvania. Their mantel catalogue shows a great variety of shapes and sizes in their moulded lines. The bricks are packed and marked and their laying so accurately described that no builder can fail to construct a perfect fireplace and mantel that will be free from defects, once seeming necessary in a brick fireplace.

The cost of the bricks, panels, moulding, returns, etc., for a complete mantel will vary from $23 to $56, and the setting can be done by any good mechanic. Correspondence is invited by this reliable company, whose product has been favorably known to the editors of THE NATIONAL BUILDER for many years.

MODERN INTERIOR TRIM.

In a recent number of the National Builder several arrangements were shown for utilizing the space of unused door openings. Frequently there is not room for a large pier glass without inconvenience somewhere, and it is with the purpose of supplying the want without the inconvenience that the Huber Builders Material Company of Cincinnati, designed the door shown herewith. As will be seen, the door simply has a large plate glass mirror in place of the wood panels usually furnished.



It is possible that to some, the grain in the wood panels and rails is preferable, but in many places, space is an item and the mirror door will usually be given the preference. The appearance is often that of an enlarged room while the usefulness of the mirror is apparent.

The door shown above is only one item from the 1911 catalogue of the Huber Building Company. This catalogue should be in the hands of every contractor and builder as there are many bargains and novelties listed. This catalogue is sent free by the Huber Building Company, Vine and Second Sts., Cincinnati, Ohio.

WOOD CARVINGS.

The great charm of wood carving, whether on a part of the structure or as applied ornament, has occupied the minds of the best artists for centuries. Until the introduction of high grade wood working machinery, the cost of this class of work was so high as to allow its use on only the most expensive work. At the present time, however, the improvements in processes of manufacture enable the cabinet maker, carpenter or builder to secure the highest grade of work at only a slight increase over the cost of the materials.

There are few concerns which have done more to improve methods of manufacture and bring the business to a commercial and artistic perfection, than the Waddell Manufacturing Company of Grand Rapids, Michigan. In their catalogue and revised price list No. 21 are shown over a thousand designs of wood carvings. Stair work, Newels, Ramps, Easements, Balusters, Mouldings, Ornaments, Grilles, etc., for practically every purpose in building or furnishing. There are grilles and pedestals for the house, knobs, rosettes, and scroll ornaments for furniture. By their improved methods they produce all the fine effects of handwork at machine prices. They also employ a staff of skilled designers and hand carvers, by which the designs of the architect may be carried out from either sketches or detail drawings. This service is only slightly more expensive than the machine work, and adds greatly to the individuality of the work.

The catalogue shows in photographic reproduction their stock patterns. From these can be seen the artistic perfection and beauty of detail of the carvings, and it is usually possible to make a selection particularly adapted to the work in hand. A charge of 15 cents to partially cover the cost of packing, postage, etc., will bring the book to any of the National Builder readers. Address the Waddell Manufacturing Company, 67 Coldbrook St., Grand Rapids, Mich.



Buy Saws Only When You Need Saws

But when you need them buy

SIMONDS SAWS

Pronounced SI-MONDS

This Saw is the Manufacturer's own brand saw; therefore note carefully the trade-mark which is on it. It is covered by the manufacturer's guarantee. It is vouched for by hundreds of Carpenters throughout the United States who during the past few years have slowly but surely become better acquainted with this saw. It is made of Simonds Steel, a steel manufactured exclusively for saws in Simonds' own steel mill.

Note the pronunciation of the name. Ask your Hardware Dealer for the Si-monds Saw. Each Saw packed in a separate case. This Saw is made especially for those who care to pay just a little bit more for the satisfaction of owning a superior article.

Simonds Manufacturing Co.

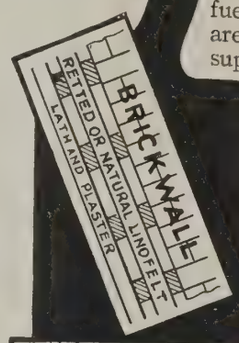
Fitchburg, Mass.	San Francisco, Cal.
New York City	Lockport, N. Y.
Portland, Ore.	Montreal, Que.
Vancouver, B. C.	Seattle Wash.
Chicago, Ill.	London, Eng.
New Orleans, La.	St. John, N. B.

Sheath Your Houses With LINOFELT

Linen-Felt made from Flax-Fibre

38 Times More Effective Than Building Paper

BUILD houses that keep the outside *out* and the inside *in*, that keep *out* the cold of winter and the heat of summer, that keep *in* the warmth in winter and the cool in summer. Put up houses and buildings that keep out sound, the rooms of which are quiet and restful. Getting these features will add less than one per cent to the cost of your house, will add more than 40% to its comfort and living value and will effect a constant saving of 40% in all fuel bills. Architects, contractors and carpenters are the ones able to appreciate most the superiority of **Linofelt** because they know how unsatisfactory is ordinary building paper.







These Plans Show The Method

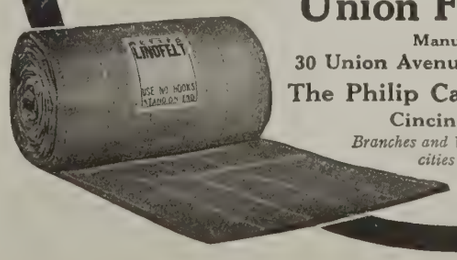
They show you clearly the practical and simple method of insulating walls and floors with **Linofelt**. Every carpenter, every builder, every architect realizes just what these little plans mean. They are keen to the advantages of building according to these methods. They know how important such efficient insulating of walls, floors, ceilings and partitions is to *all* classes of homes and buildings. We might emphasize residences, office buildings, hospitals, school buildings, stores, and buildings constructed for manufacturing purposes. These must have the uniform warmth in winter, coolness in summer and the quiet all the time that **Linofelt** insures.

Anyone who knows **Linofelt** immediately becomes enthusiastic about it—because it has so many delightful features. It is an insulating quilt. No other is as light as **Linofelt** cubical contents considered. It comes from the same source as linen. It is made from flax in the largest flax market in the world—Winona. It is odorless, chemically clean, as sanitary as a surgical dressing.

We have had made comparative tests of **Linofelt** and other sheathing mediums for sound deadening qualities. We will send them on request. The same sound heard 200 feet through ordinary building paper is heard only 2 feet away through **Linofelt.** Tests prove **Linofelt** more than 38 times as effective as building paper for all uses.

Let Us Place All The Data In Your Hands

Let us send you an attractive book for Architects, Contractors and Carpenters showing **Linofelt** in all forms, telling how it is made, showing and explaining plans and methods of using **Linofelt,** illustrated with excellent photographs of residences and buildings built with **Linofelt,** located in different climates. Let us send you this meaty book because it also tells in like manner of Lith Board and Rock Wool. Let us acquaint you with our Service Department, our own engineers, who have a world of experience in insulating work, who have pursued it under all sorts of conditions for a great many years, who are fully equipped and qualified to be of the greatest assistance to you in your work, whom you can consult at any time regarding any of your work *gratis*. Let us send you a **free** sample of **Linofelt** so that you can see it with your own eyes and feel it with your own hands and have a close realization of its extreme effectiveness, have a firm knowledge that it will do *more* than we claim it will do. Get the book, the service, the sample by writing to us today. **Please ask us for the name of the dealer nearest your home.**



Union Fibre Co.

Manufacturers

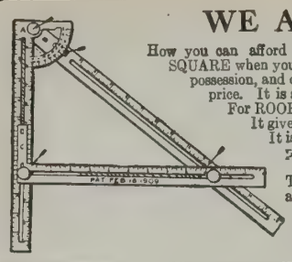
30 Union Avenue, Winona, Minn.

The Philip Carey Co., *Distributors*

Cincinnati, Ohio

Branches and Warehouses in all the large cities in United States, Canada and Mexico.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



WE ARE WONDERING

How you can afford to get along without the A B C PROTRACTOR SQUARE when you can BUY IT FOR $2.00. If you had one in your possession, and could not get another one, you would not sell it at any price. It is a TIME SAVER and mistakes are IMPOSSIBLE. For ROOF, STAIRWAY and CIRCULAR work it has no equal. It gives lengths as well as bevels.

It is no new method, just the old one made easy by the proper construction of the tool.

IF NOT SATISFIED with the A B C PROTRACTOR SQUARE, return it to us within 30 days, and your money will be CHEERFULLY refunded.

Write for Circular "N"

CROOKSTON TOOL CO., Crookston, Minn.



COLD WEATHER TROUBLES IN SHINGLING
OVERCOME BY

Pearson's Nailer



for it works as well in one season as another. Wear your gloves or mittens and (with it) drive more nails than you ever did. Quit using your mouth as a nail pouch. **PEARSON NAILERS are made in two sizes.** The Blue Nailer is for common 3d No. 14 wire nails, and the Red Nailer is for the galvanized 3d, No. 13, 1¼-in. wire nails. **$5.00** each express prepaid. Money cheerfully returned if Nailer is not as represented.

Write for Circular "N."

PEARSON MFG. CO. : Robbinsdale, Minn.

Producers of —— **ROOF SLATES** BLACK GREEN PURPLE RED

Slate Blackboards Guaranteed Strongest and Best Finish

Pamphlet with setting instructions on application

THE E. J. JOHNSON CO.

Main Office:	Branch Office:	Quarries:
38 Park Row, New York	626 Park Bldg., Pittsburg	Pennsylvania and Vermont

ARCHITECTURAL DRAWING MADE EASY

By I. P. HICKS — 94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over

170 PAGES—CLOTH BOUND—PRICE $1.00

I. P. HICKS, Box 22, Station A Omaha, Neb.

PHŒNIX INSIDE SLIDING BLINDS

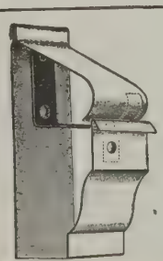
COMFORT CONVENIENCE ECONOMY

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.
Write for Catalog P-T.

PHOENIX SLIDING BLIND CO., PHOENIX, N. Y.

Over 4,000 Builders and Architects Bought copies of the second edition of "California Bungalow Homes" during 1910. Half of them wrote back that the book was worth many times its cost. New (3rd) edition is just ready. Price $1.00 postpaid. Send for a copy. The Bungalow *is the thing*, and this is the only book published which shows the REAL California Bungalow inside and out. Better send at once.

The Bungalowcraft Company, 407 Chamber of Commerce, **Los Angeles, Cal.**



Cassens Ideal Eaves Trough Takes Water Only

The Ideal completely overcomes the disadvantages of the old style open gutter. It satisfactorily catches and carries away the water that falls on your roof. Its use insures clean, healthful cistern water. Leaves, trash, gravel, etc., cannot enter it. Neither can birds build nests in it. Therefore it is never clogged. **Ice will positively not break down the trough**

A unique and important feature of the IDEAL is that it will not fill with snow and ice. When it sleets the small opening (about one-eighth inch) is quickly closed. This prevents the bursting of the trough, also of the down spout. When it thaws the ice melts, and the entrance opens automatically before the water from the roof reaches it.

The Ideal can now be erected with a Wire Hanger if face-board has mouldings.

Special Propositions to Contractors, Builders and Architects

WRITE FOR FREE BOOKLET

CASSENS MANUFACTURING CO., Edwardsville, Ill.

MOTORCYCLES FOR CONTRACTORS.

A noted writer speaking of the mistakes man in general is prone to make stated, "The average man's errors can be divided into two classes. The errors of commission and the errors of omission." Of these two with the contractors, the first is undoubtedly by far in the minority.

The average contractor of today has generally so thoroughly mastered his profession or has had sufficient experience "burning his fingers" to thoroughly convince him that contracts which call for things "he don't know" had better be left alone, therefore the average contractor's loss from "doing things wrong," due to lack of knowledge is small.

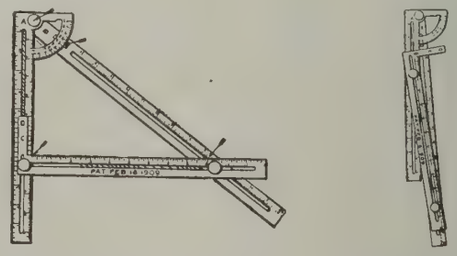
Errors due to omission, naturally cover by far the majority of contractors' losses. This is undoubtedly due to the small margins on contracts in general, combined with the natural ambition of the American contractor to "get along." Many contractors in the phraseology of the day "bite off more than they can chew." They bid on a number of contracts and fortunately or unfortunately, as the case may be, are awarded more work than they can personally supervise thoroughly. Then come the losses through omission. This or that goes wrong. Errors arise which before they come to the contractor's attention, have absorbed more or less of his margin. The writer personally knows two or three contractors whose annual losses would have made a fair start for a saving account. Obviously the easiest way to overcome or remedy this great source of loss must be one which will broaden the scope of the ordinary contractor's personal supervision. Many of the large contractors realizing this have purchased automobiles and found that by means of same, they can nearly double the amount of work they could formerly properly supervise. The original investment as well as the up-keep, however, has prevented many from adopting this method. To this, by far the larger majority, the motorcycle should prove a boon. The writer recently talked with one large contractor who stated that he had used horses, autos and finally the motorcycle. Now he uses the motorcycle entirely as he finds he can not only get around faster in crowded districts, but much more economically. He says in part, "I ride a —————— motorcycle made in Milwaukee. I don't know what the up-keep cost of the other machines may be, but I do know that my operating cost is but a fraction of a cent per mile, in fact, far less than my former carfare and I further know that my motorcycle has saved me its original cost time and time again. When I considered the purchase of a motorcycle, I looked at it from a purely business standpoint and sat down and figured it out. I estimated my time as worth $2.00 per hour and when I figured the hours a machine could save me—well, there stands my motorcycle.

"Now four of my carpenters and two of my masons have purchased machines and are living out in the suburbs, where rent is cheap. Although one of them lives nearly five miles away from his present work, yet he finds that the hour's nooning gives him ample time to run home and have a hot dinner. Each of them have a luggage carrier or rack right over their rear wheel to carry their tools on. The motorcycle brings me nearer to being in two places at once than any other mode of conveyance."

Here's food for thought, Mr. Contractor. Personally, I don't know whether this contractor was right or not, but I do know were I a contractor, I should most assuredly investigate.

THE A B C PROTRACTOR AND SQUARE.

Practically, the difference between an ordinary workman and a foreman is in the latter's ability to lay out the work. In carpentry, as in stone masonry, a knowledge of geometry and mathematics is usually necessary in order to accomplish some of the commonest forms in construction, and, while it is always convenient to have an understanding of the sciences, the ingenuity of modern designers has obviated the need of detailed technical training and enabled the mechanic who knows what he wants to do to perform the same operations mechanically as the technical man does with mathematics. An instrument of this character is the A B C Protractor and Square, made by the Crookston Tool Company, of Crookston, Minn.



This instrument, as seen by the cuts herewith, consists of three parts working together, the different pieces being lettered and figured to give the required results. It works on the principle of the right-angled triangle, and is capable of giving any of the cuts required on a building, no matter how intricate, and it will give the length of rafters, etc., as well.

This instrument, so simple that it is called a tool, is meeting with deserved success wherever introduced, and readers of THE NATIONAL BUILDER who are not already acquainted with it should investigate.

We understand that the Crookston Tool Company, who are placing this tool on the market, guarantee that it will do all they claim it will. Aside from the very complete directions which come with the tool, they are always willing to explain fully any point not perfecty clear to the user.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

THE MAN THAT MAKES THEM SAYS:

The P.H.L.C's C.C.Mo chisel is sold under the positive guarantee that it will do more work than any other chisel.
It is not made by chance, but by a thorough scientific process.
It could look the same and cost half as much. It's what you don't see in my chisel that makes the cost—and gives the service.
I insist on every user being a satisfied user.

P. H. Learner

MR. TOOL USER:

If you want information about the best chisel made, have your dealer write the maker.

The P. H. Learner Co. Factory KOKOMO, IND.

108 W. Lake St., Chicago

It's A Question of Cost

and the first cost is not all important—it's the first cost plus repairs.

"Buckeye Brand"
RED CEDAR SHINGLES
Reduces Roofing Cost

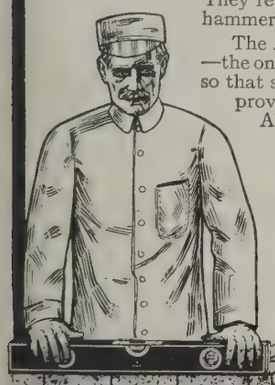
because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

R. J. MENZ LUMBER CO.
SEATTLE, WASH., U. S. A.
Pacific Coast Lumber and Timber Lands — MENZ TIMBER GOLD BONDS — Buckeye Brand Red Cedar Shingles
Profit Sharing Interest Bearing Deed Protected

HERE'S THE LEVEL THAT'S ALWAYS RIGHT

Akron Eclipse Levels are dependable—always accurate—always right in every way—the kind a good workman wants and appreciates. They're as different from other levels as a dropforged hammer is from one that's cast.



The Akron Level is the pioneer among spirit levels—the one that introduced the idea of having two plumbs so that stock can be applied either end up. More improvements in spirit levels today are due to the Akron than any other source. Others have imitated, tried to equal, but without success.

For twenty-five years past

Akron Eclipse Levels

have been, and today *are*, the best spirit levels made. Thousands of skilled craftsmen in all parts of the world acknowledge the supremacy of the Akron.

The Akron has two exclusive and valuable features found in no other make—

1—Non-Breakable Double Spirit Tube
2—Easy Reading Feature

Unlike ordinary levels, the Akron Eclipse spirit-tube is set in an outer tubing of heavy steam-gauge glass, which is unbreakable with ordinary use. The *easy reading feature* consists of 2 silver lines around spirit tube, one at either end of bubble when it is in the exact center. This shows L-E-V-E-L or otherwise instantly, even in a dim light. No straining your eyes or getting out your spectacles when you use an Akron level.

Made in 33 styles and sizes for every purpose—some with 2 plumbs, some brass bound, but all with adjustable glasses. You'll find the one best adapted for your needs.

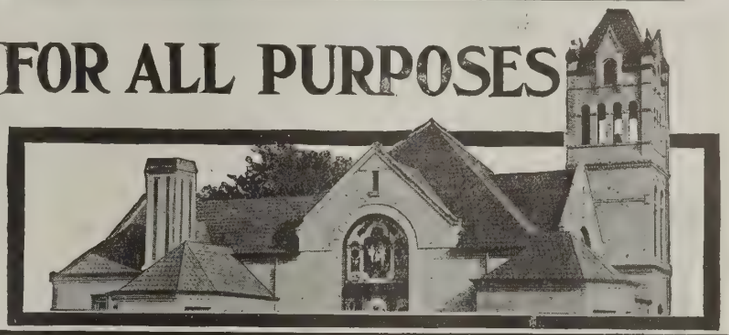
Ask Your Dealer

but if he or some other dealer in your town does not sell Akron Eclipse Levels, write us for catalog and prices. We'll fill your order direct.

Look for This Trade-Mark
It's the distinguishing mark of all genuine Akron Eclipse levels.

BAKER, McMILLEN CO.
Dept. A. AKRON, OHIO

FOR ALL PURPOSES



CORTRIGHT
Metal Shingles

What appeals to Carpenters and Builders about Cortright Metal Shingles is the fact that they have all the advantages of other forms of roofing combined; so that they do not have to adopt a special kind of roofing, and employ a special kind of labor for each different job.

Cortrights they can use for any style building, and can be laid by their own men, eliminating trouble and expense of employing special skilled workmen.

And best of all—besides these advantages he is able to overcome with them any kind of roof competition, for Cortrights are Fireproof, Stormproof and will outlast the building without needing repairs, and at the same time afford a far more handsome roof.



All these facts are illustrated and described in our catalogue "Concerning That Roof." It also shows how Cortrights actually look on all kinds of buildings. Write us for our proposition.



Cortright Metal Roofing Company

PHILADELPHIA AND CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SCREEN CARPENTERS MAKE $6 A DAY

Putting the new FLY ESCAPE ATTACHMENT on ordinary old style window-screens, and making the new ESCAPE fly screens.
Thousands are already in use.
Endorsed by best homes everywhere.
Exclusive Agency Proposition. Act quickly.

CHATTANOOGA SCREEN CO., - Chattanooga, Tenn.
Agents also making money handling
Wright's ESCAPE fly-screens: made to order.

WHAT WOULD YOU SAY if you had Wall Brackets that would last a lifetime?

The Taylor Steel Scaffold Bracket



Be decidedly cheaper than continually making wooden ones—would it not? Absolutely safe too.
Write for catalogue and special trial offer.

JAMES L. TAYLOR MFG. CO.
Bloomfield, N. J.

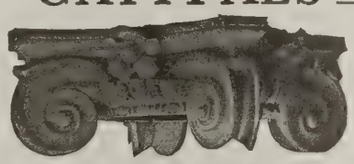
CARPENTERS' Ready Reference For Roof Framing

is a copyrighted book that gives lengths of common, hip valley and jack rafters, and the figures to use on square for all cuts for following pitches:
1 1 1 3 5 3
4 3 2 8 8 4
Also octagon rafters for same pitches and a scale for polygon miters up to ten sides. Can be carried in vest pocket. A handy and time-saving book for anyone to have. Sent postpaid, for 25c.

E. OEHRLE, 2567 Dodge St., Omaha, Neb.

INTERIOR AND EXTERIOR **CAPITALS and Ornaments**

Plastic Relief Work a Specialty



Most Complete Catalog ever issued

DETROIT DECORATIVE SUPPLY CO.
Limited
812 14th Avenue DETROIT, MICH.



DON'T ORDER Lignine (Wood) Carvings, Unbreakable

INVESTIGATE

Send postal for FREE sample and catalog. One cent investment saves dollars. LET US PROVE THIS.

ORNAMENTAL PRODUCTS CO.
West Lafayette Ave., DETROIT, MICH.

Wood Carvings for Interior Finish



SEND 15c for catalogue showing 1,000 designs on Ramps, Easements, Newel Posts, Mouldings and Balusters.

Write Today

WADDELL MFG. CO. 67 Colbrook Street Grand Rapids, Mich.



Consoles, Columns and Grilles

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG No. 16

It contains many beautiful designs of Consoles, Columns and Grilles.

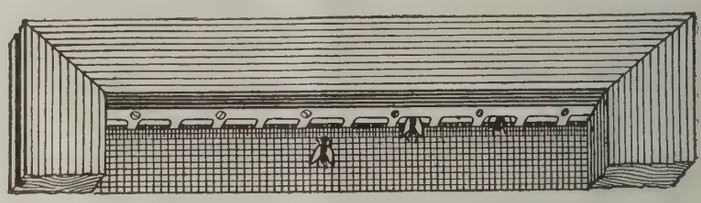
NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

FLY ESCAPE SCREENS.

With the approach of the warm season we are again confronted with the "fly-question." In some parts of our country we have the question the year round, complicated by mosquitoes and other insects.

To a certain extent these can be kept out at the wnidow openings, but the opening doors allow enough to enter to make trouble for the susceptible. To get them out after once in is difficult as opening a door simply lets more in, and the ordinary driving out results in merely a stirring up and adding new blood.

To remedy this evil, and get the pests out after they get in,



The Chattanooga Screen Company make a clever device to be attached to old screens or incorporated in new ones. The ingenious construction seems to lead the flies to the "exit" and through the turnstile to the open air; with them goes the danger of contamination, disease and annoyance.

The Chattanooga Screen Co., Chattanooga, Tenn., make screens having this device and want to hear from everyone before ordering screens.

STYLE AND DETAIL IN SHEET METAL WORK.

The Empire Iron and Steel Company of Niles, Ohio, in their catalogue of Metal Ceilings and Sidewalls, shows a number of excellent designs of the French Renaissance, Louis XIV and Colonial periods. Fidelity to the detail of these periods is difficult in most classes of decoration, as the delicacy of the detail is easily destroyed by the necessary repetition. In the example shown in this catalogue, the technique of the artist is faithfully reproduced in the finished product, while the greatest attention is shown to the constructive detail in order to allow sufficient leeway for the mechanic when installing the work. Extreme accuracy is possible in the drafting room and possibly in the shop, but as a rule the workman installing the finished work meets unforeseen obstacles to clocklike precision in the installation, due to interference by other mechanics, avoiding other work, scaffolding, etc. To furnish plates, etc., to fit properly under these conditions, requires the experience which only comes with close intimacy with the details of construction, manufacture and erection.

We understand that the Empire Steel and Iron are well equipped to do this class of work.

Rules for measuring surfaces are given in detail, so that no difficulty should be experienced in ordering. The prices also are given, making the work a ready reference on the subject. This catalogue, we are advised, will be sent free to interested readers of THE NATIONAL BUILDER and those contemplating the use of Metal Ceilings, by the Empire Iron and Steel Company, Niles, Ohio.

AN ADVERTISING CAMPAIGN IN THE INTEREST OF BUILDERS AND ROOFERS.

Builders and roofing contractors will be interested in the advertising for Asbestos "Century" Shingles, which the Keasbey & Mattison Company are running in "Country Life in America."

The campaign started with the December issue of this magazine, and will be continued monthly, the advertisers state.

Each advertisement shows one of the hundreds of handsome private and public buildings which are roofed with Asbestos "Century" Shingles, with strong text on the merits of this well-known roofing, and refers the interested reader to the nearest responsible roofer for estimates and quotations.



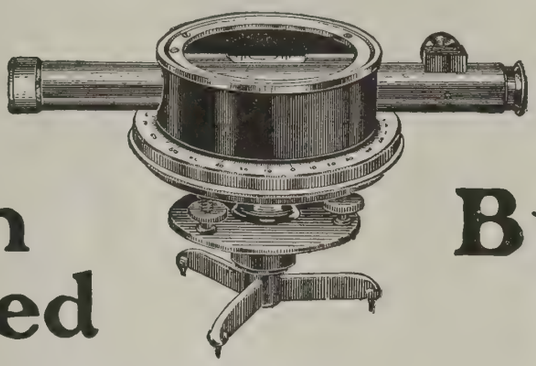
We reproduce on this page the illustration from the second of these announcements—showing the Communal Theater of Fiume, Austria.

Builders and roofing contractors who are not in touch with the Asbestos "Century" Shingle proposition will do well to write to the Keasbey & Mattison Company, at Ambler, Pennsylvania, and get into position to take advantage of the added demand that is sure to be created by this advertising.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

EVERY CONTRACTOR

LARGE OR SMALL WOULD BUY A



Bostrom Improved Builder's Level

If he would just drop us a line to ship him one for inspection and approval. We say that because we have never known a Contractor, Builder, Architect, Surveyor, Civil Engineer, or even Instrument manufacturer to inspect a BOSTROM LEVEL who did not concede that **at the price** there had been nothing yet produced which would compare with the Bostrom in all the necessary essentials of a **simple, accurate, durable** and **throughly dependable** Level

Another thing, the Bostrom Level possesses means of adjustment for proving its accuracy, not surpassed by the highest priced Engineer's Level, and this principle is applied in such a novel and simple manner that even the inexperienced operator can **prove his work right on the spot,** and it can be done in a mere fraction of the time required to prove the accuracy of any other level, regardless of the price.

You have to examine the Bostrom Level to appreciate all of its merits, but the above feature alone makes sales on sight, and a sale always means a Bostrom endorser.

We back up every statement we make with a GUARANTEE of satisfaction or money back.

Our terms are cash with order, or shipment made C. O. D. SUBJECT TO EXAMINATION. Prices: No. 3, $25.00; No. 4, $30.00, f. o. b., Atlanta. Shipping weight 15 lbs., and complete outfit includes Level, Tripod, Graduated Hardwood Rod (not furnished by any other manufacturer without extra charge), Target and Plumb-bob, Trivet, and neat oak box for keeping Level when not in use. Eyepiece in No. 3 Telescope has magnifying power of 10 to 12 diameters, with sliding focus; and eyepiece in No. 4 Telescope has magnifying power of 18 to 20 diameters, with rack and pinion focus.

If you are needing Level at once, order direct from this article, as we do not even require you to guarantee express charges (and no other instrument manufacturer ever made such an offer). We don't hesitate to do it, as we have shipped thousands of Levels in that manner, and the enthusiastic endorsements of these purchasers gives us the unlimited confidence that the Instrument will please you. If you are not needing Level right away, write for full description and get acquainted with the Bostrom before buying. Bostrom's Levels are used and endorsed in every State in the Union, and are rapidly taking the place of instruments much higher in price, and you owe it to yourself to inspect the Bostrom before buying.

BOSTROM-BRADY MANUFACTURING CO.

126 Madison Avenue **ATLANTA, GA.**

THE WINTHROP **Solid Tapered Asphalt Shingles**

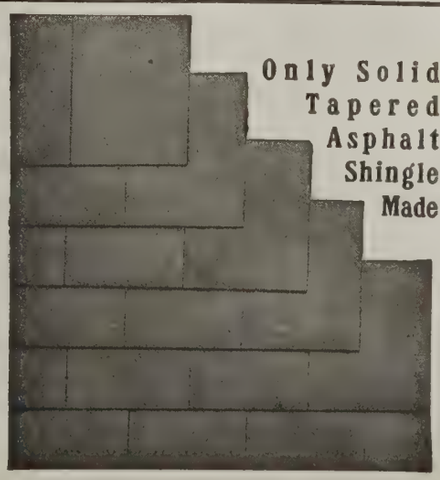
ARE OF A COOL, GRAY SLATE COLOR

And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

SPECIAL INDUCEMENTS TO THOSE WHO APPLY FIRST ROOF IN EACH TOWN

Catalogue on Request

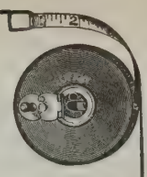
WINTHROP ASPHALT SHINGLE CO. 1100 THE TEMPLE CHICAGO, ILLINOIS



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

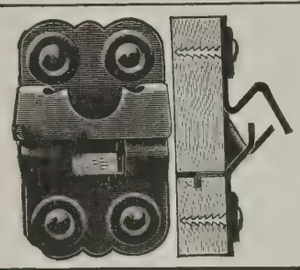
LUFKIN

Steel Measuring Tapes



With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catologue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor



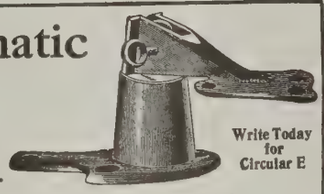
THE WATROUS No. 18 SAFETY SASH HANGER

EASIEST AND QUICKEST TO SET

Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.

E. L. WATROUS MFG. CO., Des Moines, Iowa

Whipple's Automatic Blind Hinge

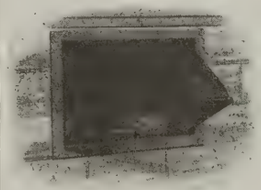


Reasons Why THEY ARE THE BEST
- Cannot slam or blow off.
- No fastening required.
- No blinds to trim or catches to interfere.
- Will hold blind—open, half open or closed.

Write Today for Circular E

We also manufacture a flush hinge, constructed on same principle
Two styles, for brick or wood buildings

R. P. WHIPPLE & CO. 277 Main St., Springfield, Mass.



The Window Chute

FOR BUILDERS OF MODERN HOMES

Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

HOLLAND FURNACE CO.
HOLLAND, MICH.



Electric Light Systems

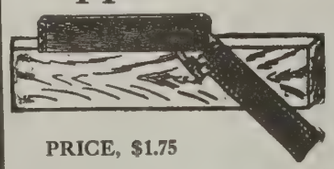
for RESIDENCES, STORES, HOTELS, CHURCHES
or any building not connected with a city plant.

Low cost to install and operate. Just press button for flood of light. Electricity for door bells, burglar alarms, flat irons, vacuum cleaners, etc., can be had from the same plant. Architects, contractors and builders write for our special proposition for installing the first plant in your town.

JOHNSTON MANUFACTURING CO.
Manufacturers of the "Best" Water System for Country Homes.
No. 6 Eleventh Street, - KANSAS CITY, MO.

Topp's Framing Tool

A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS
- It is accurate, thus preventing all mistakes.
- It gives angles for any pitch.
- It gives lengths for any rafters.
- It gives cuts for principals, jacks, hips, valleys and cripples.

PRICE, $1.75

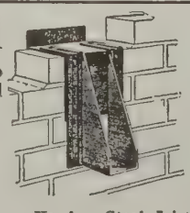
G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.



Van Dorn's Steel Joist Hanger Has no Equal

Send for Catalogue

THE VAN DORN IRON WORKS CO.
CLEVELAND, : : OHIO
Structural Steel and Ornamental Iron Workers

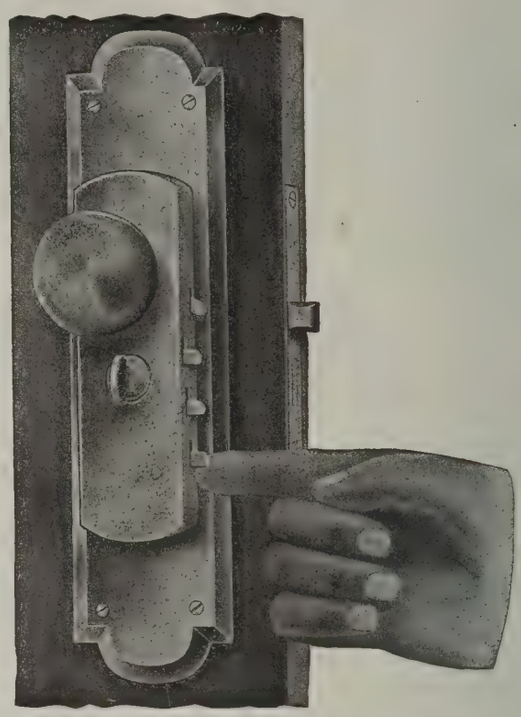


No. 1—Steel Joist Hanger for Wood Header.

No. 4.—Steel Joist Hanger for Brick Walls.

KEYLESS LOCKS.

It is easy to lock the door after the horse is stolen, but how much better to put a lock on before. And not only a lock, but a lock which is proof against the many failings of ordinary locks. Some locks are easily picked. Some get out of order and won't work when most wanted. Keys get broken, lost or mislaid. There has recently been placed on the market a lock which the manufacturers claim is proof against all these accidental annoyances. And at the same time offers perfect protection against all not inclined to be perfectly honest. The Dayton Keyless Lock Company make a number of styles of Keyless Locks suited to the finish of various styles and all embodying the principles of ease of operation and absolute protection. The lock is operated on such a simple system that a child can quickly open the door in the dark, while the combination can be changed in a few minutes should it be considered advisable.



The Dayton Keyless Lock Company, 804 U. B. Bldg., Dayton, Ohio, are sending convincing literature to all interested and are anxious to get in communication with men in the building field who will act as salesmen for them.

OF SPECIAL INTEREST TO BUILDERS.

The David White Company, 421 E. Water, Milwaukee, Wisconsin, Manufacturers of Surveying and Engineering Instruments, have perfected a high-grade Combination Level and Transit as illustrated in cut herewith. This Instrument is a saver of both time and labor, two items of importance to the Builder, and is an Instrument no Builder or Contractor can afford to be without. It can be used to plumb a wall, line up girders, lay stakes, grade streets, square buildings, etc., and will practically do the work of a Level and Transit as well.



It is constructed the same as our Improved Architect's Level, with a Telescope 12" in length and adjusted in the same manner as the larger Levels. The lenses are of the best optical quality, magnifying power about 25 diameters, object glass 1¼" and is provided with 4 leveling screws and clamp to spindle. The Y's have an improved locking arrangement, dispensing with the pin bolts. It has also a horizontal circle 4½" in diameter fitted to the upper end of the socket and turning readily upon it; the circle is graduated from 0-90 each way, and has a vernier to read to 5 minutes, which is screwed to the flange of the center. The Telescope is of good definition and is focused by rack and pinion. The eyepiece turns in a screw like manner to enable precise focusing of the cross hairs. The Tilting Level has an addition of an attachment by which sights of 45 degrees above or below the horizontal can be taken. This attachment is a small set of standards screwed into the center of the level bar and when not in use can readily be removed permitting the telescope to be set back in the wyes. The Instrument is supplied complete with Tripod, Trivet Sun-Shade, Plumb-Bob, etc. Write for Catalogue and Special Prices.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Where the Big Bargains Come From

Out from these great concrete warehouses come the greatest millwork and lumber bargains that the American market affords.

Our whole business revolves around the bargain idea. The present building season finds us better equipped than ever before to save money for contractors and builders: You will be amazed to see the big reductions on staple millwork and lumber of highest guaranteed quality.

New Bargain Catalog Ready

This catalog is in itself an immense exhibit of the finest building material on the market. It offers an almost unlimited variety of the latest styles in millwork of every description. Doors in all regular sizes and in scores of new and beautiful patterns and in various woods—veneered doors in Colonial, Mission, Craftsman and other popular styles—art glass doors in exquisite designs and colors—doors for every purpose. Windows to correspond with every style of door. Mouldings, inside finish, flooring, mantels, stair and porch material—everything that goes into any home, down to the very last detail. A bargain price and a guarantee of quality safe delivery and satisfaction on every item. Send for the catalog and see for yourself.

New Plan Books—Just Out

The new Gordon-Van Tine Book of Plans, prepared at a cost of over $5,000, is now ready for free distribution to carpenters and contractors. A complete and practical work that gives 32 designs for city, suburban and country residences, cottages and bungalows costing from $600 to $6,000. Also 12 plans for barn, dairy and cattle barns and other outbuildings. **This book keeps cost within original estimates,** for every plan has been proved again and again by actual construction.

The Plan Book will be mailed free on receipt of 10 cents in stamps or a dime to cover cost of packing and mailing.

You Are Invited to Visit Our Vast New Millwork and Lumber Plant

Although we conduct our business entirely by mail, we like to have carpenters and contractors visit our plant. Hundreds of them do this every year. Our warehouse is the busiest place in Iowa. Come and see us loading 22 cars at a time from our loading platforms, extending the entire length of the plant. Meet personally the men who stand behind this gigantic enterprise. The latch-string is always out.

No. E 322—Colonial Built-up Column; Cypress, Plain Cap.

$1.63

Dealer's Price, $3.25

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We Can Save You Hundreds of Dollars This Season

Why pay middlemen's double prices for millwork, lumber and other building material? Save several hundred dollars this season by buying at wholesale prices direct from

GORDON-VAN TINE COMPANY

580 Federal Street (125) **Davenport, Iowa**

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If It Pays Over 1,000 Contractors to Use Convertible Builders' Levels

it will pay you to investigate why the "STERLING" is the strongest and most accurate Convertible Level made, and how its use will save you its cost in one season's work. Send for Catalogue, Manual and special offer for this month.

Level guaranteed for two years

PRICE Complete, $60.00

ISZARD-WARREN CO., Inc.,

136 No. 12th St., Sole Makers Philadelphia, Pa.

DO YOUR WORK ON THE LEVEL

AND USE A

WHITE'S IMPROVED TILTING LEVEL

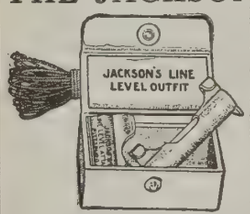


which will guarantee you against errors. It will pay you to investigate its merits. Write for Catalogue and Special Prices.

LEVELS for $16 and Upwards

DAVID WHITE COMPANY, 421 E. Water St., Milwaukee, Wis.

THE JACKSON ALUMINUM LINE LEVEL



Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

This is possible because the Aluminum Line Level weighs only one-fourth ounce and is easily and quickly attached to a line. Levels thus taken are guaranteed to be accurate on a stretched line from one to forty feet. Besides, from its construction, it can be used as a Pocket Level.

This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

PRICE $1.00, POSTAGE PREPAID

It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

JOS. WOODWELL CO., Sole Agents, 201 Wood St., PITTSBURG, PA.

Drawing Materials **Surveying Instruments**

Drawing and Blue Print Papers, Architects' and Builders' Levels, Drawing Instruments, T Squares, Triangles, Scales, Inks, etc. Steel and Metallic Tapes, Builders' Levels. Repairing promptly executed.

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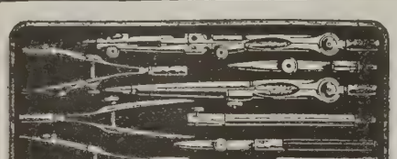
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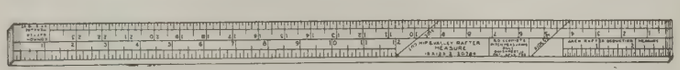


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SCHMIDT'S PITCH MEASURING RULES

For Framing Rafters

ROOF FRAMING is easy, accurate, and quicker with these rules, no figuring or setting. Use it like a common rule. The pitch on one foot run is divided into 12 inches of pitch measure for hip and common rafters. The rules are from 1 inch rise to a foot run and up, two different measurements on each. Roof framers should not be without them.

They are time savers. Price per rule $3.00 postpaid

Send for circular telling about the rules, and how to make roof framing easy

R. D. SCHMIDT, 738 West Fourteenth Street, Davenport, Iowa



NO SINKING INTO THE FLOOR WITH THE

ZIMMERMAN IRON BASE

It has a center bearing that the sun cannot heat. Have done with this rot nuisance and have your architect specify the ZIM-ZIMMERMAN BASE. It separates the column from the floor and also ventilates the column shaft, preventing columns from checking and opening.

Write for Circular J

SYRACUSE CORNER BLOCK FACTORY, SYRACUSE, NEW YORK

RELATIVE TO THE COCOMO CHISEL.

In any line of manufacture the competitors at the bottom are always numerous. As the quality ladder is climbed, the competition gets less and less. The P. H. Learner Company of Kokomo, Ind., claim that they have very little competition in the matter of high grade chisels. It is an axiom that "No product can be better than the responsible head of the manufacturing concern." No one who has ever come in contact with Mr. P. H. Learner can doubt his ability to produce a chisel of merit. Coming from good thorough-going German stock, with a natural aptitude for the handling of steel, and having given a persistent study and application to the securing of the best results, he is equipped in a peculiarly efficient way for obtaining results in this line of endeavor. In conversation with Mr. Learner we learn that he emphasizes the excellence of their chisel from the tip to the edge. They claim that they spare no expense ni the matter of securing the best crucible steel of special analysis, most experienced workmen and most approved processes. They emphasize the fact of the proper temper, neither too hard nor too soft, and the special shape of the blade. They are proud of their pattern of handle, which is shaped so as to give the maximum amount of comfort to the user. They also claim that the pattern and special grinding given to their beveled chisels, gives a lightness in the hands of the mechanic without affecting the strength of the chisel. Mr. Learner states that he can make a chisel for half the price that would look the same. He claims that it is what one can't see in his chisel that makes it so good.

An excursion through the Learner plant is of considerable interest. On its journey to a Cocomo chisel the bar steel is first taken to the shears and clipped in lengths of 2 feet each. These pieces are then placed in a forge and heated. The one end is then formed so as to receive the socket, if it is to be a socket chisel, or shaped into a tang if for a tang chisel. The socket is made of seamless steel tubing formed in a cone shape so as to telescope over the especially shaped neck of the steel bar. This embryo chisel is then returned to the furnace, heated to a welding temperature and is thoroughly welded together, after which the shear is again used, leaving a sufficient amount of steel which with the socket will make a tool of the proper length when it is turned out. A careful inspection is then made in regard to the welding.

In department 2 the tool is taken through another set of dies which forms the piece of steel into the proper shape and length. This process is technically known as plating. The smoothing operation is given by the socket being passed through another set of dies after it is heated. At this point the tool is brought to another shearer and clipped to the exact length. This is followed by straightening and a careful inspection. The chisel is then heated to the proper temperature and hardened in oil and after this given a lead bath. By means of a pyrometer this lead bath is kept at the proper degree of temperature so as to give the steel the proper temper. The pyrometer is infallible, so that it is impossible for the temper to be either too hard or too soft. At this stage every chisel is thoroughly and fully tested and then inspected with the greatest of care.

In department 3 the chisels are ground by experienced men on fine grain Huron grindstones. From there they travel to the edging machines and are properly edged so as to be sure and have every one of the proper width. They then pass back to another set of grindstones and have the cutting bevel put on them. Before being allowed to pass through the special beveling process they are again inspected and tested.

In department No. 4 the socket or tang is ground, when after another inspection they are passed into the polishing room where the polisher passes them over four grades of emery wheels. They are then returned to the grinding room where they are sharpened and where another test and most rigid inspection is given.

In department 5 they go into the hands of the polisher, where they are finished by being passed over three finer wheels.

On arriving in the stock room they are given their final examination. If the chisel passes this inspection it is oiled with pure olive oil, handled and then given its name, as an emblem of high degree, after which it is carefully polished with a soft woolen cloth and air slacked lime. After being polished the steel is never touched by the hand. It is packed in anti-rust paper and boxed for shipment.

COAL CHUTES.

Wherever it is necessary to put vegetables or fuel in a cellar, there is the need of an up-to-date chute to get them in.

The purpose of the chute is not only to get the materials in, but to do it without damage to the materials, the chute, or the surrounding property. Where there is no chute, broken glass, damaged frames and wasted materials are sure to result. Frequently the window, through which material is taken into the cellar, is left open or unlocked over night, an open invitation to the thief or other undesirables to come in. The damages to the sash frame and building will soon amount to the cost of a first class chute, while the annoyance attending the old style methods should settle the question at once in favor of an up-to-date chute.

The Roenius Chutes, as manufactured by the Grand Rapids Foundry Co., Grand Rapids, Wisconsin, are made in three styles and 7 sizes. Some prefer a square chute, while others want a round one. Others want a little light through the cover. The manufacturers claim that in the six years they have been in business they have shipped chutes to every state in the Union and that their thousands of customers are all satisfied with them. It will be well for every prospective builder to have their circular, which gives far more information than can be crowded into these few lines.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STEEL SCAFFOLD BRACKETS.

In the erection of a building there is a great quantity of material and work furnished which does not appear in the finished work. There are runways over the soft ground, forms, cribbing and centering for the concrete, temporary closures for the windows, etc. Not the least is spent on scaffolding merely to hold the men and material in place until their work is done. With some contractors no effort is made to economize on this point, the safety of the men being the first consideration. With others, an attempt is made to save the poles, braces, etc., of which the scaffold is composed, but they do not always come apart without splitting, causing considerable loss of material. Others use built up wood brackets, heavy and cumbersome, occupying valuable space whether in use or in storage.

The American Steel Scaffold Company, 501 Woodward avenue, Detroit, Mich., has recently placed on the market a folding scaffold bracket, designed to take the place of the temporary constructions heretofore relied upon. Being made throughout of steel and designed to carry a load of 1,500 lbs., far in excess of any which is apt to come on it, it seems reasonable to believe the statements of the manufacturers that their use will save the cost of many brackets on each job. As they are easily folded when not in use and occupy a very small space, there is no occasion for leaving them around when not in use.

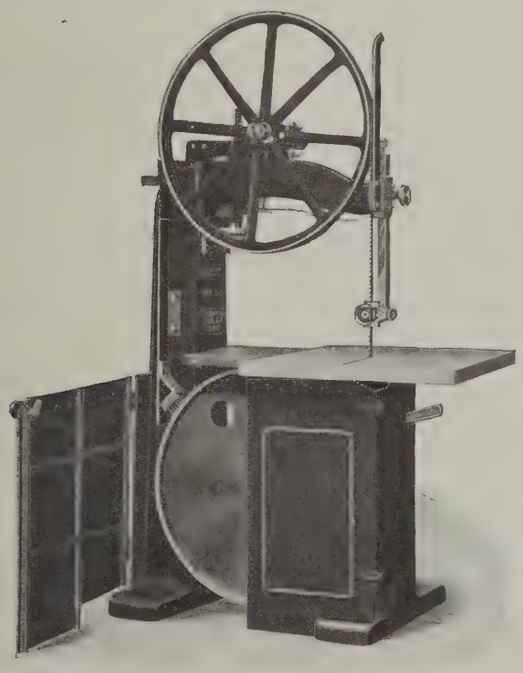
A scaffold of this description has many uses and advantages in all of them. Only one small hole through the sheathing is required, and whether the sides are shingled or whether branded, the scaffold can remain until the sides and cornice are finished.

Contractors who have used this scaffold enthusiastically endorse it. Contractors and carpenters should have the circular describing these scaffolds in detail. The American Steel Scaffold Company is always glad to advise prospective purchasers regarding teh use of these scaffolds or their adaptability to any certain class of work.

THE BAND SAW IN THE SHOP

The most important machine in any wood shop, especially the Carpenter, Contractor or Builder. It follows, therefore, that the Band Saw purchased for use in such a shop must be chosen for its ability to stand up to hard work and of all kinds day in and day out. Nothing is more annoying than to have a machine which will break a blade or go to pieces right in the middle of a rush job.

Undoubtedly, the best all around Band Saw now made is the Fay & Egan Co., No. 50. W. S. Milne, the large chair manufacturer of Cleveland, Tenn., says that after seeing one of these machines in operation in another factory he immediately decided to purchase a Fay & Egan No. 50 the next time he needed a machine of this type. He got such excellent results from the first that he has since purchased eight more, now having nine of these tools running in his factory.



The illustration herewith shows one of the latest improvements to this machine, the iron doors over the lower wheels, eliminating any chance of the operator getting caught in the lower wheel.

The success of this machine is attributable primarily to Fay & Egan's Patented Knife Edge Straining Device. This device is so sensitive that it will compensate for even the smallest chip sticking to the blade or rim of the wheel. Broken blades are practically unknown where this strain is used, the sum saved in this respect alone amounting to quite a little in a short while.

This Patented Strain in connection with the Solid Lower Wheel permits the use of a thinner blade at a higher speed than was ever known before, increasing the quality as well as the quantity of the work.

The square form of column, cast in one piece gives great rigidity to all working parts. For pattern work, the table is arranged to angle to 45 degrees with micrometer adjustment.

Further information regarding this Band Saw may be obtained by addressing the manufacturers, J. A. Fay & Egan Co., 327-347 W. Front St., Cincinnati, Ohio.



Learn to Fill BIGGER SHOES!

Don't be satisfied with merely pushing a saw and driving nails Be a *master* of your craft. Learn to *plan* as well as to work—to use your *brain* with the *same skill* that you use your hands.

Learn to fill a *big-salaried* job—the kind of a job that hundreds of other men, with no more natural ability than you, are filling with ease and success.

HOW YOU CAN DO IT

You can *master every detail* of your line of work, *every branch* of building construction, *every angle* of architecture and carpentry—can do it in your spare moments and at almost no expense at all. You can have the knowledge and experience of over *four score experts* at your command, ready for instant use whenever you want it—can fit yourself to *fill any first class position above you that you desire*—simply by allowing us to place in your hands this great ten volume set *without your sending us one cent in advance.*

This Cyclopedia of Architecture, Carpentry and Building

is the most exhaustive, comprehensive and *practical* work on the building trades that has ever been published. It covers *every detail* of building construction from common carpenter work to reinforced concrete and steel; from masonry to heating and ventilation; from specifications and estimates to building laws and superintendence. It covers all the *practical* things that you *want* to know, all the things that you've *got* to know if you're going to be a success. It contains over 3,000 drawings, full page plates, diagrams, etc., has 4,670 pages, is bound in handsome half morocco and printed on special paper in large clear type—10 massive volumes—titles engraved in 23 karat gold. No *carpenter, contractor* or *building owner can afford to be without it a single day.*

Learn the Vitally Important, Practical Facts About

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Elevators
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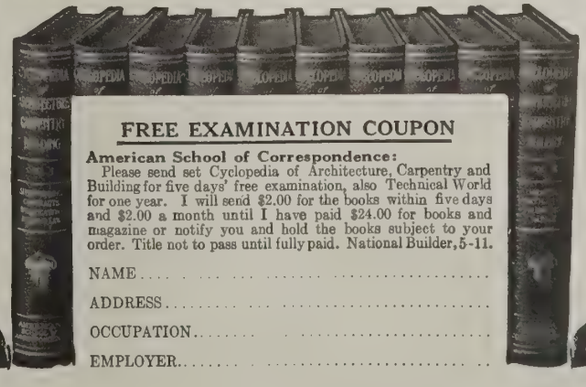
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With Its Back to the Wind and the upward sloping opening in the back taking the full force of the wind, the Iwan Volcano Revolving Chimney Top makes a sure draft on the chimney.

Mountings can be bought separately and the hood and vane can be made in your shop according to patterns furnished free with all iron mountings. Sizes 6 to 12 inches.

Prices and catalog sent promptly.

Iwan Brothers, 1509 Prairie Avenue, **South Bend, Ind.**



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Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS

and Dumb Waiters, Automatic Hatch Gates

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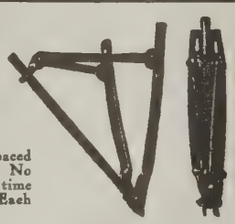
KIMBALL BROS. CO., Council Bluffs, Iowa



1000 Pounds Easily Carried on THE ASHLAND Folding Scaffold Put up with Four 10d. Nails.

Strongest and Best Bracket made. Instantly adjustable to any spaced studding or pitch of roof. Can be used on any kind of siding. No pins or bolts used in adjusting. No boring holes in siding. Saves time and money on every job. Special Discount for First Order in Each Locality. Write for Circular N and Prices.

Ashland Folding Scaffold Co., : 17 Washington Street ASHLAND, : OHIO



"Diamond N" Expansion Shields



Have increased holding power on account of the corrugated ribbed exterior surface.

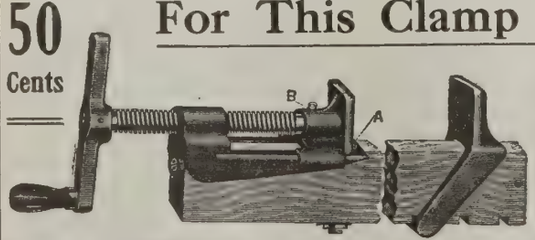
Securely clamped together without the use of springs or wires.

A better shield at the same price.

DIAMOND EXPANSION BOLT COMPANY

90 West Street, corner Cedar, - - - NEW YORK

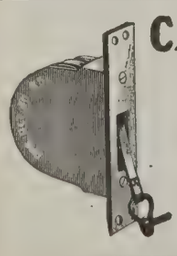
50 Cents For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO.
321 N. May St., CHICAGO



CALDWELL SASH BALANCE

Does away with weights and cords and VASTLY more durable.

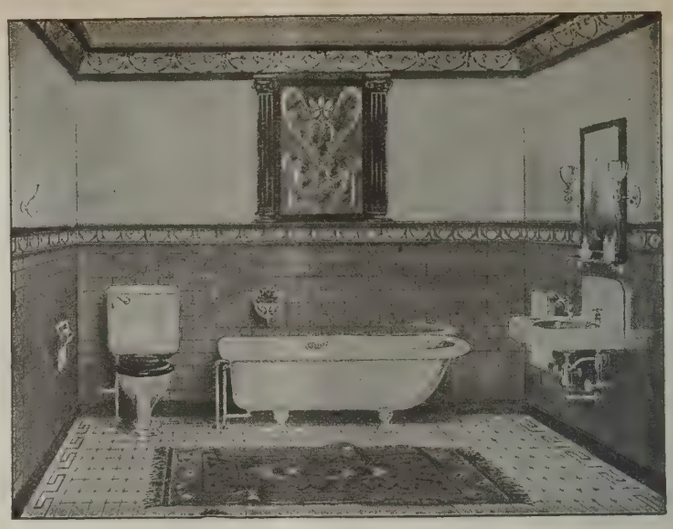
Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.



PLUMBING AND STEAM GOODS.

The 1911 catalogue of B. Y. Karol, 768-772 West Harrison street, Chicago, shows a complete line of fittings for the purposes mentioned. With an experience of twenty years, Mr. Karol has seen a remarkably growth in the plumbing goods industry and has had much to do with raising it to the high standard it now holds. A large stock of goods enables him to ship promptly and his long experience would indicate that an order would be promptly and properly filled.

Mr. Karol, while supplying all the standard plumbing goods, supplies and accessories, also sends out complete outfits of various combinations of fixtures. Many times a considerable saving can be made by uniting several fixtures in a set, besides giving a more harmonious appearance to the house. One of the many combinations which he has on hand is shown in the cut herewith, and intending purchasers should write him when in the market for goods in his line.

CEMENT BRICK MACHINERY.

In the search for materials calculated to insure permanence, fireproof qualities and good appearance, cement is a most important factor. The durability of cement products in almost any of its forms is well known, and its fireproof qualities are a matter of record. When the artistic design and appearance are considered, however, there is a great variety of expression which concrete and cement are capable of expressing. Possibly, in no material is there a greater range. We get the massive effect of the monolithic structure, the rough appearance from the rough cast on metal lath, cut stone effects at a fractional cost from block construction, etc. For certain conditions each construction may be adapted, but for the best appearance under nearly all conditions, nothing equals the standard size cement brick. The clay brick has held its size for so many centuries with comparatively little variation in size that it truly represents the ideal form of architectural expression. The advantage of cement bricks over clay bricks are numerous and apparent. There is a uniformity in size, color and texture which is hard to obtain in clay. For the same quality, the cement brick has the advantage in cost. For moulded courses and decorations, the cost of clay brick is practically prohibitive, while the cost in cement brick is no greater than common brick.

In the manufacture of cement brick, however, great care must be taken to obtain the best results. Many of the machines now on the market are defective mechanically and a first-class product is impossible on them. The Raber & Lang Manufacturing Company, of Kendallville, Ind., make a machine which they claim overcomes all the objections of the most critical. They claim the machine has a capacity of 12,000 brick per day when operated by one man with two assistants. This reduces the cost far below the cost of common brick, and there is no delay waiting for them. A copy of their circular should be in the hands of every cement contractor, that he may realize the opportunities in the business. A postal brings it.

FOX UNIVERSAL TRIMMERS.

Pattern Making, Cabinet Work, Joinery, Carpentry, Picture Framing, and many other trades require accuracy, and at the same time speed. Where a perfectly plane surface on either hard or soft wood, at any given angle from any other face is required, a machine of the trimmer class is practically indispensible.

The Fox Universal Trimmer was designed by a pattern-maker, having the exacting requirements of that trade in mind. The improvements made from time to time to the original design, as suggested by its use in other trades, makes the name "Universal" particularly significant. The trimmer is built upon the principle of a shearing cut, and consists of a bench somewhat similar to a mitre box, on which the material may be fixed at any angle. A knife shearing against the point of a gauge, which is made to swing in the arc of a circle, cuts or "trims" the exposed surface to a perfectly plane surface.

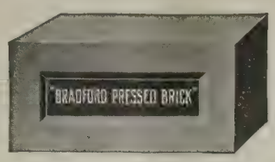
The manufacturers of the Fox Universal Trimmer call attention to two particular features of construction.

First—Pivoting the edge of the gauge in such a manner that the shearing edge of the gauge always remains in the same position in relation to the cutting edge of the knife, no matter at what angle the gauge may be set.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Brick Mantels AND Face Brick

"Bradford Reds"



"Bradford Ruffs"

"Trade Mark Registered"

Brick Mantels Made of Really Red Red Pressed Brick from

BRADFORD'S

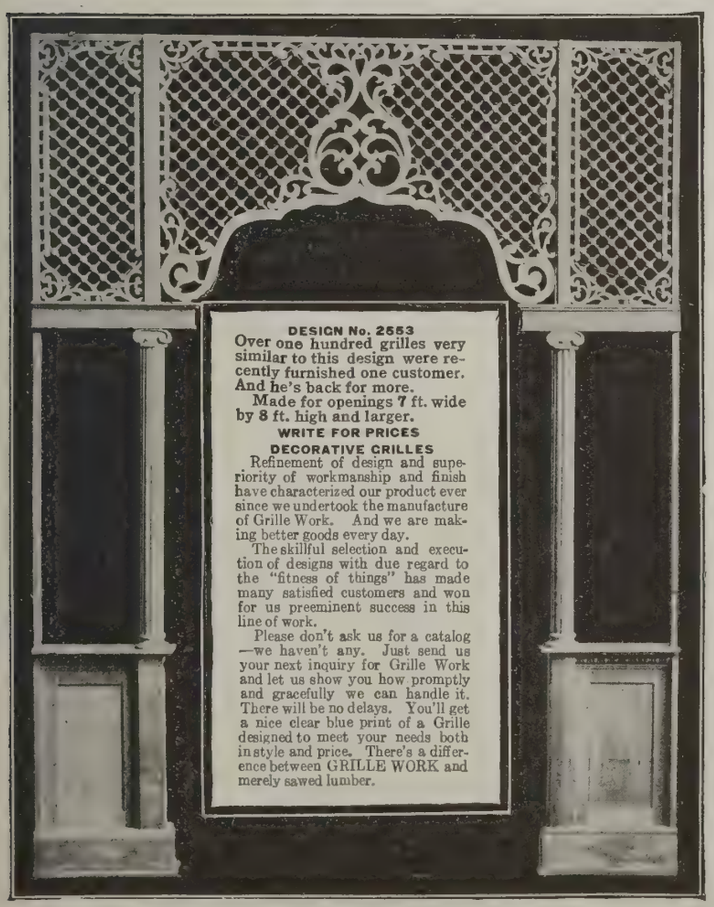
Peculiarly Warm Colored Shale. A1 Standards, Romans, Ornamentals in all shapes, Circle Brick, Pilasters, Panels, etc.

Directions for setting the Complete Mantel are so explicit that the assembling is simple, resulting in Fireplaces at once satisfying to good taste, everlasting in material and at a cost acceptable to the home builder.

BUILDERS AND CONTRACTORS

are invited to correspond with us. Get the facts and keep the round profits that are legitimately yours.

BRADFORD PRESSED BRICK CO.
BRADFORD, PA.



Syracuse Screen & Grille Company

NORTH MANCHESTER, DEPT. G. INDIANA



"You Get the Job"

That's what the trained man, the expert in his line, hears today from the man that hires.

Training lands the job—training that means high-grade work and a short cut to results. And training wins quick advancement to still better jobs.

The day of the "Jack-of-all-trades" is passed. This is the time of the specialist. No concern can afford to place a high-grade equipment in the hands of low-grade men. Competition forces employers to meet skill with skill.

The business of the International Correspondence Schools is to supply training; to give job-getting and job-bettering ability; to raise salaries.

Every month upward of 400 I. C. S. students write to Scranton to tell of positions secured or bettered—of earnings increased and prospects brightened—through study of I. C. S. Courses. Last month the number was 416. The letters come from every section and from all sorts and conditions of men.

All got the education—the training that enabled them to get work they liked and advance in it. They furnished the ambition and perseverance. The I. C. S. furnished the training.

If you wish to make sure of the job you want—there is an I. C. S. way for you. To find out all about it, mark and mail the coupon. Doing so will commit you to nothing, place you under no obligation, and may prove to be the turning point in your career. Dont wait.

Mail the Coupon Now!

International Correspondence Schools
Box 1332, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

Architect	Telephone Expert	Mining Engineer
Arch'l Draftsman	Bridge Engineer	Mine Foreman
Contracting & Building	Civil Engineer	Railroad Constructing
Building Foreman	Surveying & Mapping	Textile Manufacturing
Building Inspector	Mechanical Engineer	Chemist
Structural Engineer	Mechanical Draftsman	Commercial Illustrat'g
Structural Draftsman	Stationary Engineer	Bookkeeper
Concrete Construction	Electrical Engineer	Stenographer
Plumb. & Steam Fitting	Electric Wireman	Advertising Man
Heating & Ventilation	Electric Lighting	Window Trimming
Plumbing Inspector	Electric Railways	U. S. Civ. Serv. Exams.
Estimating Clerk	Heavy Elec. Traction	Automobile Running

Name _____

Street and No. _____

City _____ *State* _____

Present Occupation _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Second—We apply power to the knife carriage in such a manner that the wear upon the ways is distributed uniformly along the whole surface.

The machines are built in three styles; the style "A" machine being a bench type machine; the style "E" machine being a machine with legs which is intended for pattern shop use, and the style "F" machine, which is to take in the largest pattern shop work, the machine being mounted on a bed having castors, so that it may readily be moved from one point to another. From this it will be seen that the use of a trimmer is not confined to the large shop. The smaller sizes are made for convenient working on a bench, and are easily taken from job to job if the work requires it, and yet they are rigid enough to handle any work coming within their range with perfect accuracy. While no shop can afford to be without at least one of the larger size trimmers, each pattern maker or cabinet maker should have an individual trimmer for his exclusive use.

To acquaint everyone with the scope of work capable with their trimmers, the Fox Machine Company, 26 North Front Street, Grand Rapids, Mich., are sending out a very complete catalogue. An unusual feature in the catalogue is the listing in two tabulated specifications in English measure and metric, the weights, sizes, etc., of the various style trimmers. The list shows a 32-pound trimmer making a cut 4 inches high and 8 inches long, and other styles up to a 700-pound machine making a cut 8 inches high and 24½ inches long. A prospective purchaser should have little difficulty in selecting the machine suited to his requirement, but if he should have special work to do, the Fox Machine Company will be pleased to assist him in any way possible.

HOW SHE GOT IT.

A little girl was sent by her mother to the grocery store with a jug for a quart of vinegar.

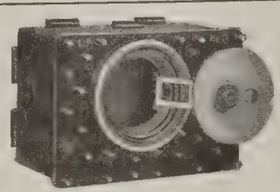
"But, mamma," said the little one, "I can't say that word!"

"But you must try," said the mother, "for I must have vinegar, and there's no one else to send."

So the little girl went with the jug, and, as she reached the counter of the store she pulled the cork out of the jug with a pop and said to the astonished clerk:

"There! Smell of that and give me a quart!"—Exchange.

The Gale Wall Safe



It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Theives, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

WRITE FOR DESCRIPTIVE MATTER TODAY

WILLIS MFG. CO., - - Galesburg, Ill.

Carpenters and Joiners!

This is what you have been looking for. The

O. K. BUTT MORTISER and RULE GAUGE

The Mortiser cuts out the seat for hinges in soft or hard wood doors, jambs, and similar work.

Sample of the Mortiser and Rule Gauge mailed for 75 cents.

AGENTS WANTED

S. O. LIPPY, 1144 No. Stricker St. Baltimore, Md.

New York Office
31 Barclay St.

Von Gerichten Art Glass Co.
Designers and Workers in
Decorative Glass
Quality not Quantity

Pittsburg Office
Royer Hotel Bldg.

Write or come to the Studios of the

Von Gerichten Art Glass Co.

550-558 S. High St.
Columbus, O., U. S. A.

Workers in Art Glass and Mosaics. Catalogue free

LOW GRADE LUMBER AND THE BUILDER

A NEW note or a new tenor of argument has entered into the deliberations of the various retail lumber dealers' associations this year, probably inspired partly by sawmill men, as a result of which there will probably be more low grade lumber than heretofore offered the building trades.

Low grade lumber is getting to be quite a burden to sawmill men, because of the desire to clean up their trees closer, makes lots of timber lower in quality, so that the precentage of low grade runs higher than it did. Also the spirit of thrift and economy creates a natural desire to utilize material that heretofore was thrown in the waste pile.

Just how this may affect the builder remains to be seen. From certain angles it looks like a benefit may derive from it that will be divided between the builder, retail lumber dealer, and the sawmill man. Looked at from other angles, it appears as if there is a chance for the builder to have more trouble with his lumber than ever before, because of the injection of low grade stuff into it.

Quite a lot depends on both the intelligence and honesty with which the matter is handled. If the retail dealer figures on handling a lower grade lumber and foists it on the building trades as representing the same old grades, it means trouble and annoyance. The claim is made that some of this has already been done, that some of the dealers use a good grade of No. 3 boards and pass them off as No. 2, and a good grade of No. 2 common framing and pass it off as No. 1.

Things of this kind are to be deplored. If there is a good grade of No. 2 framing that will do in lieu of No. 1 it should be sold for what it is and the price made so that the builder and the lumberman may divide the profit. The same is true of boards.

If the thing is taken up in an honest, co-operative spirit, however, both the builder and lumber dealer may profit by the use of a greater percentage of low grade lumber. In the present day there is a chance to use quite a lot more low grade both in framing and in sheathing if attention is given to it. There are various ways its use may be encouraged. There are lots of short lengths in framing that No. 2 common will do as well as No. 1, and there are occasions where larger dimensions in No. 2 would be preferable to small ones in No. 1. Then in boards for false work to do concreting there is no need for anything but low grade. The complaint is often made that too much lumber is wasted and destroyed in this kind of work. All that is wanted is something that will hold the concrete while setting and here lots of low grade might be used. Also, for storm sheathing and in connection with the use of thin hardwood floors there is a chance to work in quite a lot of low grade by proper cutting and refining. Then in planing mill work there is a chance to trim low grade and refine it for what clear stock is present in it, and there are many opportunities for both the lumbermen and the builders to utilize some of this low grade to their mutual advantage provided they go about it in a co-operative spirit.

No one knows just what spirit the matter will be taken up with, but since the subject is opened up and it is liable to be a matter of experiment it behooves every builder to be on the look-out and be in touch with his lumber dealer so as to know what is what and be prepared to protect himself, or either in co-operation with his lumber dealer, as occasion may require.

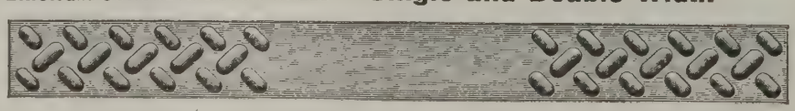
BATH ROOM COMFORT.

The introduction of the Never-split Seat marks a new era in bath room appointments.

The ordinary closet seat depends upon glue alone to hold it together at the joints. Glue loses its adhesive power when exposed to dampness or heat and hence the seat in the majority of homes soon splits and becomes not only uncomfortable but unsanitary. This seat made by Never-Split Company of Evansville, Ind., has a strong steel bolt in every joint in addition to the tongue and groove. In shape and finish, perfection is an adjective that truly describes this modern improvement.

NIAGARA 12" GALVANIZED WALL TIES For STONE, BRICK and CONCRETE BLOCK WALLS **Single and Double Width**

Samples sent on request also Folder B.



Above cut shows Single Width Tie Complete, greatly reduced in size.

We have introduced into these ties principles that give them the s rength of the keystore.

Wall and Veneer Ties
Wall Plugs

Manufactured Exclusively by
NIAGARA FALLS METAL STAMPING WORKS
NIAGARA FALLS, NEW YORK, U. S. A.

10-M.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Amatite ROOFING

Why the Buyer of Amatite Never Complains

WHEN a man buys ordinary ready roofing he usually neglects to paint it and after three or four years he comes back to the dealer with a protest. It is human nature to neglect painting roofs.

When a man buys Amatite Roofing he lays it on his building and in three or four years it is still as good as new and does not need any paint. He forgets he has such a roof but no harm is done by that.

There is nothing to neglect in the case of Amatite. Amatite has a peculiar surface—a sort of plastic concrete made of pitch and mineral matter.

This surface is plastic enough so that the material can be rolled up into handy rolls in the usual manner and handled just like any other ready roofing. When unrolled on the roof and nailed down it presents to the weather a continuous surface of mineral matter and pitch. On this surface wind, rain, storm, heat and cold have little effect. Year after year it looks up to the sky undisturbed and unaffected. It costs nothing to maintain and relieves the owner from all responsibility.



Dealers can improve their business by selling Amatite and buyers make a good bargain when they buy it. The price of Amatite is less than that of most painted roofings of less weight and durability.

Sample free on request. Address our nearest office.

Barrett Manufacturing Company

New York Chicago Philadelphia Boston St. Louis Cleveland Pittsburg Cincinnati Kansas City Minneapolis New Orleans Seattle London, Eng.

SIMPLE, SCIENTIFIC SASH VENTILATOR

Practical proven device for putting pure air in, poor air out. Does not disfigure windows nor offer projections interfering with dusting or washing windows, non-rustable brass throughout. Adjustable to any air current. No drafts, dust or insects.



Secured Through the

IDEAL SASH VENTILATOR.

Results far better than from costly cumbersome affairs formerly used. Retails at $1.25 each.

Write for the big special discount made to National Builder readers.

Tested for three years by experts. Users are delighted. Get the facts and keep the profits.

Write for Details

IDEAL MFG. CO., - ERIE PA.

The Carey Roof Standard

CAREY'S FLEXIBLE CEMENT ROOFING

To Prove to You

the high, standardized construction and composition of Carey's Roofing, we want to send you

Booklet and Sample FREE

and give you practical information regarding Carey's Roofing based on 25 years' actual time-proved tests. Carey's Roofing is equally adapted to flat or steep surfaces, wood-sheathing, tile or concrete. Whether your contract is large or small, we want to show you the advantage of using a standardized roofing material.

THE PHILIP CAREY MFG. CO.

59 Wayne Avenue, Cincinnati, Ohio — 50 Branches

"FAMOUS FOR DURABILITY"

LUMBER DIRECT FROM THE MILL LUMBER

You Save Half-a-Dozen Profits

Our DIRECT selling plan has solved economy for the man who is going to build. No more exorbitant high prices to pay—Buy Lumber DIRECT from the Timber Country. We have no roadman—no commissions to pay—no retail yards—nor the expense of handling several times. Thus we save YOU the middlemen's profits—several of them. Your money is as good as the big wholesalers' or retailers' if you ship in car lots, and the biggest part of the Lumber sold in your locality comes from this territory. Send for our Lumber Price List.

ESTABLISHED 1894 **SHAW-WELLS CO.** SPOKANE, WASH.

SHAW-WELLS CO.

SPOKANE, WASH.

Address DEPT. L

Please send prices on

Lumber, Sash, Doors and Mouldings

To . . . . . .

City . . . . . .

State . . . . . .

Don't be afraid of the freight.

CARLOAD RATE ON LUMBER

SPOKANE to

Chicago	**52c**	per 100
Kansas City	**47c**	" "
Fargo	**37c**	" "
Denver	**33c**	" "
Philadelphia	**85c**	" "

READY-TO-LAY

Burmite

FLEXIBLE-CEMENT-BURLAP INSERTED **MATERIAL**

For ROOFING and SIDING

(Reg. U. S. Pat. Off.)



'Pioneer Press," the Finest Off. Bldg. in St. Paul Roofed with *"BURMITE"*

Residences, Business and Factory Buildings of any construction—*be they NEW or OLD*—is being **specified** by Architects, recommended and used by Contractors, Building and Roofing Experts, **sold by** Dealers and called for by General Users—*because it is*

Practical—Durable—Artistic—Inexpensive and GUARANTEED for 10 YEARS without Coating.



"Burmite" used on Roof and for Siding Upper Story.

Successfully used in all climates; can be applied in Summer or Winter without danger of buckling, expanding, or contracting; will not "run" on steep roofs; can be laid over old shingles or tin. **Lasts longer than shingles, costs less—lays smoother, looks nicer and requires no paint to preserve it.**

WRITE TODAY *for Samples, Printed Literature and Booklet,*

"Burmite Quality Counts"

Illustrated with Residences, Summer Homes, Cottages, Bungalows, Garages, Barns, etc., beautifully printed in colors, showing effect of "Burmite" applied as a Roofing and Siding.

Bermingham & Seaman Co., Roofing Manufacturers **Chicago**

GEN. OFFICES: 1208-1226 Tribune Bldg. PLANT: 56th, Armitage and Grand Avenues

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Johnson Offers Free Samples

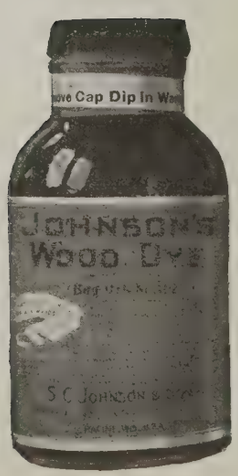
S. C. Johnson & Son of Racine, Wis., are offering to send to our readers liberal free samples of their famous wood finishing materials post-paid. This is being done that all of our readers may be familiar with the superior merits of the goods manufactured by this old and reputable concern, who have been wood finishing authorities for 30 years.

With these free samples, they will send a copy of the last edition of their book "The Proper Treatment for Floors, Woodwork and Furniture." To get samples and book free all that is necessary to do is to fill out the coupon, addressing to S. C. Johnson & Son, Racine, Wis.

Johnson's Wood Dye

is made in 15 standard shades, as follows:

No. 120 Fumed Oak
No. 126 Light Oak
No. 123 Dark Oak
No. 125 Mission Oak
No. 140 Manila Oak
No. 110 Bog Oak
No. 128 Light Mahogany
No. 129 Dark Mahogany
No. 130 Weathered Oak
No. 131 Brown Weathered Oak
No. 132 Green Weathered Oak
No. 121 Moss Green
No. 122 Forest Green
No. 172 Flemish Oak
No. 178 Brown Flemish Oak
Half Gallons, $1.50 each



Any other shade may be easily produced, as each shade may be lightened by adding alcohol and darkened by adding No. 172 Flemish Oak Dye.



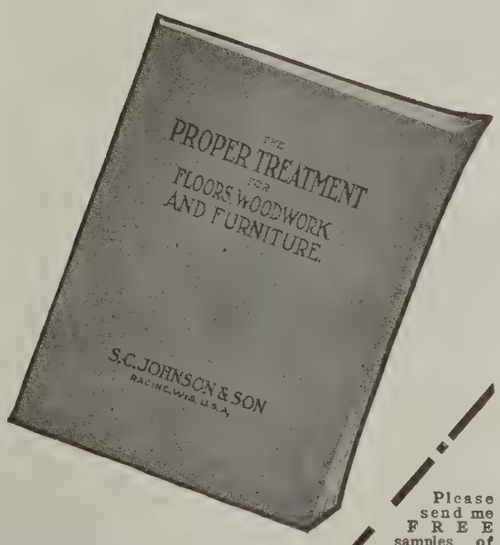
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

To Readers of National Builder

Johnson's Under-Lac is a spirit varnish which will not chip, mar or scratch. It is better than shellac or varnish as it can be easily applied and does not raise the grain. Neither is it thick and sticky like varnish —it dries in a half hour. Gallons $2.50 each.

Johnson's Wood Panels—In addition to sending free samples of Johnson's Wood Dye and Under-Lac, we are glad to supply painters and contractors with panels of various woods finished with Johnson's Wood Dye, Under-Lac and Prepared Wax.

If you care for a set of these panels drop us a line—and we shall be pleased to send them to you without any obligation whatever on your part. You will find the panels very convenient to show prospective customers and they will assist you in procuring contracts at **Good Prices.**





Mail the Coupon now for samples, panels and book, "The Proper Treatment for Floors, Woodwork and Furniture."

S. C. Johnson & Son

Racine, Wis.
U. S. A.

"The Wood Finishing Authorities."

Please send me FREE samples of Johnson's Wood Dye, No. ....., and Johnson's Under-Lac. Also Wood Panels and booklet, "The Proper Treatment for Floors, Woodwork and Furniture." I agree to test the samples and if they are satisfactory will use and recommend them in my work.

Name .....

Address .....

.....

NB-5 .....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Material Hoists



For Double Platform Elevators

SIMPLE, STRONG, DURABLE

The most economical method for elevating building material. Two sizes, 4 and 6 horse power.

Contractors send for Bulletin No. 5 and get our proposition.

Also a full line of engines from 1 to 35 horse power.

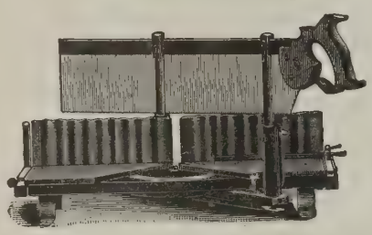
Bates & Edmonds Motor Co.

1146 MILL ST., LANSING, MICH.

GOODELL MITRE BOX

Made of STEEL - Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

BUY YOUR FURNACE DIRECT



Save the middleman's profit. Set it up yourself and save the charge of installation.

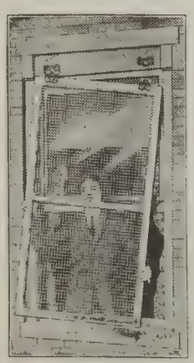
Jahant Down-Draft Furnace

Burns the fuel from top to bottom. Easily regulated. Gives more heat from less fuel than any other system. Sold direct, freight prepaid, for **$10 down and $10 monthly.** All pipes and fittings cut ready to set up. Guaranteed satisfactory or money returned after one year's trial. Send for our big free furnace book.

The Jahant Heating Co.

2 Mill Street, Akron, Ohio

KEES BEATRICE



Hanging Screen from inside the building

KEES-GOSSETT DETACHABLE SUSPENSION HINGES

Try a pair to hang one of your own window screens.

After that you'll always use and recommend them.

Ask on your letter-head and we'll send a sample set free if you mention your hardware dealer.

F.D. KEES MFG. CO. BEATRICE, NEB.

BOX 810



Screen swung out to wash windows



From an Economy Standpoint

STAR HACK SAW BLADES

FOR MACHINE USE 12 x 5/8

Surpass all other Blades. Eliminate carrying in stock Blades of varying widths and thicknesses with different numbers of teeth to the inch. They are made of the best material.

POSSESS GREAT STRENGTH AND DURABILITY.

Ask for and insist upon getting the Blade with the ★

ALL DEALERS KEEP THEM.

Write for leaflet.

MILLERS FALLS CO.

28 Warren St., NEW YORK

ST. LOUIS, MO. **BALTIMORE, MD.**

F. Weber & Company

1125 Chestnut St., Philadelphia, Pa.

DRAUGHTING AND ENGINEERING SUPPLIES

Drawing Tables and Boards



Filing Cabinets and all Drawing Room Requirements

Detail Drawing, Blue, Brown and Black Print Papers

The "UNIQUE" direct BLACK PRINT PAPER requires only one bath. Best on the market. Write for samples.

BEST MAKES OF BUILDERS' TRANSITS AND LEVELS. Complete catalog Vol. 300B sent on request.

Full Line of Plumbing Supplies



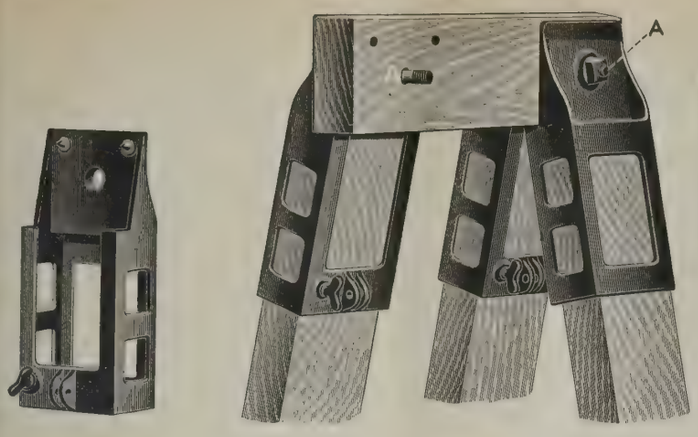
Sold Direct at Wholesale Prices

20 to 40 per cent Saving

Complete bath room outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

B. Y. KAROL, 768-72 W. Harrison St., Chicago, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



G. & M. Trestle Irons

(Patented Aug. 25, 1903)

Made of best quality malleable iron, it is non-breakable, light and portable.

By removing bolts **A** trestle will fold together for convenience in transportation from one job to another or from one room to another. Also for storage purposes no space is lost.

G. & M. Trestle Irons enable any one with saw and auger bit to set up trestle in 1-5 the time it takes a mechanic to make an ordinary trestle.

No planing required. Timbers 2x4 in the rough are all that are required.

For Sale By

ORR & LOCKETT HARDWARE CO.

Established 1872

14-16 W. Randolph St., CHICAGO

Also Agents for the **Acme Floor Scraping Outfit, Buck Bros.' Chisels, Barnes Foot Power Woodworking Machinery, Jennings Take Down Squares, Job Pugh Hand Made Auger Bits.**

Send for our Catalog A of CEMENT TOOLS.

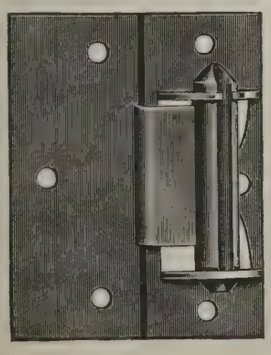


Samson Spot Sash Cord

IS made of extra quality fine yarn, and warranted free from imperfections of braid or finish. It can always be distinguished by our trade mark, the Colored Spot. Carried by all dealers. Send for samples and tests.

Samson Cordage Works

BOSTON, MASS.



Diehl's Separable and Reversible Hinge No. 20

This hinge is designed for storm and screen doors. The door may be swung at right angles and lifted from its bearings without removing the screws, as the shank slides through the small slot in the upper ear so that it makes it very easy to change from storm to screen doors and from screen to storm doors without removing the hinges. Hinge No. 20 is made of open hearth wrought steel, 14 gauge, and finished in black baked japan or oxidized copper.

A Sample Set of Hinges will be sent upon receipt of 25 cents in stamps.

The Diehl Novelty Company

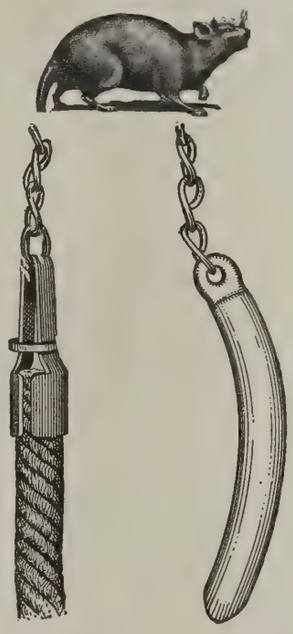
SHEBOYGAN, WISCONSIN

Mention National Builder.

MR. CONTRACTOR

Look at These Prices

CARPENTER MOUSE



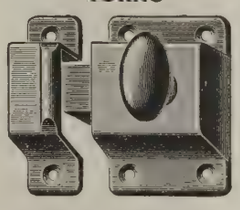
Chain is 63 inches long, fitted at one end with a patent sash cord fastener, at the other end with a lead weight. Price each.....**30c**

WROUGHT SASH LIFTS



2367. Sash Lifts. Wrought iron, bronze plated, per doz.....**15c.**
2368. Sash Lifts. Wrought iron, old copper finish, per doz.....**15c.**
8368. Hook Sash Lift. Steel, dull brass finish, per doz.....**15c.**

WROUGHT CUPBOARD TURNS



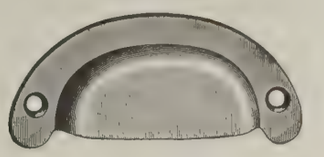
1496. Cupboard Turns, wrought steel, old copper finish, per doz. **95c.**
8274. Cupboard Turns, wrought steel, dull brass finish, per doz. **95c.**

WROUGHT SASH LOCKS



5493. Sash Lock. Steel, antique copper finish, per doz.....**50c.**
8393. Sash Lock. Wrought steel, dull brass finish, per doz. **50c.**

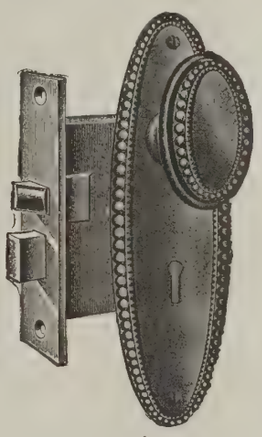
DRAWER PULLS



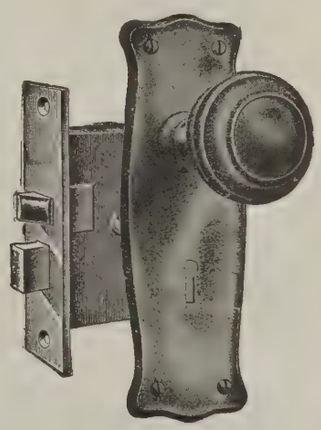
No. 2330 and 8330.

2330. Drawer Pulls, steel, old copper finish. Price per doz. **22c.**
8330. Drawer Pulls, steel, dull brass finish. Price per doz.... **22c.**

INSIDE LOCK SETS



5155. Lock Set. Lock has wrought steel front, antique copper finish, electro plated bolts, nickel plated steel key. Knobs and escutcheons, wrought steel, antique copper finish. Price, per set.. **37c.**



No. 5755.

5755. Lock Set. Lock has steel front, antique copper finish; brass-plated bolts and steel keys. Knobs and escutcheons wrought steel, antique copper finish, per set.. **44c**

FREE

Our illustrated catalog and net price list. When sending for this catalog state whether you are a contractor, carpenter, or material man.

REHM HARDWARE CO.

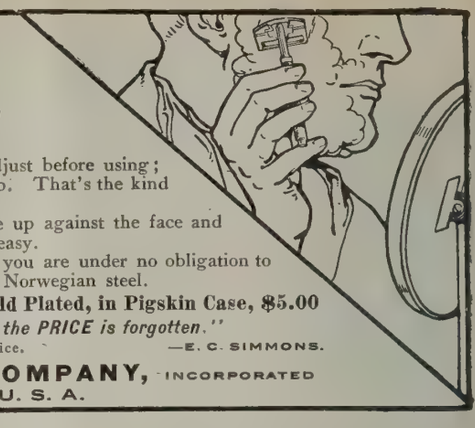
1503 Blue Island Ave., Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



"Left" and "Right" are Both **Right** to a

KEEN KUTTER Safety Razor



Think of a Safety Razor that is **always** in shaving trim; that you don't have to adjust before using; that will shave up or down, left-handed or right-handed, and **always** do a clean, cool job. That's the kind of shaving implement you have when you invest in a ***KEEN KUTTER*** **Safety Razor.**

It's because the ***KEEN KUTTER*** "Safety" is **built right**—correctly angled to lie up against the face and shave the toughest beard with the correct diagonal stroke that makes shaving easy.

Every ***KEEN KUTTER*** **Safety Razor** is guaranteed and **must be right** or you are under no obligation to keep it. Comes in a compact leather case with twelve fine blades of best Norwegian steel.

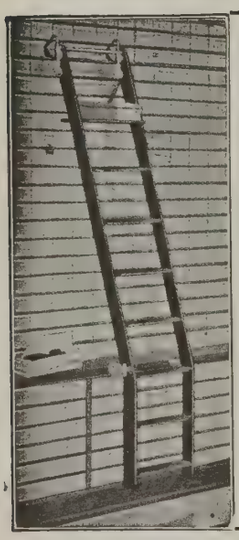
Silver Plated, in Black Leather Case, $3.50 **Gold Plated, in Pigskin Case, $5.00**

"The recollection of QUALITY remains long after the PRICE is forgotten."

Trade Mark Reg. in U. S. Pat. Office. —E. C. SIMMONS.

If not at your Dealer's, write us.

SIMMONS HARDWARE COMPANY, INCORPORATED
ST. LOUIS AND NEW YORK, U. S. A.



Mr. Carpenter and Builder

Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY
1442 N. Eighth St., ST. LOUIS, MO.

LET US SEND YOU THIS BOOK FOR

FIVE DAYS FREE TRIAL

Send no money—just mail to us your name and address. Your book will reach you by return mail. Keep it 5 days—use it—then either send One Dollar or return the book.

Standard Handbook of
ESTIMATING DATA
Every Man in the Building Trade needs it.

READ WHAT OTHERS SAY:

Your Standard Handbook is the best book of its kind ever written. For all the **30** years I have spent in estimating and building I would not be without it for twice the cost.

Name .....

Address .....

THE BUILDERS' AUXILIARY COMPANY, 325 Old South Bldg., Boston, Mass.

the VOLTZ UNIVERSAL SASH BAR



Makes any angle, allows for settling of building—keeps windows from frosting. The most beautiful, practical and durable bar in the world. Made in metal.

"Holds with a grip of iron, yet with a touch of velvet." Glass set from the outside. **More good features explained in our catalog—it's fine—send for a copy before you build or repair.** Write today.

VOLTZ MFG. CO.

1102-1104 S. 8th Street, :: St. Joseph, Mo.

HARTMANN-SANDERS CO.



Originators of the
"Lock Joint" Stave Columns
Universally Recognized

As the leaders in Architectural Beauty and Quality.

When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.

We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty.

But we are glad we stood the test, **that's why** we are selling more columns today than ever before.

Ask for Catalogue "T"—it's worth having for any **Home Builder**

We manufacture a full line of porch material and Interior Hardwood Columns.

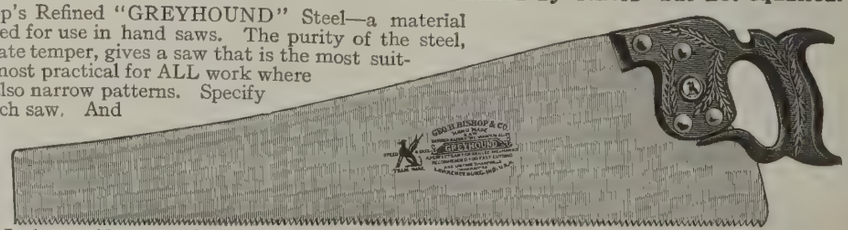
2155 ELSTON AVENUE - CHICAGO, ILL.

GREYHOUND HAND SAWS

SPEED & EASE
TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.

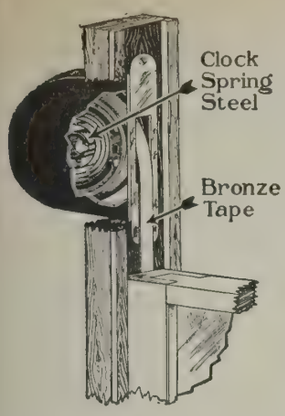


Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana
CHICAGO BRANCH: 108 W. Lake Street

Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Pullman Unit System Sash Balances

(Patent Pending)

FOR NEW BUILDINGS

Cost less and give better service than cords and weights.

Frames mortised at the mill.

Let us tell you about this new and up-to-date hardware item.

Pullman Mfg. Company, **10 Allen Street, Rochester, N. Y.**

WHEN YOU GET TO **SASH CORD** USE

SILVER LAKE

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

Was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

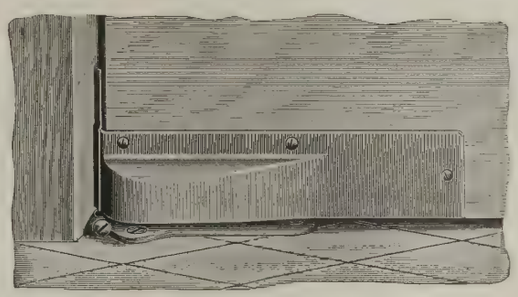
Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. R. BARTON 1832 ROCHESTER, N.Y.

MACK & CO., Sole Makers

Brown's Race **Rochester, N. Y.**

1910 "Standard" Floor Hinges



sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio



Screen Door

THE SENSIBLE SCREEN DOOR CATCH

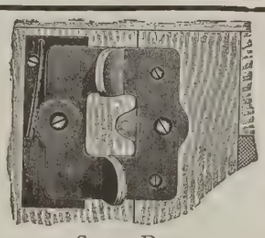
A New Idea

The Sensible is the Catch that catches securely but quietly—prevents the door from warping, keeps out the flies, and reduces the noise of slamming to the minimum. Note the simple adjustment. Illustrations in this advertisement show catch one-third of actual size. Write for prices. Sample set mailed upon receipt of 25 cents.

MANUFACTURED BY

R. G. Winter Manufacturing Co.

2104 Vliet Street, : : MILWAUKEE, WIS.



Screen Door

CONCRETE MACHINERY

The greatest mixer made. All kinds of styles of the latest cement block and brick machines and molders from $5 and up; in fact WE MAKE EVERYTHING IN CONCRETE MACHINERY (low prices but high grade) GET CATALOG N. FREE.

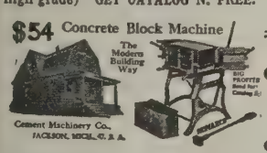
SYSTEMATIC CONCRETE MIXER 28 ADVANTAGES



CEMENT MACHINERY COMPANY

Jackson, Michigan, U. S. A.

$54 Concrete Block Machine



CEMENT IS CHEAP—BIG PROFITS

making concrete products and building sidewalks. Get a mixer. Get started. Prospects brighter than ever; things are going to boom in the cement industry. Get free Catalog "N."

CEMENT MACHINERY CO., Jackson, Michigan

LOW FREIGHT RATES

On Machinery and Household Effects

That's what we can offer SHIPPERS from points east of the Mississippi River destined to Interior and Pacific Coast Points by our plan of shipping in CARLOAD LOTS. Latest maps of any principal western state free on application by addressing Forwarding Department of the

TRANS-CONTINENTAL FREIGHT CO.

215 DEARBORN STREET, CHICAGO

29 Broadway, New York
625 3rd Street, San Francisco

322 West Sixth Street, Los Angeles
305 Main Street, Seattle

THE LITHOGRAPH POSTAL WILL INCREASE YOUR BUSINESS

By using Lithograph Postals you convey the natural color effects to the prospective home builder as well as the architectural construction.

This is an entirely new idea for the contractor and builder.

It is a very effective way to advertise and create future business at small cost.

Write for free samples.

AMERICAN VIEW CARD MAKERS

334 Dearborn Street :: :: :: :: **CHICAGO**

CUSTOM MADE

FLY SCREENS



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS

Our screens are made from kiln dried lumber and have waterproof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced

Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

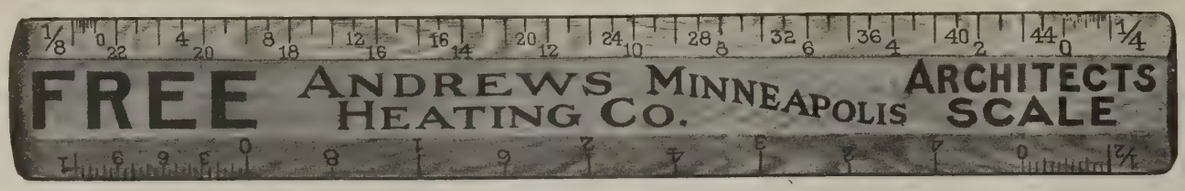
Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

A. J. PHILLIPS & CO., Le Roy Street, Fenton, Mich.

28 Years Experience. 3½ Acres of Floors

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Send us Two or More Names of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.



ANDREWS HEATING CO.
1166 Heating Building
MINNEAPOLIS, MINN.

$1.00 Good For $1.00

TO INTRODUCE
The SELF-SETTING PLANE
(As long as this Ad appears.)

Any dome in this paper is good for one dollar, in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our Planes are not sold.

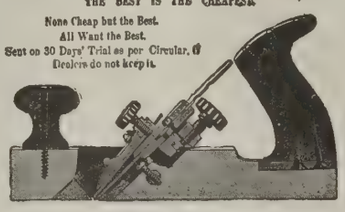
If you want more than one Plane and they are not sold in your town we will allow you dealer's discount.

List price of **Beech Wood Planes:** Smother $3.25, Jack $3.50, Fore $3.75 and Jointer $4.50.

Do not say the price is too high until you try it, then if the Plane is not worth to you, twice its cost, return it at our expense and the trial won't cost you a nickel.

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

If you don't want a **Self-Setting Plane** now, send us a dome and the addresses of ten carpenter friends, no matter where they live, and we will send you a hard, tough, carpenter's pencil and circulars.



Gage Tool Co. VINELAND, NEW JERSEY

The Excelsior Dumb Waiter

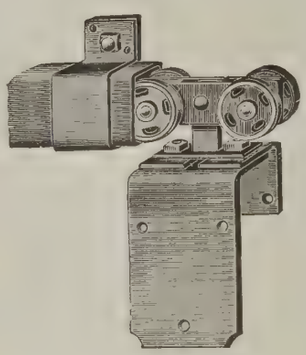


Sent complete to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. Send for Descriptive Pamphlet.

R. M. RODGERS & CO.
175 Washington Ave., Brooklyn, N. Y.

RICHARDS-WILCOX TROLLEY HANGERS



for that garage job. We'll solve your problems in warehouse work, too. Tell us your needs, get catalog and mention name of your hardware dealer.

Richards-Wilcox Mfg. Company
Aurora, Illinois

THE "E-Z-way" SCREEN HANGERS

NEVER ALLOWS SCREEN TO BIND OR STICK WHEN HUNG—
ALWAYS FIT SNUG TO BLIND STOP

Everything Done from the Inside of the Building

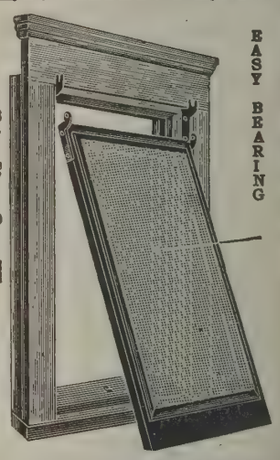


"E-Z-way" Hangers are made of 18 Gage Black Iron and are electro galvanized. THEY WILL NEVER RUST.

You can hang one-half to two-thirds more screens in a day with "E-Z-way" Hangers than with any others.

TRY TWO DOZEN SETS FOR $1.00—NO PERSONAL CHECKS

Use a No. 1 Hanger on a 1 Inch - Casing
" No. 2 " " 1½ "Brick Mould
" No. 3 " " 1¼ " " "



PETERS & GRANT
Patentees and Manufacturers
2214 East 18th Street
KANSAS CITY, MO.

Wood's Key to the Steel Square



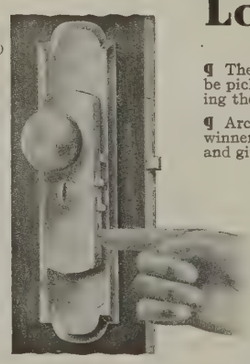
Has been tried by thousands of Builders and not found wanting. It is a wonderful instructor as to the uses of the square in obtaining cuts and bevels for all kinds of work.

Made of celluloid and put up in neat leather case of pocket size, so that it can readily be carried on the job. It is a snap at our low price of $1.50.

Send your order at once and it will be shipped prepaid to your address

HODGSON BOOK CO.
358 Dearborn St., Chicago

Dayton Keyless Locks are the Safest and Most Convenient Locks for the Home



¶ They are handsomely made in different finishes—cannot be picked—are easily and instantly opened by simply touching the right sentinel as shown here.

¶ Architects, contractors and carpenters will find them money winners—meeting every want in locking and opening doors, and giving absolute protection.

SALESMEN WANTED

¶ Let us tell you about them—also about our padlock having 38,005 combinations. Write today.

THE
Dayton Keyless Lock Co.
804 U. B. Bldg. Dayton, Ohio

THE "EUREKA" SPIRAL SCREWDRIVER

PUSH ON THE **HANDLE and THE SCREW GOES IN**



Will Drive a Screw in Hard or Soft Wood
QUICKER AND EASIER THAN ANY OTHER
THE "EUREKA" SPIRAL SCREWDRIVER
is made in two sizes from the highest class materials—No. 1, 14 in. long opened, 9 in. closed; and No. 2, 19 in. long opened, 12 in. closed. Can be used as an ordinary screwdriver.

GET ONE TODAY FROM YOUR DEALER

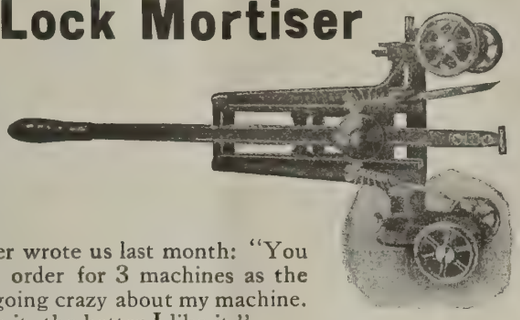
DECATUR COFFIN CO., E. North St., DECATUR, ILL., Manufacturers

OLDEST AND BEST

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Miller's Two Minute Lever Lock Mortiser

Chisels the opening for Locks and is the greatest time and labor saver



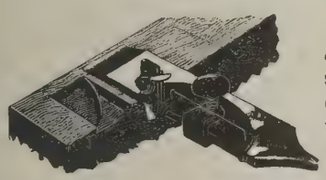
One builder wrote us last month: "You may expect an order for 3 machines as the carpenters are going crazy about my machine. The more I use it, the better I like it."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

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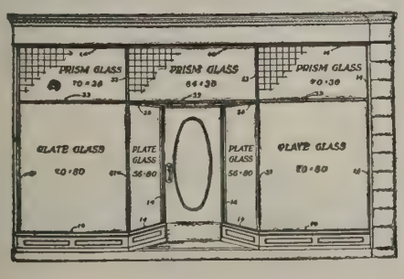
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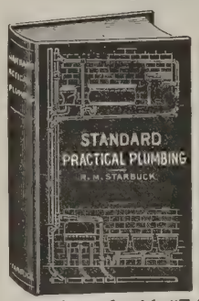
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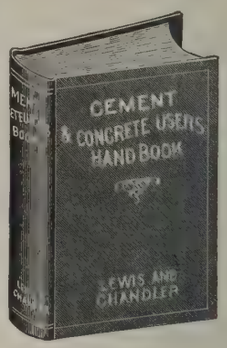
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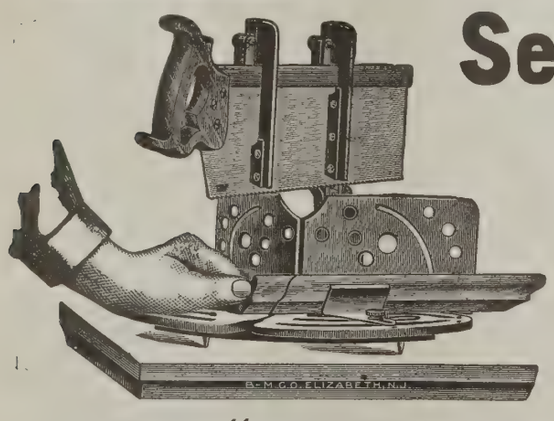
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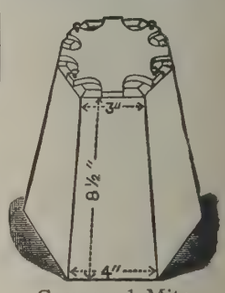
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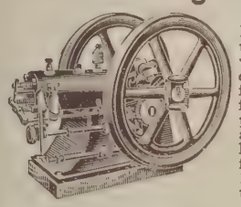
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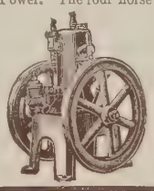
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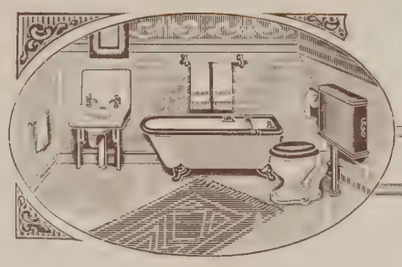
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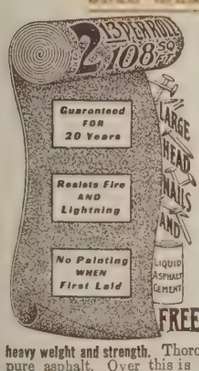
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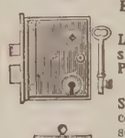
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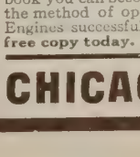
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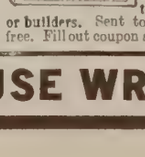
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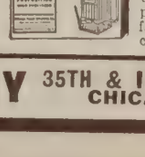
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The Disston Insulate Screw Driver is something new.
Most practical electricians' screw driver ever made.

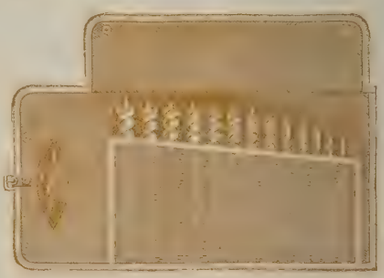
HENRY DISSTON & SONS

INCORPORATED

Keystone Saw, Tool, Steel and File Works

Philadelphia, Pa.

BRANCHES: Chicago Boston Cincinnati New Orleans Memphis San Francisco Seattle Portland Spokane Toronto Vancouver



FOR MORTISING DOORS
And Similar Work

"RUSSELL JENNINGS"
AUGER BITS

in new set—22½ QUARTERS

HARDWOOD TOOL BOX OR CANVAS ROLL

Contain 11 bits—4, 5, 6, 7, 8, 9, 10, 11 and 12 sixteenths, standard thread, and 8 and 10 sixteenths, quick-boring threads for end-grain boring and gummy woods.



RUSSELL JENNINGS MFG. CO.
CHESTER, CONN., U. S. A.

21-42

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

FOR WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut at the factory into 4x4 ft. sheets, which are easily and quickly nailed to studding, ready for immediate application of wall paper, paint, burlap, or other decoration.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary, and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

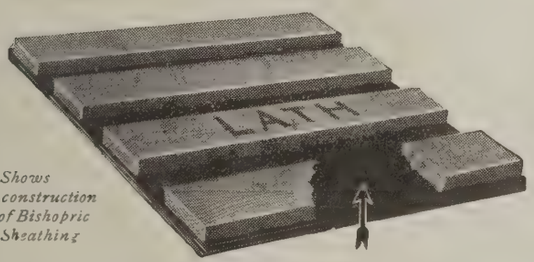
Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



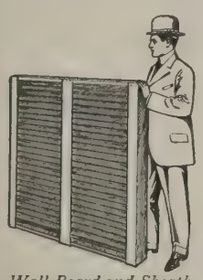
Shows construction of Bishopric Sheathing

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space

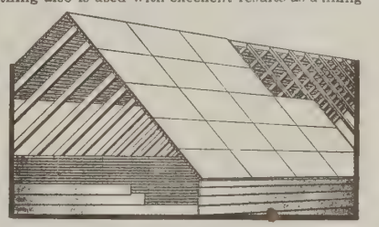
In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time

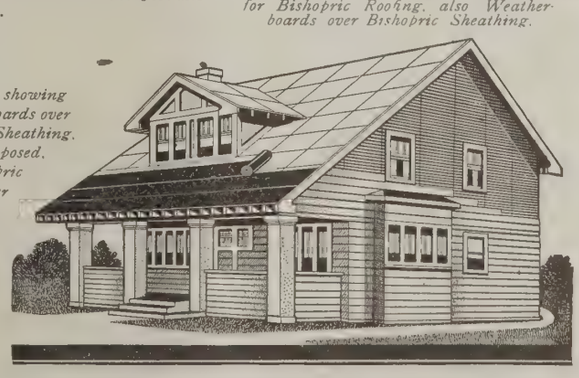
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Utility Wall Board

Is Used on Walls and Ceilings of These Artistic Rooms

The first illustration shows how easily Utility Wall Board can be applied. The other two illustrations show how nicely wall paper can be applied on walls and ceilings lined with Utility Wall Board.

Does it not look good to you ?

Wouldn't you like to have us send you a sample of it—and tell you how economical it is—How easily it is applied—How artistically it can be decorated?

Our *beautiful illustrated booklet* tells the whole story—and shows pictures of artistic interiors. It is free for the asking, together with a sample of Utility Wall Board.

UTILITY WALL BOARD

is unlike any other Wall Board you have ever seen—It is made of exceedingly tough, durable fibre, thoroughly waterproofed—No moisture can penetrate it—It is applied directly to the studding, taking the place of both lath and plaster—Any carpenter can put it on—It will last as long as the house stands—You'll be amazed at the convenience of it—the economy of it—the beauty of it.

Mr. Contractor: This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern wall lining.

Don't fail to send for the sample and booklet at once—ask for our special proposition to contractors and builders

UTILITY WALL BOARD is Sold Through Dealers in Building Material Everywhere

THE HEPPES COMPANY

4502 Fillmore St., Chicago, Ill.



SEE THAT

Compo-Board

IN IN YOUR SPECIFICATIONS

It is the most satisfactory wall lining yet devised. It will last longer than lath and plaster.

Compo-Board is easily and cleaply put on, and the walls will look well as long as the building lasts. They will never be disfigured with ugly cracks or blemishes from moisture accumulating on the walls. Will not crumble, crack or fall off. Cannot be marred by jamming furniture into them. ¶ Compo-Board makes dry, warm, moisture-proof, fire-resisting walls, ceilings and partitions. The rooms will be free from draughts, warm in winter and cool in summer. ¶ Not only is Compo-Board a superior wall lining, but it has many uses around the house, in offices and factories. ¶ It is made of thoroughly seasoned, kiln dried strips of lumber well glued together. They are covered with a thick coat of cement on either side and an outside covering of thick paper.

You can buy it in strips four feet wide and one to 18 feet long, any length you want in even feet. **Send for BOOKLET and SAMPLE.**

It explains the many uses and advantages of Compo-Board and you can get an idea of what it is from the sample.

NORTHWESTERN COMPO-BOARD CO.
5776 Lyndale Ave. No., Minneapolis, Minn.

The border of this advertisement is a cross section view of Compo-Board.

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SAP GUM

The success of ***RED GUM*** in New York building operations—both large and small—has been most pronounced.

Any builder who wants to be up-to-date may find several hundred high class apartment buildings and residences in which ***RED GUM*** has been selected for the interior trim because of its beauty and value.

SAP GUM

(which comes from the same tree) is not yet so generally known perhaps because it lacks the superb grain and color of ***RED GUM*** and because it is usually used where it does not show. (***SAP GUM*** is the ONE BEST WOOD known for WHITE ENAMEL TRIM, for instance.)

Builders who don't yet know about ***SAP GUM*** will find it is thoroughly reliable when properly manufactured, and will find, furthermore, that ***SAP GUM*** has all the good qualities of many of the woods hitherto used merely through force of habit.

Get any of the following trim manufacturers

F. Eckenroth & Son
921 East 5th Street, New York City
Empire City-Gerard Co.
40 East 22d Street, N. Y.
David Gilmour Door Co., Buffalo, N.Y.
Harlem River Lumber & Woodworking Co.
Grand Avenue and 138th Street, N. Y. C.
H. Herrmann Lumber Co.
254 Canal Street, N. Y. C.
Jamestown Mantel Co.
271 West 125th Street, N. Y. C.
Kertscher & Co., 13 Lawrence St., N. Y. C.
C. R. Macaulay
18th Street and 5th Ave., Brooklyn, N. Y.
Lewis Marx & Son
Tompkins & Delancey Sts., N. Y. C.
Murray & Hill Co.
143d Street and Southern Boulevard
H. W. Palen's Sons 1 Madison Ave. N.Y.C
Niagara Wood Working Co.
159 East 88th Street, N. Y. C.
Weisberg-Mark Co.
Astoria, N. Y.
Yerks & Co.,
32 N. Broadway, Yonkers

to make you a quotation on good ***SAP GUM*** in places where you would otherwise use other woods, and you will be glad to find

YOU WILL SAVE SOME MONEY

without any loss of value whatever, and with an increase of prestige.

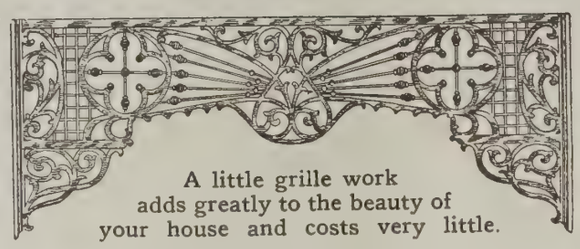
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
CARRIER LUMBER & MANUFACTURING COMPANY . Sardis, Mississippi
BAKER LUMBER COMPANY . . . . . Turrell, Arkansas
ANDERSON-TULLY COMPANY. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., . . St. Louis, Mo.
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

CHICAGO GRILLE WORKS

1892 1911

WHY NOT?



A little grille work adds greatly to the beauty of your house and costs very little.

Try the **manufacturer** with your next order of Grille Work Colonnades, Consoles and Interior Columns. You may be agreeably surprised with prices and promptness in shipment. **Why not** send us your next order? We have thousands of well pleased customers; if you are not one of them, **why not** write today for our **Catalog No. Nineteen** and find out what we have to offer you in the way of interior decoration? Every dollar spent with us adds five to the value of your home.

828-838 Wells Street, Chicago, Ill.

Use Pearson's Nailers

FOR ANY PITCHROOF — OR — ON A LEVEL



Thousands of Pearson's Nailers are now being used by carpenters and builders on their shingling jobs with the most satisfactory results.

Pearson's Nailers Are Light, Strong and Fast

The nails can be dumped into it any old way and they will always drop automatically into place, ready to be driven in with the hammer. They do away with that old, unsanitary way of carrying nails in the mouth. The operator can wear gloves or mittens when shingling. A Pearson Nailer will pay for itself on a fair sized job.

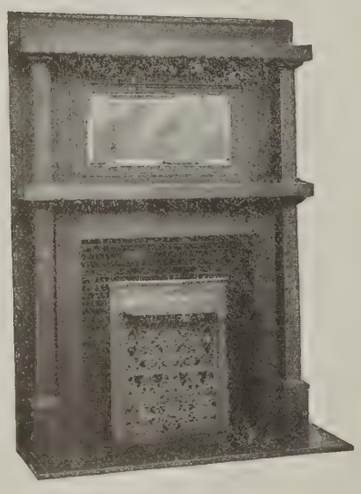


Pearson's Nailers are made in two sizes, the Blue Nailer is for common 3d No. 14 wire nails and the Red Nailer is for Galvanized 3d No. 13, 1¼ in. wire nails

Order one now, stating Nailer wanted. You are taking no risk, for we refund your money if not satisfied after a trial. Price **$5.00** each, and **we will pay express charges if ordered now**, before our big rush sets in.

Write for circular "N" and use a Nailer on your next job of shingling.

Pearson Manufacturing Co., ROBBINSDALE, MINN.



$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

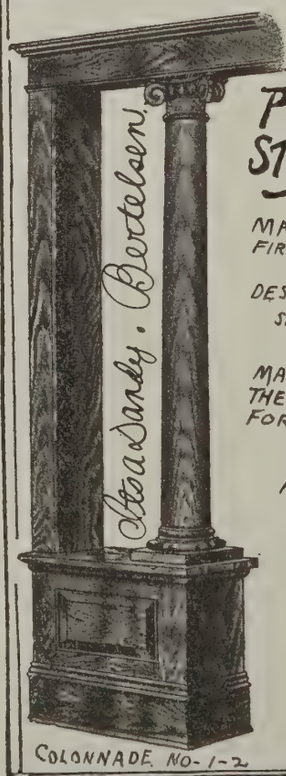
are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

$8.50 FOR THIS COLONNADE



COLONNADE. NO-1-2

A VERY LOW PRICE FOR THIS STRICKING NEW COLONNADE

MATERIALS AND WORKMANSHIP FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUDED
MADE FOR 5¾-INCH JAMBS
MADE IN OAK OR YELLOW PINE, IN THE WHITE, HAND SMOOTHED, READY FOR FINISHING.

PRICES
ANY HEIGHT NOT OVER 9 FEET.

Style No. 1-2 EACH...$ 8.50 PER PAIR 17.00

Columns are 6 inches in diameter, tapering to receive 5-inch compo. cap, pedestals are 20 inches high over all and the width is 24 inches over all, and when set in to receive casings extension from jamb is 18 inches. Top shelf is 10 in. wide.

Style No. 2-2 EACH...$ 9.00 PER PAIR 18.00

Same measurements as above, only pedestals are 30 inches wide over all and when set in to receive casings extension from jamb is 24 inches.

SEND YOUR ORDER NOW, DONT LET IT GET AWAY FROM YOU.

BERTELSEN ADJUSTABLE GRILLE CO. 619. S. CLINTON ST. CHICAGO.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BEFORE YOU BUY A FOOT OF LUMBER

FOR ANY PURPOSE, big or little, indoors or out, in city or country,

Write for the proper volume of The Cypress Pocket Library. (Free)



Backed by our "All-round Helps Dept.," it is the "guide, counselor and friend" of

ALL THE PEOPLE WHO CARE

WHAT *VALUES* THEY GET for their LUMBER MONEY.



Why not buy WOOD with the same discrimination you apply to other things?

We do not advise CYPRESS for *all* uses, but *only* where it can *prove* itself "the one best wood" for *your* use.



1 You don't tell your broker: "Buy $10,000 of Railway stocks!" Hardly! You tell him *what.*

2 You don't simply tell your Real Estate agent: "Buy me 'some land'!" You tell him *where.*

3 You don't tell the dry goods clerk: "I want 8 yards of *cloth!*" You say "silk," "wool," or "linen."

4 You don't merely order "200 head of live stock!" You specify Horses, Cattle, etc., *and the Breed.*

5 You don't tell the contractor: "Build me a house!—and paint it!" You dictate the *plans.* And the *colors.*

WHY NOT BUY **LUMBER** WITH EQUAL CARE? INSIST on **CYPRESS**—"THE WOOD ETERNAL."
WRITE AT ONCE for **VOL.** of **CYPRESS PKT. LIBR.** that fits your case. **WE'LL REPLY AT ONCE.**

THESE VOLUMES MAY BE HAD NOW:

5. How to Avoid Mistakes in Bungalows.
9. CYPRESS for SIDING—and Why.
22. Cypress SILOS and Tanks (of course.)
18. Cypress Bungalow "A" (Complete Working Plans and Specifications Free.)
6. Cypress Bungalow "B" (Complete Working Plans and Specifications Free.)
3. Cypress, "Only GREENHOUSE Wood."
29. Cypress Shingle House (Free Working Plans and Specifications.)
16. Cypress for Porches, etc., and the Reasons.
31. Cypress' Great Beauty for Interior Trim.
12. "The Wood Eternal" for Exterior Trim.
30. Cypress Pergolas, etc. (8 Working Plans Free.)
7. Cypress Shingles "Yes Book" (Last a century.)

THESE IN PREPARATION—APPLY NOW:

10. Cypress for Artistic Doors (a revelation.)
2. "Pecky" Cypress—"The Vaccinated Wood."
4. Cypress "& Nothing Else." for BARNS, etc.
1. "The Wood Eternal"—What It IS (incl. U. S. Govt. Report.)
8. Cypress Bungalow "C." (Free Working Plans and Specifications.)
28. Cypress for All Trellises and Arbors.
15. Cypress for Dairy Uses—"The Only Wood."
19. Cypress for Canoes and Boats (defies decay.)
24. What People (who *know*) SAY of Cypress."
26. Japanese Effects (Sugi) in Cypress.
11. Cypress for Sash, Blinds and Frames.
14. Cypress for Gutters, Curbs and Culverts.
23. Cypress "Perfect for Exterior Painting."
25. "Perfect for Interior Painting and Staining."
27. As a "Preventive of Proper y Depreciation."
20. Cypress for All FARM Uses.
33. "How I Finish Cypress," by a Craftsman.
32. "Caustic Surfacing of Cypress," (novel.)
21. Cypress for "All Outdoors" (of course.)
17. Cypress for All "Odd Jobs" (of course.)

When Planning a Mansion, Bungalow, Pergola, Pasture-Fence or Sleeping Porch, remember—"*With CYPRESS you BUILD BUT ONCE.*"

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with reliable Counsel.

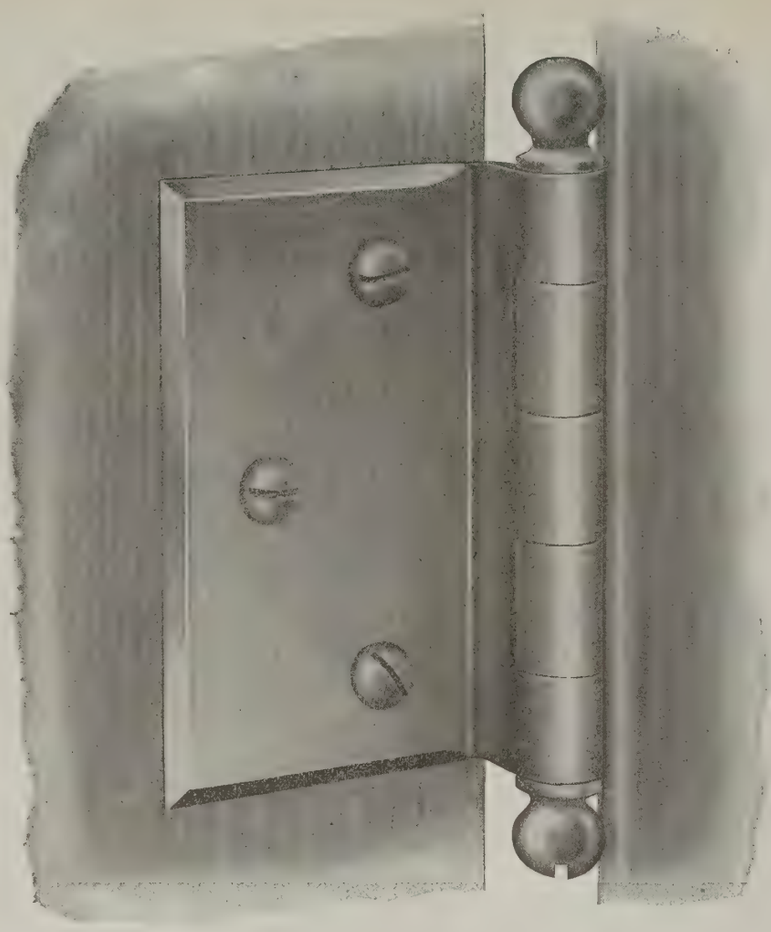
SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS OF YOUR LOCAL LUMBER DEALER. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.





No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

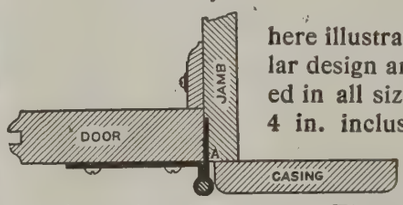
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

These are exclusive "NATIONAL" features.

Style No. 450



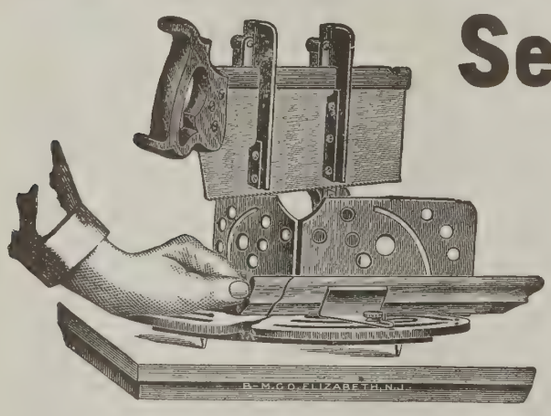
here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.

DORN'S REVOLVING MITRE BOX

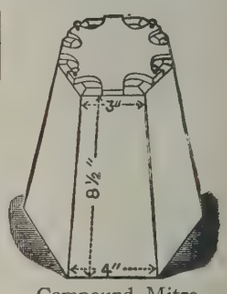
A MITRE BOX FOR A LIFE-TIME

Sent on 10 Days Trial



The Famous Dorn Revolving Mitre Box. Will saw compound as well as plain mitres any width with a back saw 4 inches wide.

Price of Mitre Box without saw $10.75 F. O. B. at Elizabeth, N. J.



Compound Mitre

Send for Booklet Called "Tools That Last"

OUR "CHISEL" GUARANTEE

We guarantee that our chisels will hold their edge all day with one sharpening, even if used on quartered oak across the grain.

Chisels look simple, but there is no tool of which such hard work and varied service is required. Recognizing this we have given the choice of the steel, regardless of cost, and the design of these chisels, the most extensive study and experimentation, and in their manufacture the greatest care and highest order of skill is employed.

SPECIAL OFFER

To further increase the number of carpenters who insist on having B. M. Co. Chisels we will sell direct to readers of the National Builder, express prepaid, any chisel or set of chisels with privilege of returning after ten days trial if they do not prove to be the BEST EVER USED.



BEVELED EDGE BUTT CHISEL



SOCKET BUTT CHISEL

BRAUNSDORF-MUELLER CO., - - - Elizabeth, N. J.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE Building Season is here—It promises to be a very busy one—keep up with the pace by always having your tools with a keen, smooth edge—an edge that you can get so much quicker and easier if your tool kit contains a

Carborundum Sharpening Stone



Always free, clean and extra fast cutting—never filled or slick, the round Carborundum Combination Stone is ideal for carpenters' use. Shaped to allow for rotary motion in sharpening chisels, plane bits, etc. For cabinet makers' tools, etc., requiring an extra fine, delicate edge, there is the Carborundum extra hard, extra fine stone.

Carborundum round combination stone, No. 107 - - - -	$1.00
Carborundum extra hard, fine stone, No. 156 - - - - -	1.00
Carborundum oblong stone, No. 108	1.00
Carborundum pocket stone in leather case	.35

FROM YOUR DEALER OR DIRECT

THE CARBORUNDUM COMPANY
NIAGARA FALLS, N. Y.

Genasco is the roofing of the age. Its foundation has stood for ages past.

It beats shingles. They warp, crack, split, and rot—more so now than ever before (lumber is getting scarcer, and shingle-quality is becoming poorer every year).

Beats tin, which rusts and needs painting regularly. And even with paint tin doesn't last like it used to—quality has deteriorated here, also.

Coal tar roofings have the same old faults they have always had—get soft and melt in the summer sun, and get brittle and crack in the cold, and leak.

Genasco

the Trinidad-Lake-Asphalt Roofing

is the one roofing that lasts. It is made of Nature's everlasting waterproofer. Trinidad Lake Asphalt has withstood the suns and storms of centuries; and in Genasco it gives this same lasting resistance to sun, rain, snow, wind, heat, cold—and even fire. The oily nature of this natural asphalt keeps Genasco alive and strong to defend itself; and this is why Genasco is lastingly waterproof.

The Kant-leak Kleet waterproofs the seams of Genasco without cement, and prevents nail-leaks besides. It gives the roof an attractive appearance.

Ask your dealer for Genasco mineral or smooth surface Roofings with Kant-leak Kleets packed in the roll. Guaranteed, of course. Write us for samples and the Good Roof Guide Book.

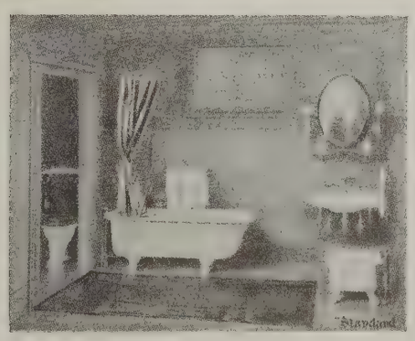
THE BARBER ASPHALT PAVING COMPANY
Largest producers of asphalt, and largest manufacturers of ready roofing in the world.
PHILADELPHIA
New York San Francisco Chicago

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Gravel.
Trinidad Lake Asphalt.
Asphalt-saturated Wool Felt.
Trinidad Lake Asphalt.
Asphalt-saturated Wool Felt.

$38.95 BUYS COMPLETE BATHROOM OUTFIT



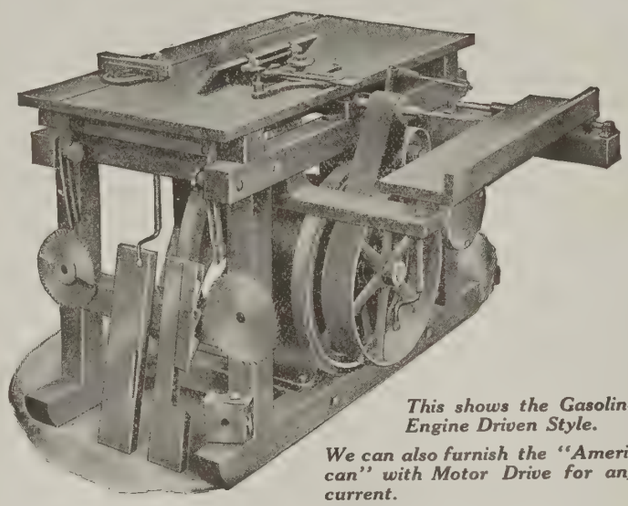
MODERN PLUMBING AT ½ ORDINARY COST

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JOHN HARDIN & CO.
Established 1876
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CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

DO YOUR MILL WORK ON THE JOB WITH THE "AMERICAN" PORTABLE SAW BENCH



This shows the Gasoline Engine Driven Style.

We can also furnish the "American" with Motor Drive for any current.

How often you have wished that your job was near the mill, so you could do a large part of your work by machine, instead of by hand.

An "American" Portable Saw Bench on your work will put mill facilities right at hand; and the time and labor this will save you means money in your pocket.

In all probability, an "American" Bench will pay for itself on the first job; and its savings on subsequent jobs will swell your profits.

For the "American" Saw Bench is not a "one-job" tool. **It is built to the "American" standard, which means that it will prove a permanently profitable investment, year after year.**

An "American" Saw Bench is the greatest money-maker a contractor can own.

Ask us to send you a descriptive circular.

AMERICAN SAW MILL MACHINERY CO.

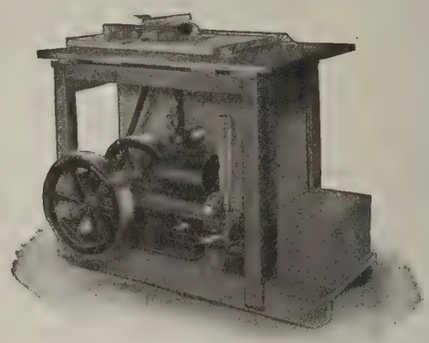
Woodworking Machinery of All Kinds

80 Laight Street
HACKETTSTOWN,
NEW JERSEY

1650 Hudson Terminal
NEW YORK CITY
NEW YORK

$165.00

For this Portable Saw Rig Complete 9 Machines in One.



Will rip 2" and cross cut 3" lumber. Write for descriptive folder.

C.H.&E. Manufacturing Co., Inc.

319 Mineral St. Milwaukee, Wis.

Have You Investigated

The Grimm Woodworker



Type "A" with 4 H.P. Gasoline Engine. Weight equipped for work 350 lbs.

Nine Machines in One

8-inch Rip Saw	Boring Machine (3 bits)	4-inch Jointer
8-inch Cross Cut Saw	Moulder (8 prs. knives)	Jig Saw (3 blades)
6-inch Dado Head	10-inch Sander	Two Emery Wheels

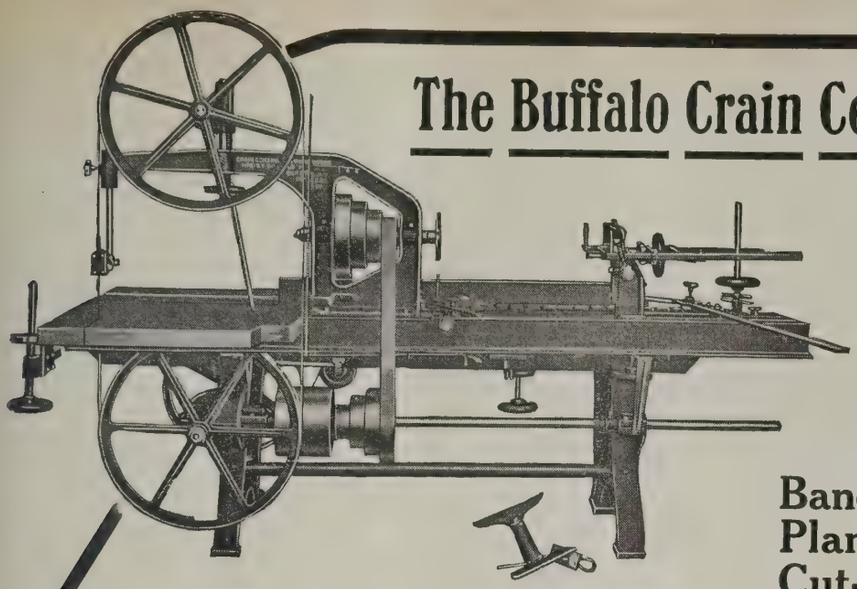
Progressive building contractors are fast coming to realize the importance of substituting practical machines for hand labor. The **Grimm Woodworker,** furnished either with gasoline engine or electric motor and combining so many important attachments in one machine, is undoubtedly one of the greatest time, labor and material savers yet brought out.

Write for descriptive booklet and our attractive selling plans.

Grimm Manufacturing Company

42 Erie Street, Buffalo, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



The Buffalo Crain Combination Wood Worker

Strong — Simple — Large Capacity

12 Operations in One Machine without any extra attachments.

Investigate and be convinced! For a thoroughly practical machine — substantial in construction and design, of ample capacity, low power cost, ease of operation, and dependability—you can't beat the Buffalo machine. It is a

Band Saw
Planer
Cut-off Saw
Shaper
Sizer
Rip Saw
Lathe
Boring Machine
Spoke Equalizer
Dado Head
Tenoner

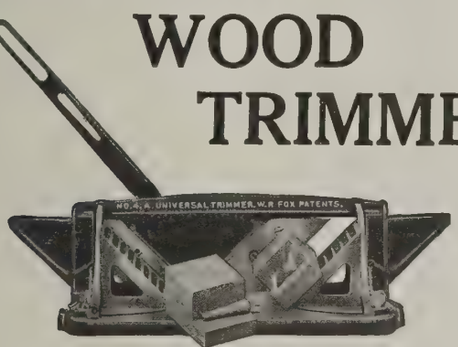
combined in one compact machine. Three men can work at it at one time without interfering with each other. Practically every operation of daily occurrence in a carpenter and repair shop can be done on it. Made with 5″ or 10″ planer head. It is a great money maker and one of the finest investments a contractor, builder or carpenter can make. Let us send you some of the letters we receive from pleased customers almost daily. Complete description on request. *Ask for catalog No. 134-5.*

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UNIVERSAL WOOD TRIMMERS

TRADE MARK



4-A STYLE

$22.50 BUYS THIS TRIMMER COMPLETE with triangular gauge blocks which make it possible to do a large amount of special work on this machine.

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Send for Complete Catalog

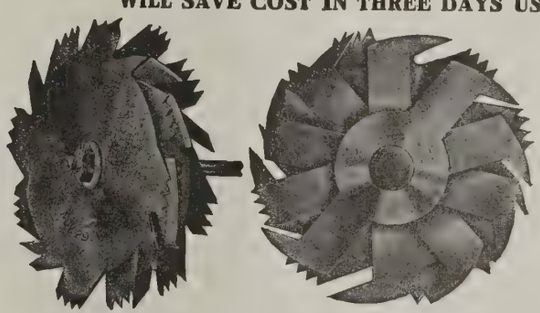
FOX **Machine Co.**

26 N. Front St., Grand Rapids, Mich.

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HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛″ to 2″ or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N. Y.**

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

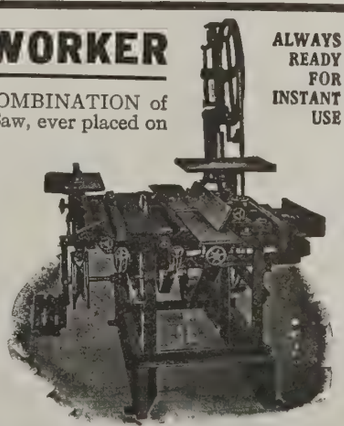
Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*



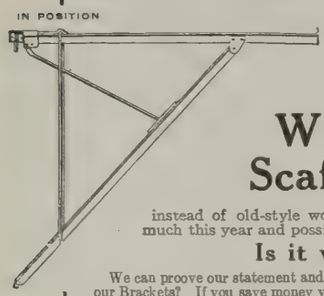
PARKS' BALL BEARING MACHINE COMPANY

KNOWLTON AND FERGUS STREETS **CINCINNATI, O.** Canadian Agts., Bourneval & Co. St. Barnabe North, P. Q.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

If you had made $15

more on each frame house you built last year, how much more would your profits have been? If you built ten houses, the saving would have been $150.



If you use

Wheeler Safety Scaffold Brackets

instead of old-style wood staging for scaffold, you can save that much this year and possibly more.

Is it worth saving?

We can proove our statement and will do so without expense to you. Will you try our Brackets? If you save money you will be glad you tried our plan. If you do not save, it will cost you nothing to make the trial. You will save during first year, three to five times what the brackets cost and have them to use year after year. They never wear out. **Write today for our trial offer**

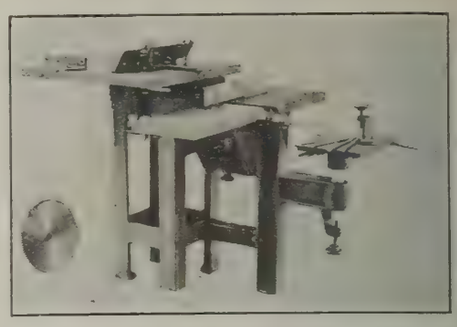


American Steel Scaffold Co., 50 McGraw Bldg. Detroit, Mich.

$95.00 BUYS 3 Machines { A SAW BENCH / AN 8″ JOINTER / A MORTISER AND BORER

This combination machine is the best value ever offered. It is made of solid cast iron and is furnished complete with necessary tools, belt, etc. Each machine is distinct from the others, and can be operated without interference with them.

You should send at once for literature. It tells all about this new machine.

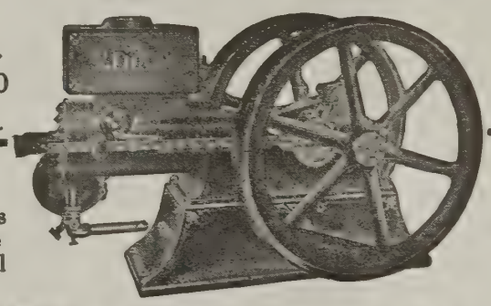


THE TANNEWITZ WORKS, 41 S. Front St., Grand Rapids, Mich.

WE SELL GASOLINE ENGINES

5 H. P. $119.50

1¾-28 H. P.



30 Days Free Trial

Built for Service

CONTRACTORS AND BUILDERS ATTENTION

Galloway Engines are made in all sizes from 1¾ to 28 H. P. They run on gasoline, naphtha, kerosene or distillate. We are furnishing complete mixing rigs and our price means a big saving of money to you—$50 to $300, depending on the engine you buy. You have the privilege of trying the outfit 30 days. If it is in any way unsatisfactory we refund your money with interest and pay freight both ways.

The Galloway Gasoline Engine

SIMPLEST ENGINE BUILT

Only four things to do:

Turn on the switch, turn on the oil, turn on the gasoline, give the flywheel a start and the Galloway will go right along all day without further attention. It is ideal power for a small shop, and it's got the capacity to take care of your growing needs for operating planers—matchers, lathes, saws and concrete mixers.

The Galloway has been classed as a standard, high grade engine for fifteen years. Over 4,000 in use in Iowa alone. Thousands in every other State and Territory.

If you try the Galloway engine, you will find that it is not overspeeded. Remember, the bore and stroke count, and you don't have to drive your engine faster than you ought to drive it to get the rated horse power. Rated by actual brake test.

On the larger sizes, if it is not entirely convenient for you to pay all cash, we will take your note for the balance at the regular rate of interest for six months.

The price given is for the five-horse power only, but we make these engines in seven sizes.

Ask for free information on stationary and portable gasoline engines from two to twenty-eight horse power. We make the best, and we price them at a reasonable figure. Write today.

The William Galloway Company, 1695 Galloway WATERLOO, IOWA

Taylor Portable Steel Derrick, 2000 pounds capacity. Adjustable capacity and speed to three ways. One man operates both cranks and can hoist with ease 700 pounds. Weight 160 lbs. Made in two sections. A man can climb a ladder with either section. Beam section connects to post by tipping in a vertrcal position. Consider the durability of a derrick constructed of malleable iron and steel and that of wood, *more compact, more powerful.* Roller bearing circle swing. Clears side wall of building three feet. With special platform attachable to side of railroad gondola car for unloading water-pipe, etc. Price of derrick with three way block, brackets, and bolts for attaching to building, $40.00 f. o. b. Chicago.



Manufacturer

John L. Taylor

1034 W. Lake St. - - Chicago

Telephone Monroe 3066





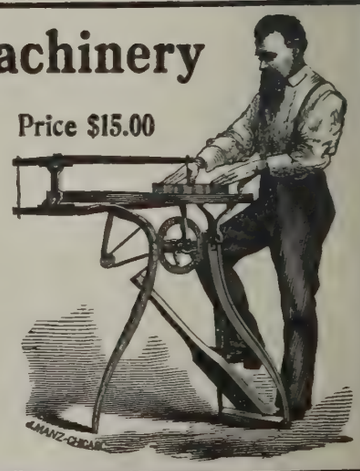


Barnes Hand and Foot Power Machinery

COMPLETE OUTFIT FOR

Carpenters and Builders

Price $15.00



IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Warranted to be well made; will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

We Make Sixty Styles of Knives

SEND FOR NEW CATALOGUE

W. F. & JOHN BARNES CO.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Messrs. Smith & Seale, of Gloster, Miss., said they could not run their shop without the FAMOUS WOODWORKER

Here's Their Letter:

Gloster, Miss.

The Sidney Tool Co., Sidney, Ohio.

Gentlemen:—We have been using one of your No. 14 Universal Woodworking Machines, furnished with all attachments, for the past year and we believe it to be the most perfect woodworking machine on the market. Every attachment on this machine works perfect and does perfect work. We consider it the most up-to-date and complete machine ever made and we could not run a general repair shop without it.

We have not bought a buggy body, seat or wood part or gear, nor wagon axle, felloe round, bolster reach, or anything of the kind since we have had this machine. We buy our timber rough and cut out all such parts that we need, and we will be pleased to recommend this machine to any man running a general repair shop and will be pleased to answer any questions that any brother repair man should like to ask in reference to this machine.

Will endorse anything the Sidney Tool Co. has said in advertising this useful machine.

SMITH & SEALE.



SIXTEEN MACHINES IN ONE

1—27-inch Band Saw.
2—12-inch Jointer.
3—Saw Table, with raising and lowering arbor.
4—Single Spindle Shaper.
5—Boring Attachment, arranged on special boring spindle.
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8—Hollow Chisel Mortiser.
9—Single End Tenoner.
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11—Disc Sander.
12—Knife Grinder.
13—Emery Grinder.
14—Band Re-Saw.
15—Spoke Tenoner, Rim Borer and Wheel Equalizer.
16—Adjustable Felloe Rounder.

The No. 14 Famous

does the work of sixteen ordinary woodworking machines.

Your business pays the biggest profits when you eliminate millwork bills. You can do this by installing a No. 14 FAMOUS Universal Woodworker. Sixteen woodworking machines in one.

All the woodworking machinery you need is embodied in this one machine. It's not necessary to invest your capital in a *number* of machines when *one* is sufficient—when *one* does just as much as several and costs *less to buy and less to maintain.*

Over six hundred FAMOUS Universal Woodworkers are in use: and we are getting letters of indorsement every day. Not one has ever been returned; no user has ever found reason for dissatisfaction. Can any other universal woodworker show such a record? No, Sir!

Our guarantee covers the entire life of the machine. You take no chances whatever. Write for special terms and full particulars. Don't think you cannot afford one—you cannot afford to do without one. Write us today.

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The A. R. Williams Machinery Co.
Front Street

MONTREAL
Williams & Wilson
320-328 St. James Street

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The A. R. Williams Machinery Co.
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The A. R Williams Machinery Co.
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Whatever your customers may demand in

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"Alcolac" Will Supply

"ALCOLAC" ENAMEL—elastic, hard and smooth—insures a sanitary, porcelain-like finish on wood, iron, stone, tin and other materials.

"ALCOLAC" VARNISH STAINS for finishing and refinishing woodwork and furniture are unequalled. Cover scratches and mars. Produce beautiful finish washable with soap and hot or cold water.

"ALCOLAC" FLOOR PAINT protects as well as covers. Dries hard and resists moisture. A most inexperienced person can apply it.

"ALCOLAC" READY MIXED PAINTS are made of pure chemicals thruout—Linseed oil, Japan driers, lead carbonate, zinc oxide and pure tinting colors. Finishes with a hard glossy surface proof against gases, sea fogs, salt air and atmospheric changes—the enemies of all ordinary paints.

Our discounts are liberal—your profits good.

Write for our Contract Proposition. Beautiful Celluloid Signs with every order
Handsome Sterling Silver Mounted Fountain Pen with every $25.00 order

Alcolac Mfg. Co., :: Long Island City, N. Y.

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THE NATIONAL BUILDER

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Charles A. Miller, Jr. } Associate Editors
Wm. C. A. Stevenson }

Porter-Hodgson Co., Publishers, 542-550 South Dearborn St., Chicago

FRED. A. HODGSON, President — FRED. D. PORTER, Secretary and Treasurer — GEO. A. FARGHER, V. Pres. and Adv. Mgr.

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THE NATIONAL BUILDER seeks the advertising of reliable houses only, and asks that prompt notice be given by any reader who has cause for complaint against an advertiser, that the matter may be investigated, and the advertisement discontinued should the advertiser be proved untrustworthy.

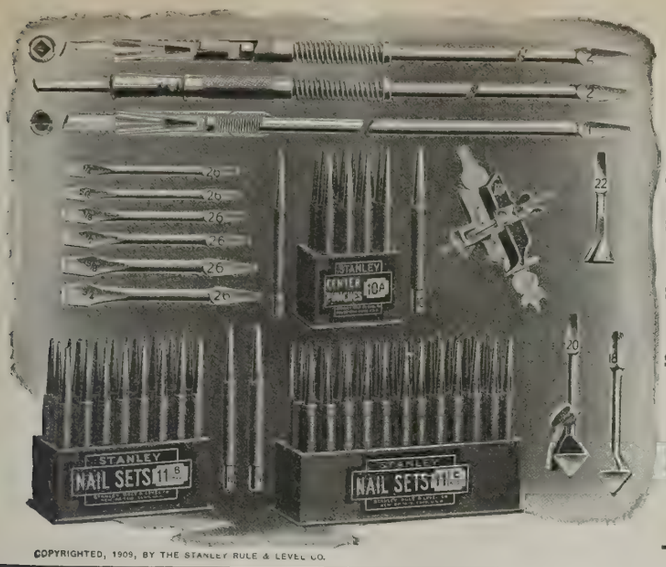
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Stanley Tools

STANLEY CENTER PUNCHES, NAIL SETS and SCREW DRIVER BITS are oil tempered and fully guaranteed.

STANLEY EXTENSION BIT HOLDERS enable the user to bore through walls, floors, etc., where an ordinary bit will not reach. Will follow up a 5-8 inch bit.

STANLEY ADJUSTABLE BIT GAUGE will enable one to bore any number of holes to a given depth. Can be attached to any size of bit up to one inch.

STANLEY COUNTERSINKS are suitable for every variety of wood screws. Send for catalogue.

STANDARD THE WORLD OVER

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NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

Bommer Spring Hinges are Quality Goods



But cost no more than the inferior kinds

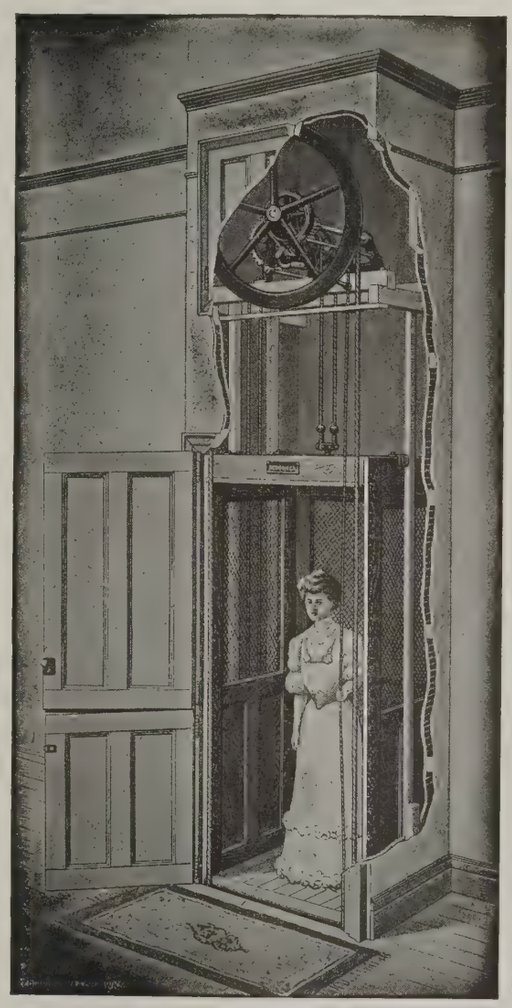
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This Trade Mark on Every THE BOMMER SPRING HINGE **Genuine Bommer Hinge**

Reputations are made by consistently giving your customer the best spring hinges and avoiding imitations or substitutes

Bommer Spring Hinges are sold by all Hardware Dealers



Hand Power Elevators and Dumb Waiters for all purposes

Cut shows the Improved Sedgwick Hand-Power Invalid Elevator Outfit.

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HAVE YOU POWER BORING MACHINES?



Quadruple Bit Price $5.00
Can not be used in a hand brace

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12

Mortised at one Punch with the

Quadruple Bit

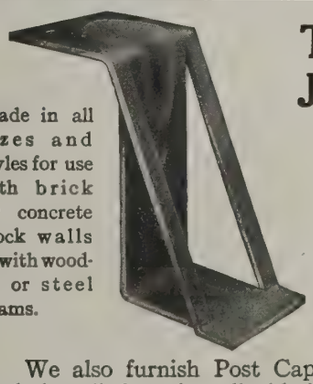
or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money

Write For Free Samples

Grand Rapids Hardware Co., 118 Pearl St. **GRAND RAPID MICH.**





Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

TRUS-CON JOIST HANGERS

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

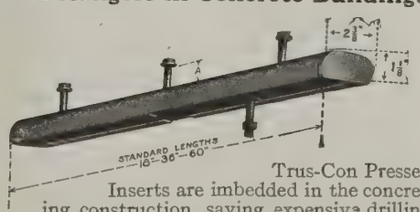
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

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Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are imbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots. Write for details and prices.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

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Most Direct Route to the "Highlands of Ontario"

Orillia and Couchiching, Muskoka Lakes
Lake of Bays, Maganetawan River, Algonquin National Park
Temagami, Georgian Bay, Kawartha Lakes

Spend Your Summer Holidays at One of These Delightful Spots

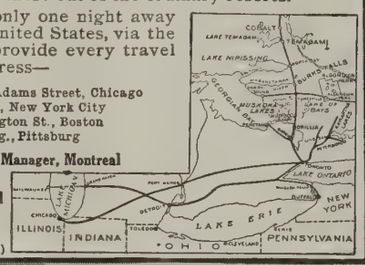


Finest summer playgrounds in America. Good hotel accommodations at moderate cost. The lover of outdoors will find here in abundance all things which make roughing it desirable. Select the locality that will afford you the greatest amount of enjoyment and send for **free** map folders, beautifully illustrated, describing these out of the ordinary resorts.

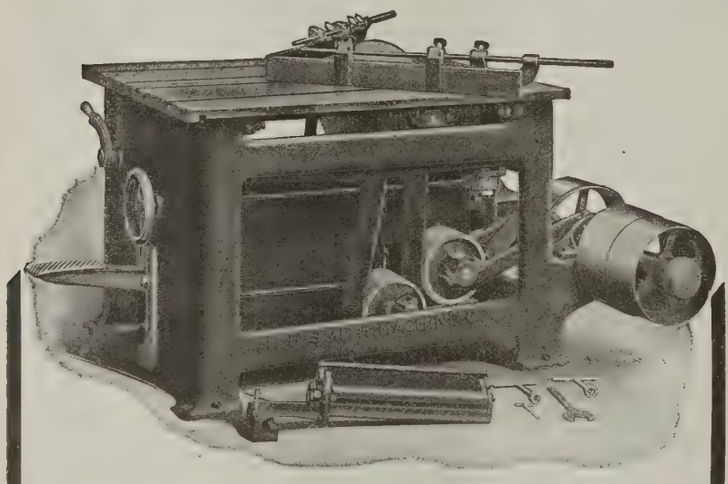
All this recreation paradise only one night away from the leading cities of the United States, via the Grand Trunk. Palatial trains provide every travel luxury to your destination. Address—

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(8)



No. 347. Combination Saw and Dado Machine.

Looking for a Modern Saw Bench?

The above cut represents our new Combination Saw and Dado Machine.

The **Frame** is quite substantial, with closed front.

The **Ways** adjust for depth of cut, and

The **Carriage** moves on rollers having ball-bearings.

The **Saw Mandrel** runs in self-oiling boxes, and is brought into the work by a foot treadle, thus leaving both hands free to handle the work.

For further particulars concerning above and other machines, address

H. B. Smith Machine Co., Smithville, N. J., U.S.A.

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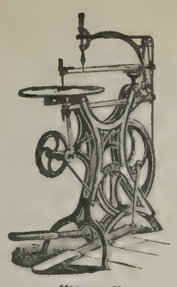
MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



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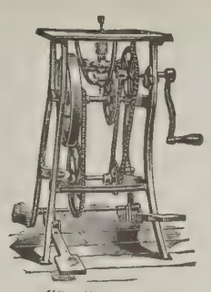
"Diamond" Mortiser

FOOT, HAND AND POWER

WOOD-WORKING MACHINERY

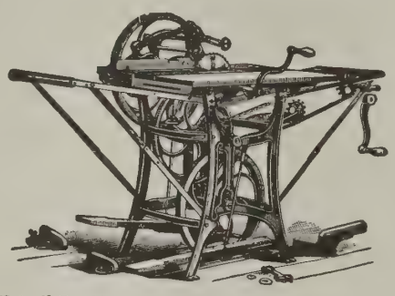
FOR CARPENTERS, BUILDERS, CABINET-MAKERS AND OTHER WOOD-WORKERS

Built for Hard Work, Accurate Work and Long Service



"Rex" Moulder

ONE MAN with one of these machines will do the work of four to six men using hand tools; will do it easier, will do it better.



"Union" Combination Self-Feed-Rip and Cross-Cut Saw

WE GUARANTEE each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory, may be returned at our expense.



No. 8 "Union" Power Saw

Enterprising mechanics are quick to see the superior merits of our machines. It will pay you to investigate these advantages.

Send for Catalog "A"

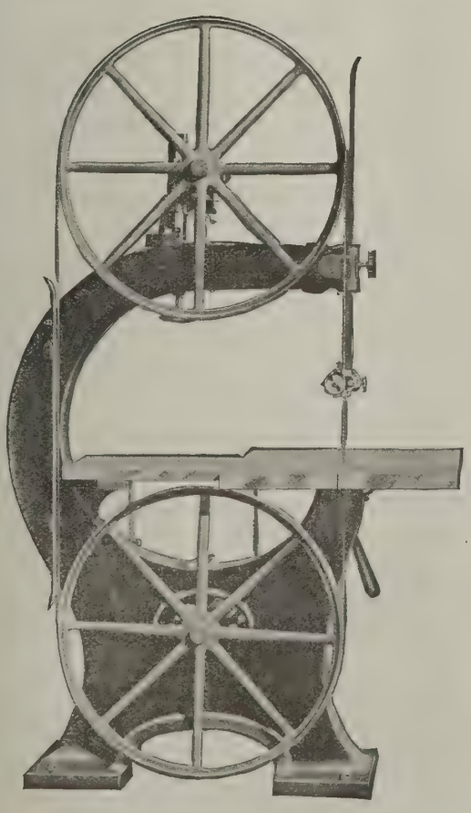
The Seneca Falls Manufacturing Co.

629 Water Street, Seneca Falls, N. Y., U. S. A.



No. 6 "Union" Combination Saw

BUY A BAND SAW THAT IS DURABLE



CRESCENT

Band Saws satisfy those practical, experienced mechanics who need strong, substantial tools.

The reason CRESCENT Band Saws are so popular is because they have earned a well-deserved reputation for durability and accuracy where hard service is demanded of them. Each day they are pleasing some of the most exacting band-saw operators in every civilized country, and as you appreciate what it means to have a thoroughly dependable, well-built, practical band saw, you should certainly look into the merits of the CRESCENT line before you order.

Send for a catalog telling all about these splendid machines, and our line of Saw Tables, Jointers, Borers, Swing Saws, Planers, Planers and Matchers, Wood-Workers, Disk Grinders.

The Crescent Machine Co.

No. 10 Main Street

LEETONIA :: :: OHIO

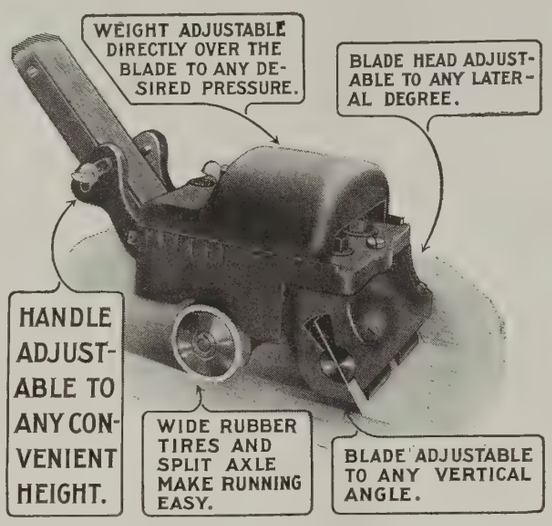
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

YOU KNOW

from the picture that the

ADJUSTABLE

Is a Practical FLOOR SCRAPER



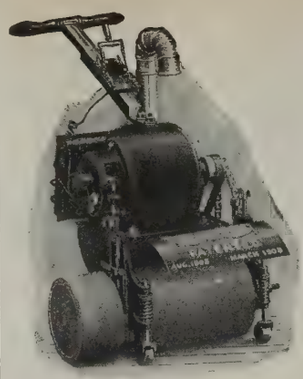
I will send you one **on approval** and let you give the machine a chance to speak for itself in your own hands.

If not more than pleased with its work, ship it back at my expense. If perfectly satisfied, remit **$40,00,** the price to everyone, payment in full.

I will make one profit the day the sale is made, but you will make a profit every day you use it.

H. P. DIDRICKSEN

941 Park Avenue SOUTH BEND, IND.



Made in three sizes: 8x18, 8x15, and 8x12 in. Roller Edge Roller easily adjusted to either side

Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

The **Schlueter** will remove all joints or warped edges, and oil, wax, lime stains, or the "muck" from skate wheels, in a most satisfactory manner.

Earning Capacity, $20.00 to $35.00 per Day

Send for prices and Free Trial Proposition

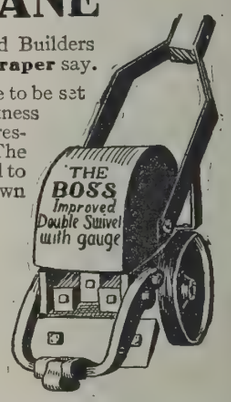
M. L. SCHLUETER

101 N. Canal St., CHICAGO, ILL.
1001 Flatiron Bldg. NEW YORK.

Acme Floor Surfacing, Laying & Finishing Co. Not Inc.

"IT'S A SCRAPER BUT IT WORKS LIKE A PLANE"

That is what the many satisfied Contractors and Builders who are using **The Boss Improved Floor Scraper** say.



THE BOSS has double swivel allowing the knife to be set in any position. Gauge can be set for any thickness of shaving and keeps knife from making depressions in floor. Gives knife double support. The pear-shaped wheel which is in the gauge is attached to the gauge in front so that when the scraper is let down to take shaving, it lets the knife down gradually and prevents the knife from making a deep cut. With this gauge and wheel attachment the knife will leave no mark. Impossible to do poor work. Adjustment simple—positive. Gauge can be removed instantly. Standing attachment cleans wheels and takes off the rosin when working hard pine. Prices very low. Write for descriptive circular "N"

GEORGE J. KEPPLINGER, - Dwight, Illinois

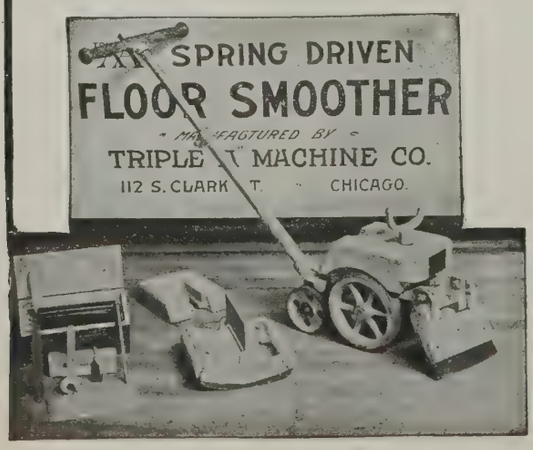
When You Buy a Floor Surfacing Machine
BUY A GOOD ONE—IT PAYS!

The Triple "A" Spring-Driven Floor Smoother combines the advantages of the hand machine and the power machine. No more expense than the former, yet has the capacity and ease of operation of the latter.

No wasted energy pulling a dead weight.

About half of all the Triple "A"s sold have been bought by owners of dead weight machines. What's the answer?

"Get the best first and save extra expense."



The Triple "A" to be appreciated needs only to be seen in operation.

For advertising purposes we will give a special discount on the first machine sold in each town.

SENT ON FREE TRIAL

WRITE FOR FULL INFORMATION

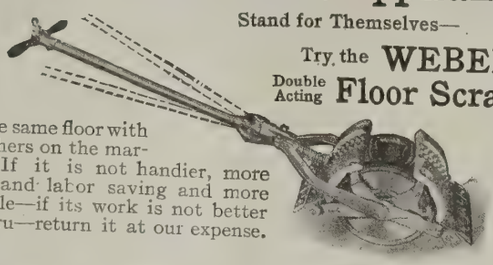
TRIPLE "A" MACHINE COMPANY

34 North Clark Street CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

TRY THEM ALL- KEEP THE BEST
TWILL BE A WEBER IF GIVEN A FAIR TEST

Weber Tools and Appliances
Stand for Themselves—



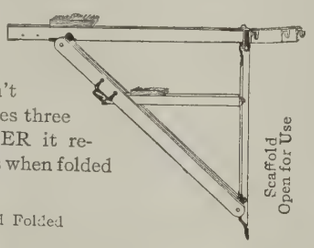
Try the WEBER Double Acting Floor Scraper

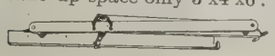
on the same floor with all others on the market. If it is not handier, more time and labor saving and more durable—if its work is not better all thru—return it at our expense.



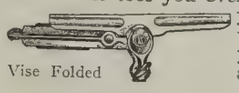
Cabinet Scraper
and sander—a tool which every cabinet maker, carpenter and painter should have. It is recognized as the most valuable article of its kind ever invented. Ask you dealer. If he does not handle it, I will ship direct or thru him.

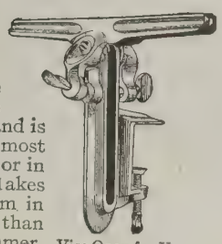
Double-Folding Scaffold Bracket
Is adjustable to any building. Can't swing. Where it ordinarily requires three rows of scaffolding, with the WEBER it requires only two; 12 of these brackets when folded take up space only 3'x4'x6'.




Scaffold Folded

Folding Saw-Filing Vise
Also ask your dealer to show you the WEBER Folding Saw-Filing Vise—the Saw Vise you want. Has a rigid grip and is almost noiseless. You will find it the most convenient tool you ever had on a job, or in your shop. It takes up no more room in your hand box than an ordinary hammer.


Vise Folded


Vise Open for Use

Wax Polishing Brush
and sander. Brush sits square and even and imparts a high gloss. Sand-papering block admits turning paper one-half around, greatly lengthening its life.

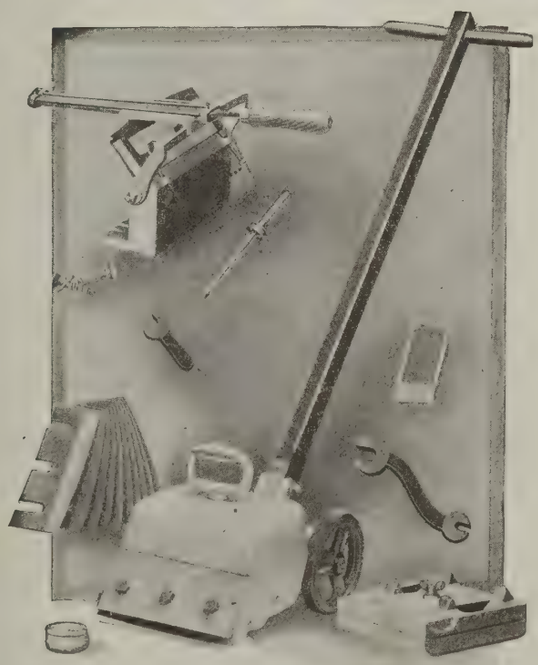


Write for Free Trial
I want you to try the Weber Double Acting Floor Scraper on my 5 to 10 days free trial offer.

JOHN F. WEBER, President

Weber Manufacturing Company
661 71st Ave., West Allis, Wis.

FLOOR SCRAPER SATISFACTION



That's what the Acme Floor Scraping Outfit assures. In fact it is guaranteed to do satisfactory work or no pay is asked for the outfit. My free trial offer relieves you of all responsibility. You take no chances, for if the machines do not meet with your approval after you have worked with them for one week, just ship them back to me at my expense. Read what contractors had to say in April.

Jos. Miotke, Milwaukee, Wis. Gladbrook, Ia., April 22, 1911.
Dear Sir:—Your floor scraper was received a few weeks ago, and will say it is the best machine I ever saw. Please find enclosed draft for the outfit.
Very truly yours
Paul Cuthbertson

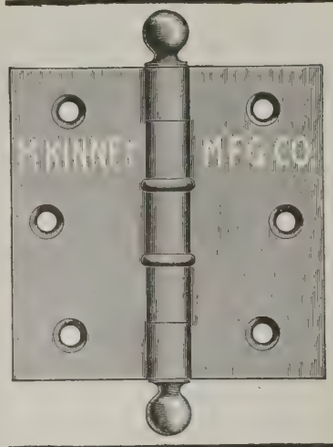
Jos. Miotke, Milwaukee, Wis. Sumter, S. C., April 17, 1911.
Dear Sir:—I have used the Acme floor scraping outfit and am very much pleased with it. It is exactly what I want and you will, therefore, find check enclosed for the same. With best wishes I am
Yours very truly
W. F. Carr.

Jos. Miotke, Milwaukee, Wis. Logansport, Ind., April 11, 1911.
Dear Sir:—Your floor scraping outfit arrived a short time ago and I have used the scraper on maple flooring and it does the work better and easier than any other machine I have ever used. The sharpening device certainly is a wonder. You can't help but get a good edge on a blade. I cheerfully enclose check in payment of the outfit.
Yours respectfully.
L. E. Wickersham.

If you want booklet and full details of my free trial offer, drop me a line now.

JOSEPH MIOTKE, 249 Lake Street, MILWAUKEE, WIS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Antifriction Ball Tip Butts

(Patent Pending)

Strongest, Best and Cheapest Antifriction Butts Made

GUARANTEE OF QUALITY STAMPED ON EVERY BUTT

FURNISHED IN ALL STANDARD FINISHES

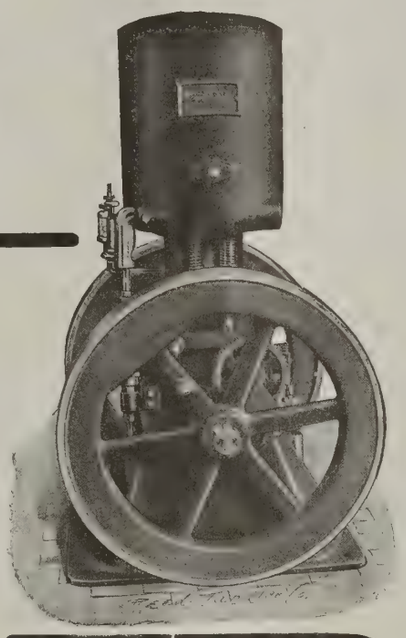
Makers of Strap and T Hinges, Barn Door Hangers and Track

McKINNEY MFG. COMPANY

Pittsburgh, Pa.

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The NOVO Engine



The NOVO gasoline engine in four sizes from 1¼ to 6 H. P. is especially adapted for use on portable and stationary machinery of every kind. It is **very light in weight, absolutely self-contained,** gasoline being in the base and the water contained in tank around the cylinder, which is guaranteed not to burst from freezing. The **upright form** and **low height** for vertical engine, and **small size of base,** adapts it for use on any machine requiring a self-contained power.

We should be pleased to furnish manufacturers or users of portable machines of any kind with full information, weights, and sizes of our different engines.

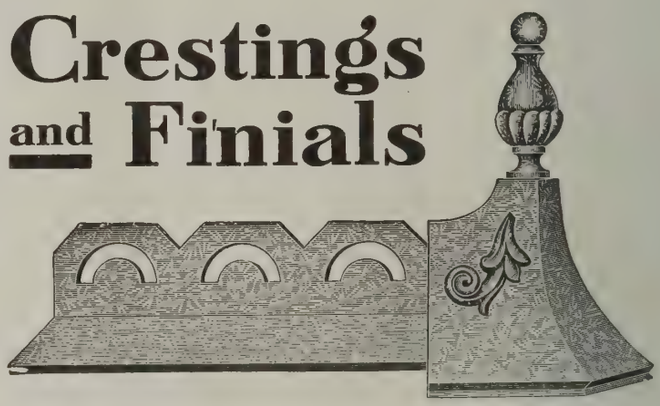
We make **three sizes** of **gasoline hoists** for builders' use.

THE HILDRETH MFG. CO.

C. E. BEMENT, Secretary and Manager

150 Willow St. LANSING, MICHIGAN

Crestings and Finials



CRESTING No. 107 FINIAL No. 97

WE take pleasure in offering to Architects and Builders our Catalogue No. 6, just received from the printer, containing 180 pages, which fully describes and illustrates the most complete line of Architectural Sheet Metal Building Material.

CORNICES, STORE FRONTS, STEEL CEILINGS, DECK RAILINGS, CRESTINGS, ETC.

WILLIS MFG. CO.

GALESBURG, ILL.

Manufacturers of the

Famous Willis Skylights and Ventilators

THE WINTHROP **Solid Tapered Asphalt Shingles**

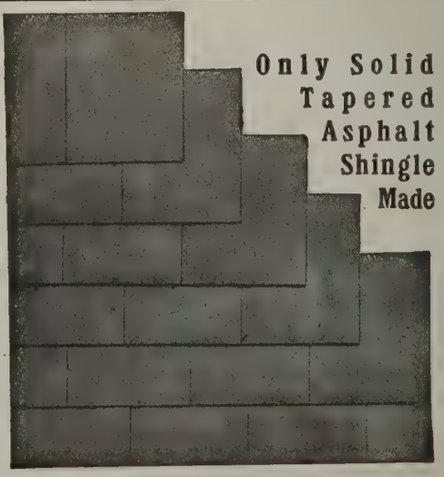
ARE OF A COOL, GRAY SLATE COLOR

And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

SPECIAL INDUCEMENTS TO THOSE WHO APPLY FIRST ROOF IN EACH TOWN

Catalogue on Request

WINTHROP ASPHALT SHINGLE CO. 1100 THE TEMPLE CHICAGO, ILLINOIS



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A ROOF THAT OUTLASTS THE BUILDING

No one knows how many centuries Asbestos has been exposed to the elements without deterioration. And Cement and Stone (Concrete) construction dates back to the time of the Romans, many of whose works are still in perfect preservation after a test of nearly 2,000 years. Both Asbestos and Portland Cement are practically everlasting.

J-M Transite Asbestos Shingles are composed of these **indestructible** minerals. They are made by moulding pure Asbestos Fibre and Portland Cement into one homogeneous mass under hydraulic pressure. There are no layers or laminations to separate in



Baraga High School, Baraga, Mich.
Covered with J-M Asbestos Shingles

J-M TRANSITE ASBESTOS FIRE-PROOF SHINGLES

These asbestos, or stone, shingles are not affected by acids, gases or chemical fumes. Continued weather changes have no effect on them. Freezing and thawing hasten the setting of the binding material. The more severe the weather conditions, the stronger and harder these shingles become. They never rot or decay; never warp or split. Do not break like slate and are at least 15% stronger than laminated Asbestos shingles. Are absolutely fireproof. And, like all stone, they never need paint or protection of any kind to preserve them.

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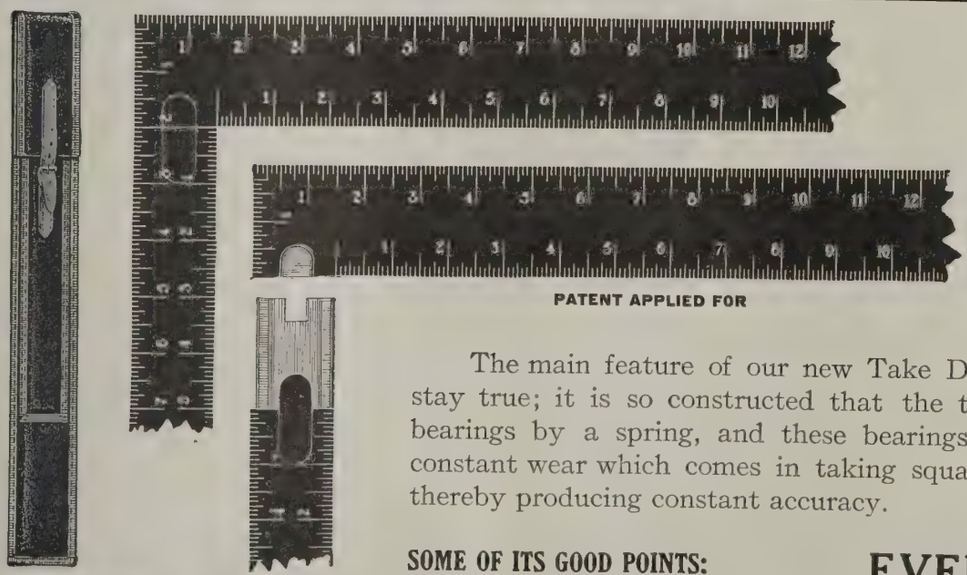
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2. Each time Square is taken apart and put together the wear produces a firmer joint, thereby insuring constant accuracy.
3. No screws used; locks automatically.
4. The only Take-Down Square which leaves no part of the Tongue attached to body, when separated.
5. Occupies smaller space than any other Take-down Square manufactured. 2″x24″.
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7. Rust-proof canvas case with each square.

Manufactured in Nos. 3 and 100 Standard; also No. 100 Rafter Framing, giving lengths of common, hip, valley, and jack rafters for 17 different pitches of roof.

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If your dealer will not supply you we will gladly ship you one of these express prepaid upon receipt of price.

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SHOULD KNOW HOW TO GET THE LENGTHS AND CUTS OF RAFTERS

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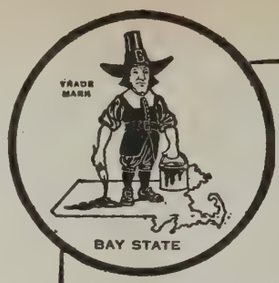
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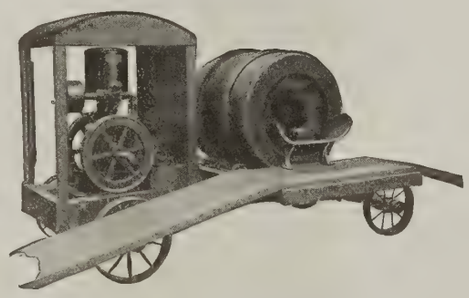
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Proof Against Water, Acid, Fumes or Alkali

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It is not alone the saving of one-third in first cost, one-half in power, one man to operate the hoist and two-thirds the delays and repairs, but the greater portability enabling it to always be kept at the most convenient position on the job for rapid work, that are the distinguishing features of the

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It is pre-eminently the mixer for the contractor because it saves money in nearly every possible use.

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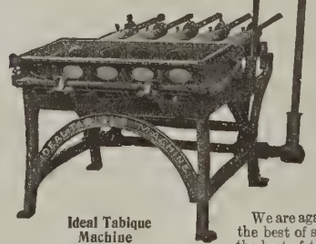
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We made a few of the octagon blocks on the adjustable face plate and will say that plate is one of the handiest things gotten out by any firm. IDEAL chimney tops are well liked here. Yours very truly,

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Ideal Model "A" Block Machine with 6-Brick Attachment



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Please send me as samples, 5 lbs. each of white and granite TYCRETE and 5 lbs., of any other color that you think I can make a run on. I will remit by return mail. Let me have price list on 100 and 500 lb. lots.

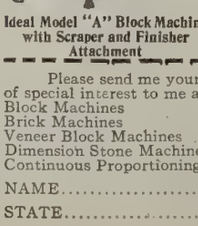
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MAIL US THE COUPON TODAY—Accompanying it, if possible, with a letter as suggested above.

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Chicago Office, 1075 Old Colony Bldg. Architects are referred to

New York Office, 1958 Hudson Terminal Bldg., Sweet's Index pages 28-29

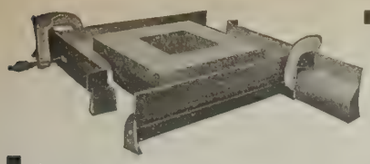
Please send me your catalog No. 12. I have checked items in the following list that are of special interest to me and ask that you send me particulars on same; N. B. June

Block Machines	Sewer Pipe	Ornamental Molds
Brick Machines	Drain Tile	Step and Sill Molds
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If You Don't Say This Mold

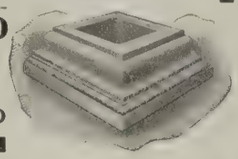
is the best value you ever bought after you have used it for six months, send it back and we'll return your money.

You'll be surprised to see how many different places you can use it; makes 476 different sizes of blocks.

We wouldn't make any such statement if we didn't know what the utility of this mold is; and we know that if you realize the value of this mold like we do you would never sell it if you couldn't get another one.

Adjustable from 2 to 24 inches in width and from 2 to 24 inches in length.

Send for a catalogue. Dont overlook sending because you ought to know what a mold like this will do for you. Send today—don't put it off. **$10.00**



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We also manufacture Continuous Mixers, Sewer Pipe and Tile Molds, Power Tile Machines, etc., etc.

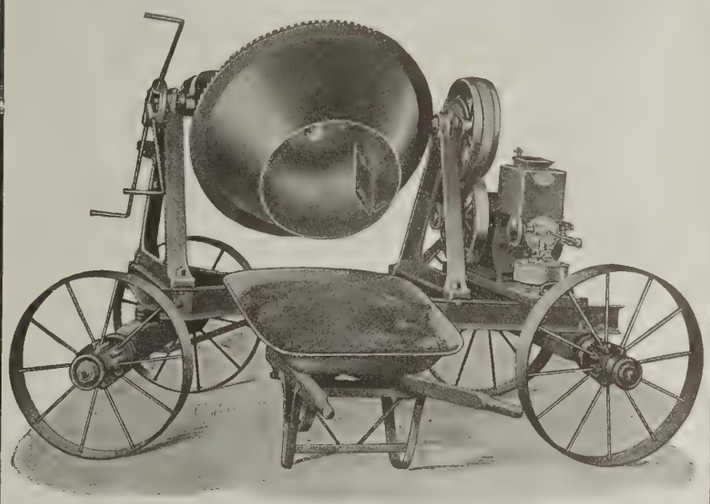
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FOR LESS THAN THE COST OF A CONTINUOUS

THE LITTLE WONDER

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Just the mixer for sidewalk or small foundation work, floors, etc.



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Big Profits In Concrete Specialties

Do you realize that there is a lot of money in some sand bank waiting for you to take it out? Do you know that every wagon load of sand can be made to produce a net profit of $25? It is a fact, and right at your very door is a golden opportunity to coin money in a most rapid and gratifying manner. Just as an example of what can be done in this line we give below one man's experience and profits for one week.

The manufacture of ornamental concrete articles is not difficult and can be accomplished by any man of ordinary intelligence. We furnish complete and detailed instructions with every mould. These moulds can be readily sold for use in city parks, lawns, cemeteries and to every property owner. Do you know of another line that will net you such handsome returns in so short a time as the manufacture of these articles?



Figure the Profit Yourself

12 lawn vases, easily sell for $5.00 each	$ 60.00
33 hitching posts, easily sell for $5.00 each	165.00
	$225.00

They Cost as Follows:

41 sacks cement (10¼ bbls.) at $2.00 per bbl.	$20.00	
5 yds. sand, $1.00	5.00	
57 hours labor, 20c	11.40	
33 staples and rings for posts, 10c	3.30	$40.00
A good week's profit		$184.80

Indestructible, Solid Substantial Hitching Post



These moulds never sell for less than $5.00 each, which is much less than the cheapest iron hitching post or vase you can buy and are much more beautiful and more durable. They easily bring from $15.00 to $25.00 a pair.

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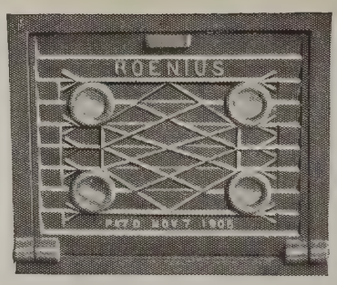
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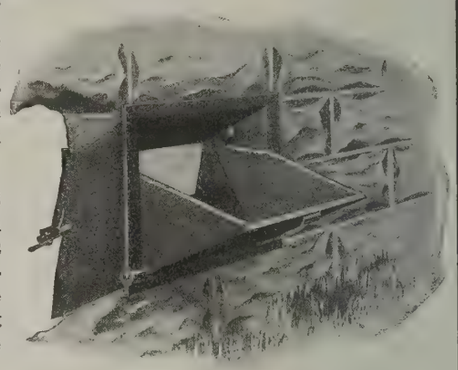


Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

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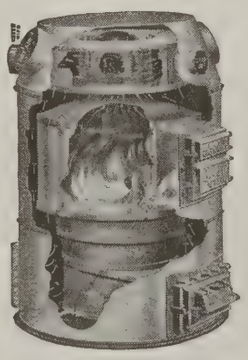


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SAVES 50 PER CENT OF COST; 40 PER CENT OF FUEL



Most Durable, Most Economical Furnace Sold
Has a Perfect Ventilating System for Every Part of the Building

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Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 20-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

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Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

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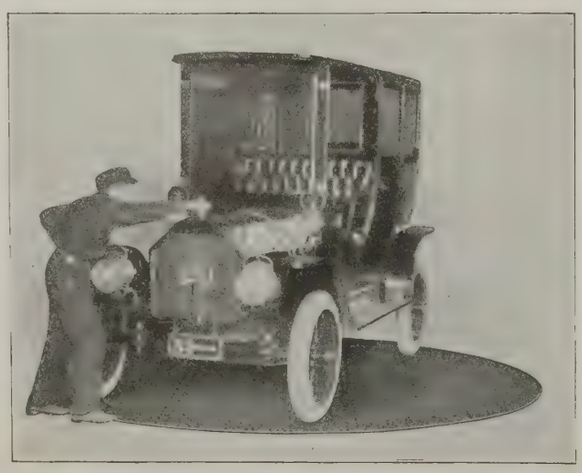
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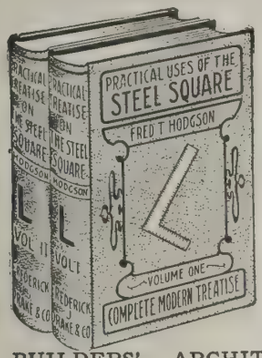
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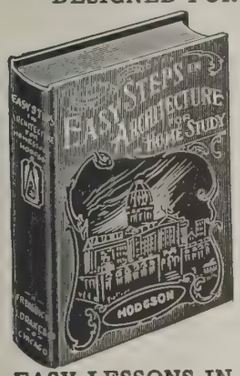
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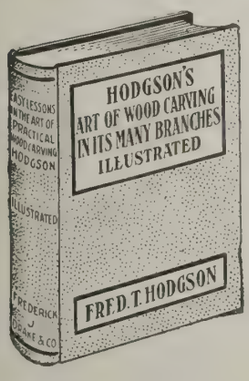
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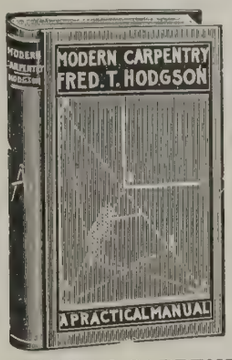
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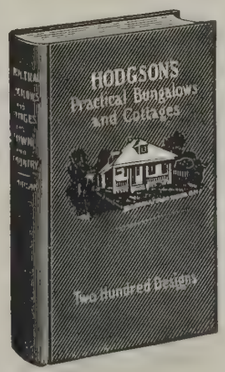
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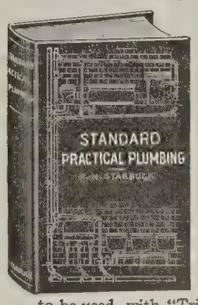
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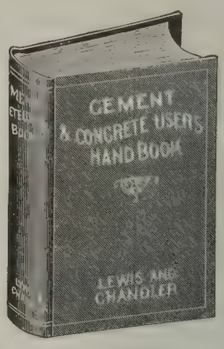
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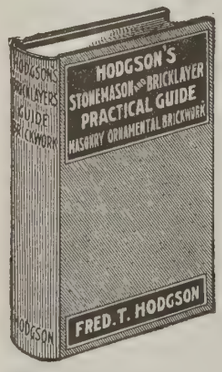
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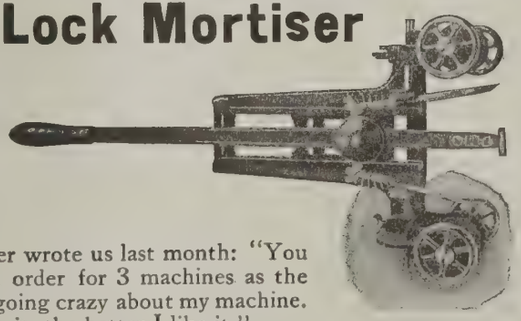
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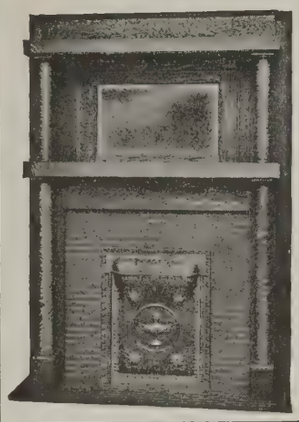
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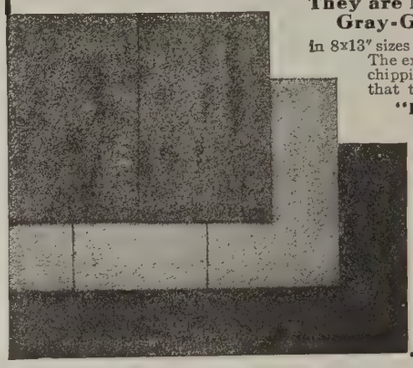
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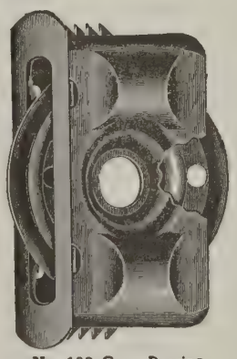
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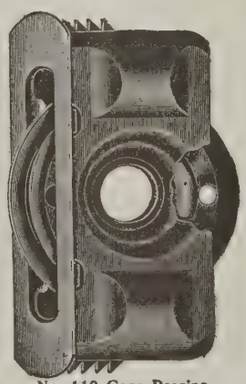


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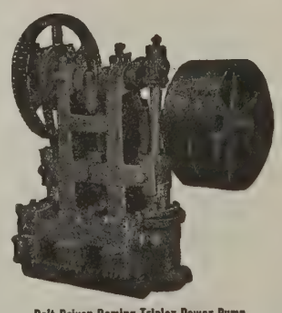


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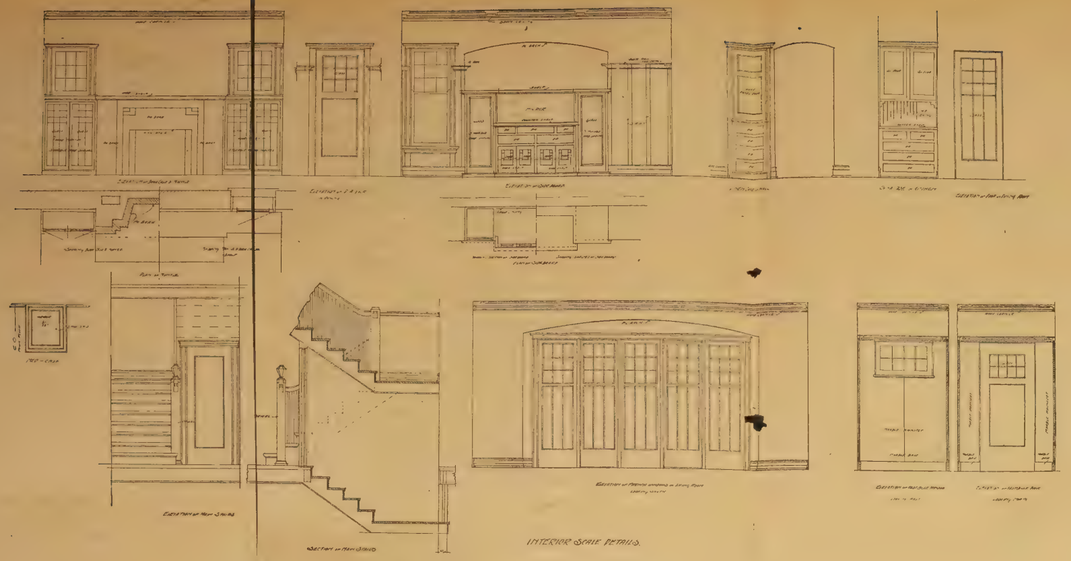
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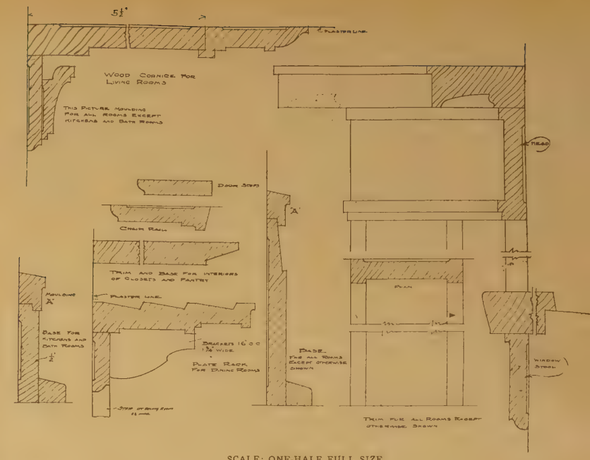
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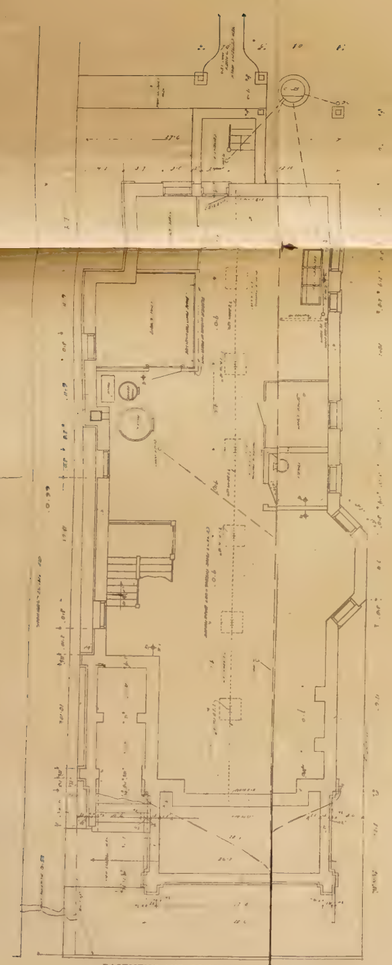
FOR ESTIMATE, SEE PAGE 29



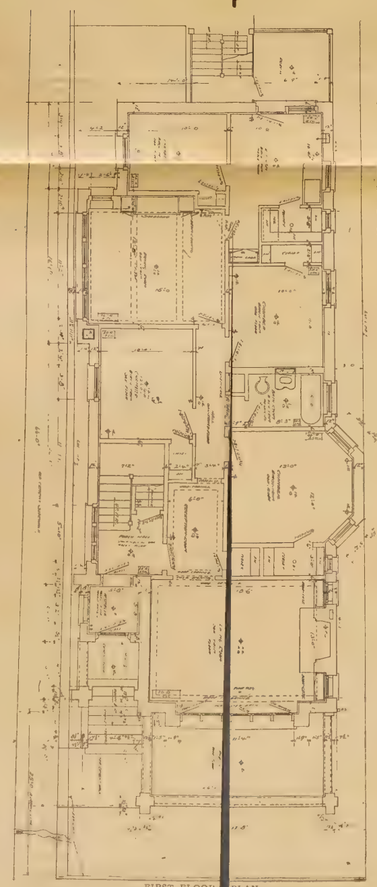
INTERIOR SCALE DETAILS.



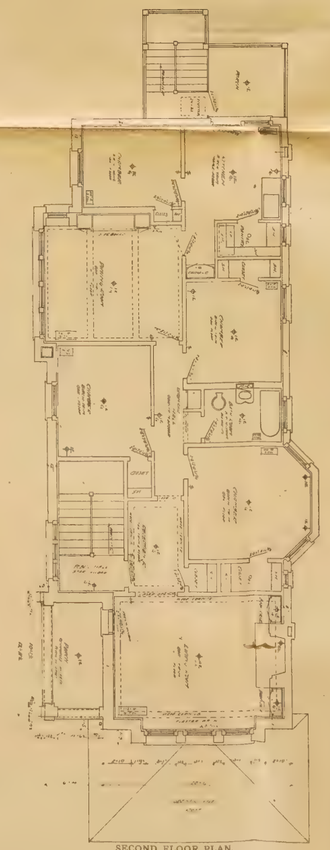
SCALE: ONE-HALF FULL SIZE.



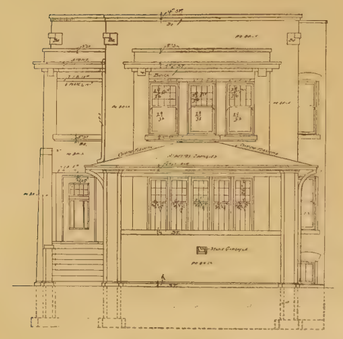
BASEMENT AND FOUNDATION PLAN.

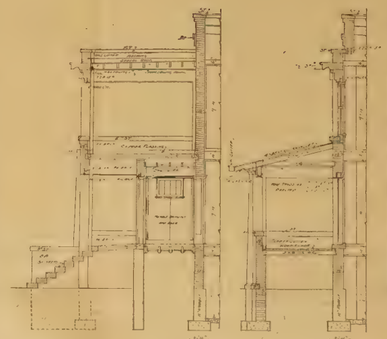


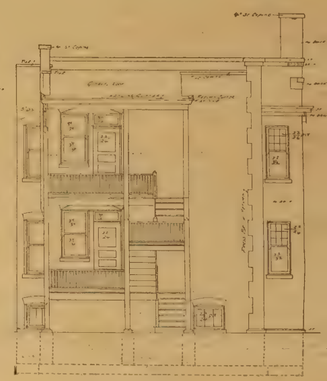
FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

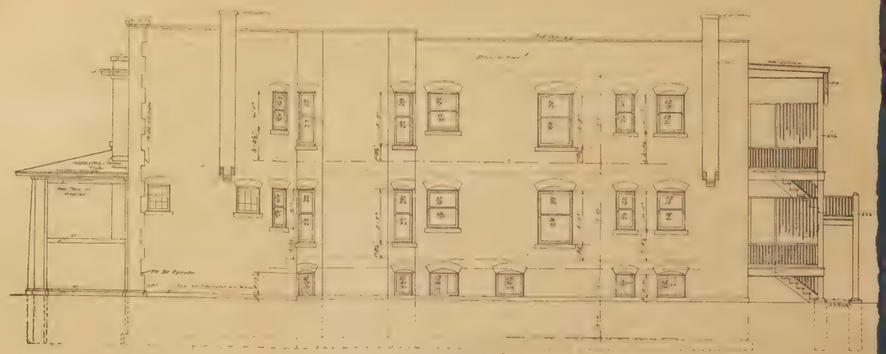








LEFT SIDE ELEVATION.



RIGHT SIDE ELEVATION.

THE NATIONAL BUILDER

Vol. 52 CHICAGO, JUNE 1911 No. 6



WALSH APARTMENT HOUSE, built for Mr. James C. Walsh, at Chicago, Ill.

NATIONAL BUILDER DESIGN No. 342

Perry and Thomas, Architects, Chicago

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $10,498.78

THE WALSH APARTMENT HOUSE

Our supplement sheet for June shows a two-story apartment house recently built in Chicago for Mr. James C. Walsh from the plans of Perry & Thomas, architects.

Pressed brick with Bedford stone trim for the exterior form a pleasing combination, with an air of solidity due to the absence of projecting metal or wood cornices.

Access to the second floor apartment is provided by an open stairway in the public hall, from which opens the door to first floor apartment. Each compartment has a porch entirely separate from the entrance porch.

Each apartment is unusually complete, the living rooms having brick mantels and built in bookcases, the dining rooms having sideboards, and each of the four bedrooms in each apartment having a large closet, besides the hall coat closet, linen closet and medicine cabinet in the bathroom.

Being built on a corner lot allows excellent light and ventilation for every room. The building is finished in hardwood throughout and heated by hot water. Laundry facilities are provided in the basement, besides which there is ample storage room.

ESTIMATE OF WALSH APARTMENT HOUSE

By I. P. HICKS

EXCAVATING AND MASONRY.

320	yards excavating, 85c	$ 112.00
1,720	cubic ft. concrete walls and ftgs., 25c	430.00
20,000	press brick laid in front and side wall, $40	800.00
130,000	com. brick laid in wall, $13	1,690.00
220	yds. cement floor, 50c	110.00
534	sq. ft. sidewalk, 12c	64.08
300	sq. ft. concrete porch floor, 20c	60.00
	Total excavating and masonry	$3,266.08

STONE.

60	lineal ft. base, 50c	$ 30.00
8	stone steps, $3.50 each	28.00
80	lineal ft. coping, 50c	40.00
120	lineal ft. top, wall coping, 50c	60.00
38	lineal ft. window head, 75c	28.50
40	lineal ft. window coping, 50c	20.00
32	window sills, $1.50	48.00

2	window sills, 12 ft. each, $6.00	12.00
	Chimney copings	3.50
	Total stone	$270.00

IRON WORK.

2 7 in. x 19 ft., 15 lb. I beams. 1 7 in. x 27 ft. 9 in., 15 lb. I beams. 6 7 in. x 7 ft., 15 lb. I beams. 2 7 in. x 19 ft., 15 lb. I beams. 2 7 in. x 12 ft., 15 lb. I beams.		$76.50

ROOFING.

21	squares gravel roofing, $4.00	$ 84.00
3½	squares asbestos shingles, $14.00	49.00
	Total	$133.00

LUMBER BILL.

		Ft.
60	2x10x16 ft. first floor joists	1,620
60	2x10x12 ft. first floor joists	1,200
60	2x12x16 ft. second floor joists	1,920
60	2x12x12 ft. second floor joists	1,440
40	2x10x10 ft. porch joists	620
20	2x10x16 ft. porch joists	1,080
40	2x 8x10 ft. porch ceiling	540
20	2x 8x16 ft. porch ceiling	420
60	2x 6x16 ft. main ceiling	960
60	2x 6x12 ft. main ceiling	720
60	2x10x16 ft. roof joists	1,620
60	2x10x12 ft. roof joists	1,200
120	1x 6x12 ft. braces	720
250	2x 4x18 ft. partitions	3,000
20	2x 8x18 ft. partitions	480
60	2x 4x16 ft. plates	660
150	1x 2x18 ft. furring	450
40	1x 4x16 ft. bridging	214
50	1x 6x12 ft. braces	300
	Total ft. framing lumber	19,164
19,164	ft. framing lumber at $27.00	$ 517.42
6,600	ft. 1x8x16 ft., No. 2 sheathing; rough floors and roof, $27.00	178.20
4,300	ft. ⅞x2¼ face oak flg., $80.00	364.00
530	ft. ⅞x2¼ face maple flg., $60.00	31.80
400	ft. 1x4x8 ft. fir flg., $45.00	18.00
600	ft. 1x4x10 ft. fir flg., $45.00	27.00
400	ft. ⅝x4x8 ft. Y. P. ceiling, $30.00	12.00
600	ft. ⅝x4x10 ft. Y. P. ceiling, $30.00	18.00
	Total	$1,166.42

MILL WORK.

1	basement dr. frame, 2 ft. 8 in. x 6 ft. 8 in., 1¾	$ 2.50
1	basement dr. frame, 2 ft. 4 in. x 6 ft. 8 in.	2.50
2	basement dr. frames, 2 ft. 6 in. x 6 ft. 8 in., $2.50	5.00
1	basement dr. frame, 3 ft. 6 in. x 6 ft. 8 in.	3.00
3	basement wd. frames, 28x22, divided, $2.00	6.00
6	basement wd. frames, 28x24, divided, $2.00	12.00
1	basement wd. frame, 16x24, divided	2.00
1	basement door, 2 ft. 8 in. x 6 ft. 8 in. x 1¾ in.	4.00
1	basement door, 2 ft. 4 in. x 6 ft. 8 in. x 1⅜ in.	2.50
2	basement doors, 2 ft. 6 in. x 6 ft. 8 in. x 1⅜ in., $2.50	5.00
1	basement door, 3 ft. 6 in. x 6 ft. 8 in. x 1⅜ in.	4.00
3	windows, 28x22, divided, $2.00	6.00
6	windows, 28x24, divided, $2.00	12.00
1	window, 16x24, divided	1.80
1	door frame, 3 ft. 4 in. x 7 ft. 0 in.	4.00
1	vestibule frame, 3 ft. 0 in. x 7 ft. 0 in.	3.50
2	rear dr. and window frames, 2 ft. 8 in. x 7 ft. 0 in., Tr. 30x10; window, 34x24, $6.00	12.00
1	door frame, 2 ft. 4 in. x 7 ft. 0 in.	3.50

First Story Inside Doors.

6	door frames, 2 ft. 8 in. x 7 ft. 0 in., $1.00	6.00
1	door frame, 2 ft. 10 in. x 7 ft. 0 in.	1.00
3	door frames, 2 ft. 4 in. x 7 ft. 0 in., $1.00	3.00
1	door frame, 2 ft. 6 in. x 6 ft. 4 in.	1.00
4	door frames, 2 ft. 0 in. x 7 ft. 0 in., $1.00	4.00

Second Story Inside Doors.

1	door frame, 2 ft. 10 in. x 7 ft. 0 in.	1.00
6	door frames, 2 ft. 8 in. x 7 ft. 0 in., $1.00	6.00
2	door frames, 2 ft. 4 in. x 7 ft. 0 in., $1.00	2.00
5	door frames, 2 ft. 0 in. x 7 ft. 0 in., $1.00	5.00
1	front dr., 3 ft. 4 in. x 7 ft. 0 in. x 2¼ in.	18.00
1	vestibule door, 3 ft. 0 in. x 7 ft. 0 in. x 2¼ in.	16.00
2	doors, 2 ft. 8 in. x 7 ft. 0 in. x 1¾ in., $8.00	16.00
1	door, 2 ft. 4 in. x 7 ft. 0 in. x 1¾ in.	7.00
2	doors, 2 ft. 10 in. x 7 ft. 0 in. x 1¾ in., $8.00	16.00
12	doors, 2 ft. 8 in. x 7 ft. 0 in. x 1¾ in., $8.00	96.00
5	doors, 2 ft. 4 in. x 7 ft. 0 in. x 1¾ in., $7.00	35.00
9	doors, 2 ft. 0 in. x 7 ft. 0 in. x 1¾ in., $7.00	63.00
1	door, 2 ft. 6 in. x 6 ft. 8 in. x 1⅜ in.	6.00
1	mullion win. frame, 5 win., 20 in. x 72 in., divided	15.00
3	window frames, 29x32x26, divided, $3.00	9.00
2	window frames, 22x32x26, $3.00	6.00
6	window frames, 36x32x26, $3.00	18.00
2	mullion frames, 4 windows, 24x32x26, $10.00	20.00
2	mullion frames, 3 windows, 14x22x16, $7.50	15.00
1	sash frame, 30x16	2.00
2	sash frames, 28x36, $2.50	5.00
2	window frames, 12x20x18, $2.50	5.00
4	window frames, 30x32x26, $3.00	12.00
2	window frames, 32x20x18, $2.75	5.50
2	window frames, 16x20x18, $2.50	5.00
2	window frames, 28x20x18, $2.50	5.00
5	windows, 20 in. x 72 in., divided, $5.00	25.00
3	windows, 29x32x26, divided, $3.00	9.00
2	windows, 22x32x26, divided, $2.75	5.50
4	windows, 36x32x26, divided, $3.50	14.00
2	windows, 36x32x26, 2 lt., $3.00	6.00
8	windows, 24x32x26, divided, $2.50	20.00
6	windows, 14x22x16, divided, $2.00	12.00
1	sash, 30x16, divided	2.00
2	sash, 28x36, divided	2.50
2	windows, 12x20x18, 2 lt., $2.00	4.00
4	windows, 30x32x26, 2 lt., $2.50	10.00
2	windows, 32x20x18, 2 lt., $2.25	4.50
2	windows, 16x20x18, 2 lt., $2.00	4.00
2	windows, 28x20x18, 2 lt., $2.25	4.50
1,120	ft. base, 4c	44.80
650	ft. picture mold., 1½c	9.75
350	ft. beam ceiling, 20c	70.00
	Bookcases	50.00
	Mantel	45.00
	Sideboard	50.00
	Main stairs	75.00
	Linen closet	10.00
	China closet	16.00
1,120	ft. base mold., 1c	11.20
1,120	ft. floor mold., 1c	11.20
140	plinth blocks, 8c	11.20
2,200	ft. casing, 3c	66.00
500	ft. head casing, 3c	15.00
500	ft. cap mold., 2c	10.00
500	ft. fillet mold., 1c	5.00
720	ft. window stop, 1c	7.20
620	ft. door stop, 1½c	9.30
200	ft. window stool, 2c	4.00
200	ft. apron, 2c	4.00
150	ft. chair rail, 2c	3.00
3	6x6x20 ft. posts, rear porch, $3.00	9.00
2	6x6x12 ft. posts, rear porch, $1.50	3.00
84	ft. bottom porch rail, 5c	4.20
84	ft. top porch rail, 5c	4.20
600	ft. baluster, 1¾x1¾	12.00
	Total mill work	$1,198.85

CARPENTER LABOR.

19,164	ft. framing lumber at $10.00	$191.64
6,600	ft. sheathing, $8.00	52.80
4,830	ft. flooring, $20.00	96.60
4,500	ft. smoothing floors, $15.00	67.50
1,000	ft. porch floors, $15.00	15.00
1,000	ft. ceiling, $15.00	15.00
	Setting window frames	12.00
	Setting door frames	10.50

	Finishing 10 cellar window frames, $1.50	15.00
	Finishing 5 cellar doors, $2.00	10.00
	Finishing store rooms, etc., in basement	12.00
	Cellar stairs, inside	10.00
	Cellar stairs, outside	8.00
	Front door	5.00
	Vestibule door	4.50
2	rear outside doors and window combined, $6.00	12.00
1	outside door, second story	3.50
4	cased openings, $3.00	12.00
	Finishing 45 windows, $2.00	90.00
	Finishing 34 doors, $3.00	102.00
1,120	ft. base, 5c	56.00
650	ft. picture mold., 1½c	9.75
350	ft. beam ceiling, 18c	63.00
	Bookcases	20.00
	Sideboard	15.00
	Linen closet	5.00
	China closets	20.00
	Main stairs	35.00
	Rear porch stairs	20.00
	Total carpenter labor	$988.79

RECAPITULATION.

Excavating and masonry	$ 3,266.08
Stone	270.00
Structural iron	76.50
Roofing	133.00
Lumber bill	1,166.42
Mill work	1,198.85
Carpenter labor	983.79
Hardware and nails	120.00
Tin work	115.00
Plastering 1,460 yds., 27c	394.20
Tile floors	15.00
Plumbing	600.00
Electric wiring	110.00
Painting	350.00
Heating	1,200.00
Incidentals, 5%	499.94
Total estimate	$10,498.78

Estimated cubic feet of building from bottom of cellar to roof, not figuring in rear porch, 60,588, which makes the cost of this class of building rate about 17c per cubic foot.

A CANON OF ETHICS FOR ARCHITECTS

The following canon of ethics has been adopted by the American Institute of Architects as a general guide to members, and will be recognized as enumerating some of the elementary duties of an architect towards fellow professional men:

It is unprofessional for an architect,

1. To engage, directly or indirectly, in any of the building trades.

2. To guarantee an estimate or contract by bond or otherwise.

3. To accept any commission or substantial service from a contractor or from any interested party other than the owner.

4. To advertise.

5. To take part in any competition the terms of which are not in harmony with the principles approved by the institute.

6. To attempt in any way, except as a duly authorized competitor, to secure work for which a competition is in progress.

7. To attempt to influence, either directly or indirectly, the award of a competition in which he is a competitor.

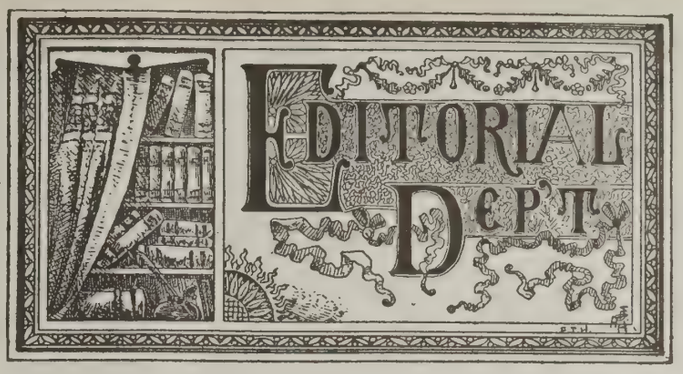
8. To accept the commission to do the work for which a competition has been instituted if he has acted in an advisory capacity either in drawing programme or making award.

9. To injure falsely or maliciously the professional reputation, prospects, or business of a fellow architect.

10. To undertake a commission while the just claim of another architect who has previously undertaken it remains unsatisfied, or until such claim has been referred to arbitration or issue has been joined at law.

11. To attempt to supplant a fellow architect after definite steps have been taken toward his employment.

12. To compete knowingly with a fellow architect for employment on the basis of professional charges.



To provide for the future is the duty of every man who has a family, or who expects to have one.

* * *

The recent movement being made in England to have every man who works for a living, protected by an old age pension, is a step in the right direction.

* * *

The British Government is also about to enact such laws that may be necessary to ensure a regular weekly or monthly payment in a case of sickness, accident or permanent injury. The money for this purpose is to be provided by a fund, a portion of which is to be raised by each workman contributing about one cent a day, from his wages, which is retained by the employer, who hands this, with a like amount to the government, which also adds to it a like sum, or about one-third of the whole amount collected.

* * *

Proper machinery is provided by the government for the collection and disbursement of these monies, and the whole is placed under the control of the National authorities, a step which will insure the nearly perfect working out of the whole scheme. This law, in connection with the old age pension enactments, will go a long way towards lessening abject poverty in the old land, if it does not encourage a tendency towards idleness and dependence. This policy is a step in the direction of socialism, a condition towards which the world seems to be rapidly drifting.

* * *

The following figures showing the working of the German workmen's insurance law in 1909 are of interest to American workers: Of a total population of 63,879,000 people, 9,938,478 males and 3,456,812 females were insured against the consequences of illness. They were insured in 23,449 insurance offices in all parts of the empire. Against accidents were insured 14,854,000 males and 8,913,000 females. Against complete invalidity, or inability to work, were insured 10,707,100 males and 4,737,200 females. There were 5,540,825 cases of illness dealt with, 1,021,168 cases of accident and 115,264 fresh pensions for invalidity in addition to the existing 983,354 pensions. Old age pensions numbered in all 130,643. The income from insurance was 891,598,800 marks (four marks equal roughly $1), of which 413,497,700 marks were contributed by the employers and 342,076,300 by the workmen. The imperial contribution was 51,500,700 marks. The total expenditure was 598,924,200 marks.

* * *

John Passmore Edwards, who died at the age of 87 a few weeks ago, was one of the best known of English philanthropists. He made a great fortune, but he has probably died a poor man, most of his wealth having been devoted to the establishment and endowment of libraries, convalescent homes and other charitable institutions. The son of a working carpenter, he made his way to wealth and position by sheer industry and pluck. No sooner was he on the high road to success than a long illness took him away from his publishing business, with the result that he was forced into bankruptcy. On his return to business he denied himself everything until he could call his creditors together and pay them all twenty shillings in the pound.

In 1876 he bought the Echo, started the first one cent newspaper in London, and rigorously excluded all mention or reference to betting and horse racing. In spite of that the paper was soon a success and made him a fortune. At one time he sold the controlling interest in the paper to the Storey-Carnegie combination, which aimed at establishing a chain of Echos covering a good part of the United Kingdom. In less than three years he bought the Echo back at an enhanced price, and the Storey-Carnegie com-

bination was at an end. He was the mainspring in the Building News Company, and succeeded in making that journal one of the leading architectural papers of the world. He was the first to introduce the art of lithography in architectural journalism.

* * *

Gold bricks, real ones, may be the means of restoring the ancient fame of Golconda, near Hyderabad, in southern India, once known all the world over for its gold mines, but now a decayed city. The natural pits from which many centuries ago the precious metal was extracted have in course of time filled up with water. A contractor recently obtained permission to make bricks near the place and ten kilns were erected. The first finished bricks aroused curiosity by their yellowish tint, and analysis proved that they contained gold dust. On the basis of the yield of the sample bricks, the ten kilns will aggregate in weight about 12,857 pounds of gold, worth about $2,500,000. The site of the find belongs to the Nizam, or native ruler, whose affairs are administered by a British secretary, who has worked hard for nine years to produce a surplus in the Nizam's last annual budget of $15,000,000. It looks insignificant now compared with the result of nine days brickmaking.

* * *

Many eulogies have been written about the Taj Mahal at Agra, but perhaps the best is that recently given by Sir Frederick Treves. "Everyone," he says, "who visits Argamand Banu's tomb for the first time approaches it with curiosity, tinged probably by a faint disposition to be hostile. So much has been written about this wonderful building, so much rhapsody has been lavished upon it, that there is some suspicion of overpraise. The claim that it is the most beautiful building in the world is a claim that many at once resent. Its outlines are familiar enough from pictures and models, and it may be that they hardly warrant unrestricted ecstasy. The visitor proposes to himself to put sentiment aside and review the building critically . . . . to submit it to a common-sense inspection, for he is inclined to believe the Taj Mahal to be a much overrated monument. With the first sight of it there comes only a sense of indefinable pleasure; it is no mere feeling of admiration, still less of amazement. No mere delight in a splendid building, because it does not impress one as a building. There is a sudden vision, and with it a sudden sense of ineffable satisfaction, as if in the place of a marble dome the garden had been filled with divine music. All intended criticism is forgotten; there is nothing that appeals to the judgment or that suggests the weighing of opinions. There is merely a something that touches the nest sense of what is tender, beautiful, and lovable—a white cloud, luminous, intangible, translucent! The secret of the beauty of the Taj Mahal lies in the great arched recesses or vaulted alcoves which burrow deep into the body of the building. These are throbbing with sensitive shadows, and they give the impression that the onlooker can see into the very heart of this gentle palace as one would gaze into the heart of a yellow rose, where leaf by leaf the tints become deeper, warmer, and more living. There is ever a sense of something half hidden and half revealed, of a tenderness which has deeper depths. It is this abiding suggestion which makes the peculiar glory of the Taj a glory which is beyond the reach of any picture or any model. To many the Taj will be the most beautiful building in the world, while there must be few who would not acknowledge that it is the most lovable monument that has ever been erected."

CONTRACTING

By WARFIELD WEBB

THERE is more real economy in having efficient office help than in trying to get along with men whose ability is moderately good. A contractor who is conscious of this fact is the man who makes progress that is helpful. Sometimes we find a builder who is desirous of making as much profit for himself as is possible on every contract that he takes, and one means to attain this end is the employment of inferior workmen. He labors under the impression that with his own assistance he can not only show them much that will be helpful, but that he can do a great deal himself, and in this way keep the cost down.

For many reasons this is a most foolish notion. It might prove helpful sometimes in the case of a very ordinary piece of work, but even then the errors made, time lost, and other annoyances really foot up more than the additional profit would be by employing the best help. There are some contractors who are so narrow in their views on this important question that they are short-sighted enough to feel they are actually making a nice profit when they are losing money.

There is also the question of cheap construction work. Of inferior building. Some builders, particularly those who construct buildings to sell, have the habit of using only inferior materials, and the most inferior labor. In order to hide the defects that are natural in such cases, they hide them with paint and paper. We once heard a remark made about a party who had this method of constructing his houses. It was to the effect that his buildings could not be depended upon, from the simple fact that they were very cheaply constructed, and the defects covered with paint and wall paper. While it is true that he sold a fair number of them, the reputation that was spreading about him and his work was sure to sooner or later ruin his business and his reputation as well.

There is another class of house constructors who work upon lines that are slightly different from the above, but which are in no respects more honorable. They use scrap lumber, cheap brick and other materials that are worse than second hand, and then offer them as first-class houses, while some of the defects are actually in evidence. Many times the buyers are poor people who have only a small cash payment to make and the rest is purchased on time payments, with large interest. The contractor gloats over the deal he has made, and if the purchaser is not satisfied with the house he tells him to get out, and shows him his contract, which is so worded that the purchaser has no redress. If he moves out the contractor is just that much ahead. He sells it to another at the original price, sometimes for cash or on the same terms. In any event he is the gainer.

Instances of this kind are far more common than many would like to believe possible. What is the reputation of the builder of this class of work worth? He does not care, and no one else should. But there is the danger of distrust that is shared by many other contractors who are honest. It is a grave error to use inferior materials, or to employ inferior help. The economy in this way is not only false, but it is a mill stone to drag to ruin the unwise contractor.

Unless you are able to oversee the work of construction yourself the greater portion of the time, it would be a wise thing to employ a foreman that is capable of doing so, and upon whom you can depend. In doing this you will have to pay a good wage. Men of ability are not to be had for the asking, and the fact that they are always in demand is a further evidence of their value in a special line. With a competent foreman on the job, and with men under him that are capable, there is every reason to feel that they will do their work in a way that will be valuable to you.

In figuring on any contract it is far safer to allow enough margin for profit to make sure of your losses from unseen and undreamed causes. If you are so anxious to secure a contract that you will take it at a loss, then you had better give up contracting and go to work by the day. In the end you will find that you have gained, both in money, wisdom, and saved yourself much worry. How often, in order to beat a competitor, or to keep a force of men at work, or for some other reason equally as unwise, will not a contractor take a job at a figure that will make it almost impossible to obtain a profit.

Ignorance of the conditions governing a contract is sometimes responsible for this; then on other occasions, it is ignorance on the part of the contractor himself as to the duties demanded of him. In either event it is well to leave it to some one else, and not take a chance that has so much of the gamble in it. It is these little points that are at times most valuable for the contractor to bear in mind. The wise contractor will see ahead of him, and not simlpy live from day to day, taking every possible opportunity that savors of chance, in order to seek and make an imaginary profit for himself.

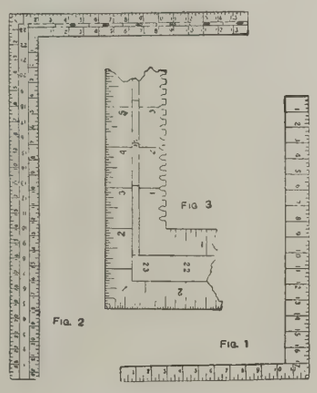
THE USE OF THE STEEL SQUARE

By J. H. B.

THE following is taken from The Building World, and gives some idea of the manner in which the Englishman at home makes use of the steel square for some purposes: Roofing by means of the steel square is doubtless now well known to many people—at least, by hearsay. The purpose of these articles is to show the methods of using the square to the best advantage. In the course of them more complete information will be given than any hitherto published, and this will be presented in a new and totally different manner. To attain this end more satisfactorily, the exact methods to be used, by which the various lengths, bevels, etc., are obtained, will be shown with the aid of photographs of the actual roofs dealt with. These will give more exact detailed assistance than is possible when drawings only are used.

Although the steel square (which emanated from America), has been in use for many years, there are still a great many who have never seen one, and who, when the tool is mentioned, confuse it with the old fashioned iron square, used for rough work, especially in the south of England, from time immemorial. Now there can be no doubt that the old fashioned carpenter's friend is really the forerunner of the modern tool, the latter being evolved from the former by our enterprising cousins across the water, the result amply repaying the troubles taken in doing so.

For the information of those who have not seen an up-to-date steel square, and also for those who are not familiar with the old style, a sketch of each is given, Fig. 1 showing the old and Fig. 2 the new. The former, as shown, consists of one arm, 1½ ft. long, usually 1½ in. wide, from one end of which branches off at right angles the shorter arm, 12 in. only in length by 1 in. wide. The



square thus formed is divided into inches, these being further subdivided into eights on the outer edge only (in the the drawing the inches are divided into quarters only); thus it is not convenient for measuring from the inside, the necessity of subtracting the width of the arms from the distance figured on the square being productive of mistakes. To these faults may be added that, owing to the comparative weakness at the angle, and the rough usage to which the tool is often put, it is rare indeed that one of these squares can be found which is a square in reality. The width of the two arms is also, as a rule, only approximately correct; the edges are not made straight, and can be depended upon only for the roughest of work, and will not by any means do for use in roofing by the methods to be dealt with here.

Coming to the improved square, as shown in Fig. 2, the longer arm is 2 ft. and the shorter 1 ft. 4 in. long, the former being 2 in. wide and the latter 1½ in. only. Each is divided into inches, these being again subdivided into sixteenths and numbered so as to read correctly from either end.

Each arm of the square is also divided, so that measurements can be read from the angle, thus adding considerably to the convenience when in use. In some makes of these squares, both arms are divided on the inside the same as the outside; but in the one used for the purpose of these articles, the longer arm is divided up into eighths only on the inside. The short arm is divided into inches, as shown in Fig. 2, and figured from the inside angle, the whole length being cut away at intervals of ¼ in., or crenulated, as in Fig. 3. By means of these crenulations it is possible to dispense with a gauge in setting out mortices and tenons; the long arm sliding along the wood, and a pencil being placed in the proper position, marks the tenon or mortice as truly, or more so, than a gauge. This may perhaps not be strictly roofing, but it comes under the same head, many roofs requiring a certain amount of framing in their construction.

On the opposite side to that shown in Figs. 2 and 3, the whole of the outer edge of the square is divided into inches, these being subdivided into twelfths, a very convenient division, as will be shown later on. The longer arm on this side of the square is

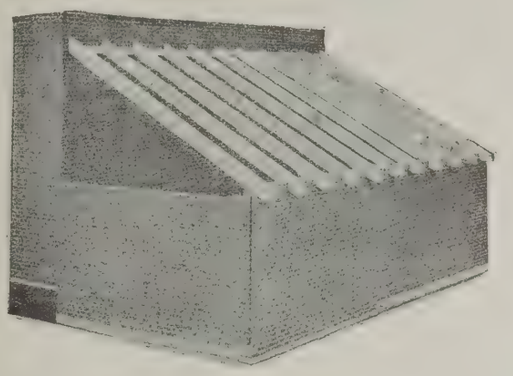


FIG. 4.

also divided into inches on the inside, these being subdivided into thirty-seconds; this is finer than usually desired for this purpose, but useful occasionally.

There are some other figures and scales on the square, the purpose of which will appear during the course of these articles, those already described being what really concerns the present subject. It may, however, be added that the steel squares are made dead true, both as regards the true right angle and the straightness of the arms. So true is the one belonging to the writer that he has used it for exact joinery work, as well as for the purpose it is meant for—carpentry.

Having thus cleared the way, how to frame an ordinary lean-to roof, all lengths and bevels being obtained by means of the square, from the plan only, will now be dealt with.

THE LEAN-TO ROOF.

The lean-to roof is the most simple of all roofs, and for this reason it is taken first in this series, its very simple character enabling us to show the principle of working apart from any complications in the roof itself. The complete roof is shown from two points of view in Figs. 4 and 5, and in section, as far as necessary for the present purpose, in Fig. 6, which will appear in the next instalment.

The width of the building is 8 ft., that is from the wall

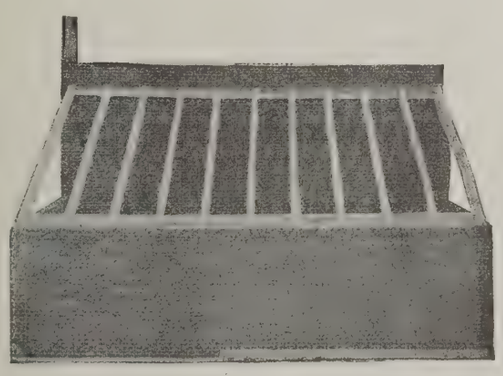


FIG. 5.

against which the tops of the rafters come to the outside of the wall plate, and the rise from the top of the wall plate to the top point of the rafters is 7 ft., this giving what is usually known as "tile" pitch. In passing, it is as well to say that a roof which has to be covered with tiles should not be made with less pitch than this, or there will be a risk of the wet finding its way in.

(To be continued.)

KEEPING THE MONEY AT HOME

Readers of THE BUILDER are deeply interested in keeping the dollar working, and keeping it working at home. At present, thousands of dollars are being sent away for "farms" or "lots" in distant states, when it should be kept at home. Money is "invested" in vacant property in new subdivisions and held for a rise in values when it should be spent in improving present property to produce an income.

No one thing helps a neighborhood more than to build a home in it. A large part, possibly one-third, goes out for labor right on the job. Fully as much more goes out for materials on which the local dealer makes his commission.

Every reader of THE BUILDER is interested in the building up, and every effort should be made to augment the movement "back to the homes." The architect can interest the owners in the newer and better methods of construction. The contractor is equally able to hunt up the people with a little money who are renting properties not entirely satisfactory, and others who have only to be urged a little to see the wisdom of having their own home now, instead of waiting until they have saved all the money necessary to pay cash for their home. When one considers that every house built means from $500 to $1,000 paid to mechanics in your own town, wouldn't it be well to make a little effort along that line?

In the building of homes of moderate cost, it is probable that building and loan associations take the lead. In the state of Illinois there are now nearly 600 such associations, with about $65,000,000 invested. One such association in twenty years has built 150 houses and is now lending nearly $3,000 every month to its members for building purposes. And yet there are carpenters and contractors, subscribers and readers of THE NATIONAL BUILDER who are not stockholders and are not keeping in touch with this means of increasing their business. Every builder should be interested in these associations, to know who anticipates buildings, and to be first on the ground to submit plans for their assistance and approval. The safest kind of business comes from it and you are keeping the money at home, where it was earned, and you are helping your friends and neighbors as well.

A DOLLAR DREAM

They wanted him to buy a farm
A thousand miles remote,
In regions that were full of charm,
The proud promoter wrote.
The more he thought and thought of it
The more he liked the scheme;
To think of it he used to sit—
And then he had a dream.

(Now, dreams are very foolish things
Undoubtedly, it's true—
Your brain puts on its fairy wings
And flies away from you;
And yet it seems that some of us
Our cash would never keep
Unless we learned a lesson, thus,
By falling fast asleep.)

He had a dream a dollar came,
With tears its features wet;
A dollar came and called his name
In anger and regret.
The coin was shedding silver tears
From out its silver eye.
He asked the reason for its fears;
The dollar made reply:

"They tell me you intend to send
Me many miles away,
They tell me you intend to spend
In speculation gay
The dollar that has been to you
A servant many years,
To send me to some region new—
And hence these silver tears.

"I've lived in this community
Almost as long as you;
I've been in ev'ry family,
I guess, but one or two—
But one or two who, sad to say,
Had such a scheme in mind
And sent their hard-earned cash away
Some other land to find.

"I am the dollar that was paid
To Johnson for his wheat,
That Johnson gave again in trade
To Murphy for his meat,
That Murphy gave to Smith, you see,
For furnishing a knife,
That Smith left at the grocery
For candy for his wife.

"The grocer gave me up to Jones,
Who runs the drygoods store,
And that the doctor set his bones
This Jones can thank me for.
The doctor paid me out for oats
To feed his dapple gray,
The feedman paid me on some notes
Fell due a certain day.

"The banker bought a book or two,
And so the thing went on—
Each night I had an owner new,
A new one at the dawn.
A welcome waited when I came,
A godspeed when I went,
In fact, a thousand ways the same
On errands I was sent.

"But now you say that I must go,
A wanderer to be,
Afar from all the friends I know
Who know and honor me.
I wonder that you dare to look
Me fairly in the face;
And in your empty pocketbook,
Oh, who will take my place?"

The speculator then awoke,
The dollar in his hand,
And softly to himself he spoke,
"At last I understand."
He gave it to the druggist's clerk
And bought a brush and comb—
He found a dollar does its work
The best right here at home.

Douglas Malloch,
in American Lumberman.

THE CONTRACTOR IS A SALESMAN

Probably it has not occurred to the contractor readers of THE NATIONAL BUILDER that they are salesmen. They are selling the materials and labor required to build a house.

We wonder if in talking with these clients they consider enough the need of salesmanship in securing their contracts. There is apt to be too much fear of losing a contract, and the anxiety prevents them from getting the right price for their job.

Just stop for a moment and consider the position of the man who builds. He is right from the "start off," at the mercy of the contractor. If you are a reliable contractor; have a reputation to keep, and have property or money to back it up, you ought to be able to get a better price than another contractor who has nothing. It is good salesmanship if you can show these points of advantage to the builder and receive his contract at a good figure.

A merchant comes to you for business, you have bought goods from him in the past and were not satisfied with the treatment received, you turn him down, and go to his competitor across the street and pay a better price. Just why do you do it? Simply because you found it pays.

Let us say you now have a chance to secure a contract to build a fine residence if you meet the other man's price. This other man is not reliable, and yet you are asked to take on a job simply because another has set a price. Good salesmanship talk here would bring you this job at your own figures. It is not necessary to run down your competitor. The thing to do is to praise your own work. Show him the buildings you have erected. Refer him to the people for whom you have done work.

LEAVES FROM A STUDENT'S NOTE BOOK. No. 1

BY GEO. METSON

Brief particulars of the three metals, cast iron, wrought iron and steel are as follows:

(1) Cast iron contains from 2 to 6 per cent of carbon; it is brittle, crystalline on fracture and cannot be forged or welded. Its safe resistances to tension, compression and shear are 1½ tons, 7 tons and 1 ton respectively. Its weight can be taken as 37½ pounds per superficial foot of 1 inch thickness.

All castings should have their internal angles well rounded, as when cooling, the crystals set at right angles to the enclosing lines of section, so that square angles would cause fracture at their junction. In a lesser degree external angles should also be rounded.

All changes of sections should be made gradually, as a sudden increase in the thickness of metal would, owing to the necessarily unequal rates of cooling, cause cracking.

Cast iron for joists is practically superseded in construction by mild steel, but cast iron for columns or pillars is employed on account of its high resistance to compression, and also, because where required an architectural finish is obtainable by means of mouldings, caps, etc., though it must be remembered that mouldings are a source of weakness to a casting. If ornamental caps and bases are required, they should be added as an extra casting and be fixed to the column afterwards.

There is a risk of flaws and cracks in cast iron columns. The flaw may occur in one of the lugs, cast on for joining up, etc., to the grave detriment of the joint and the column as a whole, for which reason steel for stanchions is now more often employed.

It is as necessary to protect cast iron columns from fire as it is with steel staunchions. The incased steel work would bend, twist and even give way, at comparatively low temperatures, while though the cast iron column might crack, it would continue to support its load, unless melting temperature was obtained.

Rough tests for cast iron are as follows:

(1) Strike the edges lightly with a hammer. If pieces fly off, it is too hard.

(2) If the hammer indents the metal, it is too soft.

(3) If it can be cut with a knife at places it contains too much carbon.

(4) If a milled or machined joint shows irregularity; some parts showing humps above the general surface, the metal has probably been badly mixed.

(5) If the casting shows surface lines of indentation, it has been run into the moulds too cold.

(6) The casting may contain holes on the surface filled with sand, etc., which may be proved by striking the metal, when the sand may be displaced.

(7) Lastly, check the dimensions. If necessary, a hole may be bored in a column shaft to ascertain the thickness of the metal.

(2) Wrought iron contains not more than ¼ of 1 per cent of carbon; it is tough, ductile, fibrous, forgable, weldable. Its safe resistance to tension, compression and shear are 5, 4 and 4 tons respectively. Its weight can be taken at 40½ pounds per superficial foot of 1 inch thickness. It can be used for rolled sections, tie rods, bars, bolts, rivets, etc., and can at high temperature be pressed into moulds.

In the trade there are two classes of materials; namely, "merchant bar" and "best bar," the latter being used for constructural purposes, being tougher and more easily worked than the merchant bar.

Each of these two classes are again subdivided, viz, "single," "double" or "treble," according to the number of times the metal has been through the processes of piling and rolling.

For constructional purposes, mild steel has largely taken the place of wrought iron.

(3) Steel is made by adding carbon to wrought iron, or by extracting carbon from cast iron, and according to the percentage of carbon it contains, so it can be welded or cast. Mild steel may contain up to ½ of 1 per cent of carbon and can be forged and welded. It is softer and yet tougher than wrought iron. Cast steel is much stronger than cast iron.

One noticeable property of steel is that it obtains a higher degree of elasticity than other metals, and another that it retains its magnetic power having once become magnetized, longer than iron, but is slower than iron in becoming magnetic.

If sulphur is present in excessive quantities, it causes the steel to be difficult to weld, becoming brittle when at red heat. This is known as red shortness. If phosphorus is in excessive quantities, the metal becomes brittle when cold. This is known as cold shortness, and such metal is of no commercial use.

Mild steel is now extensively used for constructional work, as roofs, bridges, floors, stanchions, etc. Its safe resistance to tension, compression and shear are 6½, 6½ and 5 tons respectively.

Cast steel is used for tool making.

It is sometimes difficult to distinguish between wrought iron and steel, so the following brief items may be useful in this direction.

(a) Plunge the metal in doubt when red hot, suddenly into cold water; if it becomes hardened, it is steel, if it remains unhardened, it is wrought iron.

(b) Steel will show a finer grain on a cut than wrought iron.

(c) A drop of diluted vitric acid will show a darker stain on a piece of bright steel than on a piece of bright wrought iron.

(d) The steel will emit a clearer ring than wrought iron when struck with a piece of hard wood; the metal to be tested being suspended.

The following points require looking to in construction:

(a) Steel should be free from laminations which are caused by the ingot from which the metal is rolled containing honeycombs.

(b) The dimensions should be correct with proper camber and rivets at proper pitch, and the riveting properly extended. That countersunk rivets are provided where required.

(c) The metal should be tested for tensile resistance at some experimental works.

WATERPROOF CONCRETE PAINTS

THE committee on treatment of concrete surfaces of the National Association of Cement Users, has investigated a number of the so-called waterproof concrete paints and finds that they are much more efficient than colorless solutions.

These paints may be divided into two classes: First, those which give white, or light tints or other colors pleasing to the eye and of a decorative nature; and, second, those which employ compounds of tar and asphalt which are necessarily black or nearly so, and are, therefore, seldom used on exposed surfaces.

The presence of a finely-divided pigment serves to seal up the small pores in the surface of the concrete, leaving less work to be done by the vehicle.

In most cases the proportion of pigment used is small, and by using a cement color but little change in the surface appearance of the concrete need be made, unless desired, while on the other hand, almost any shade or color may be obtained. In this way the waterproof-coating is made more serviceable and at the same time ornamental.

All these treatments are applied with a brush in the same manner as paint and are probably as durable on concrete as paint is on wood.

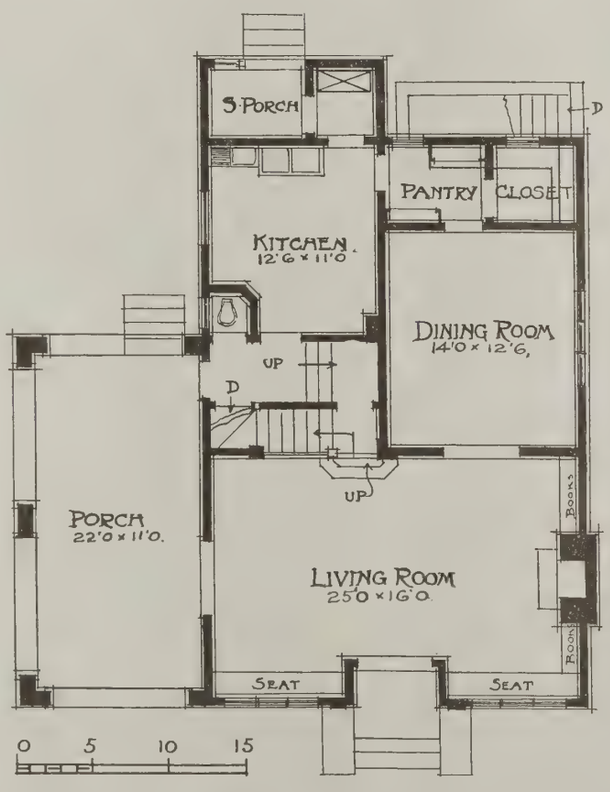
Linseed oil paints should not be applied directly to new concrete or to any concrete which has not been long exposed to the weather. The free lime in concrete not thoroughly weathered out on the surface by exposure to the elements will saponify the oil, destroying its adhesive power and its life, and the paint will soon scale off. After concrete has been exposed for a long time to the elements, linseed oil paint may be used with greater safety. It is difficult, however, to determine when the concrete is sufficiently free from lime to render it safe for the application of linseed oil paints, and it is therefore safer to avoid their use directly on concrete.

There are preliminary applications which may be given to concrete which renders it harmless to linseed oil paints. The best known, and perhaps the most thoroughly proven treatment of this kind, is that devised by Charles Macnichol, of Washington, D. C., and published in the transactions of the American Society for Testing Material for 1910. It consists in giving the concrete, after it has been thoroughly set, a priming coat of a solution of zinc sulphate, eight pounds to a gallon of water. This is applied with a brush, and after it is dry ordinary linseed oil paints may safety be applied over it.—*American Roofer.*

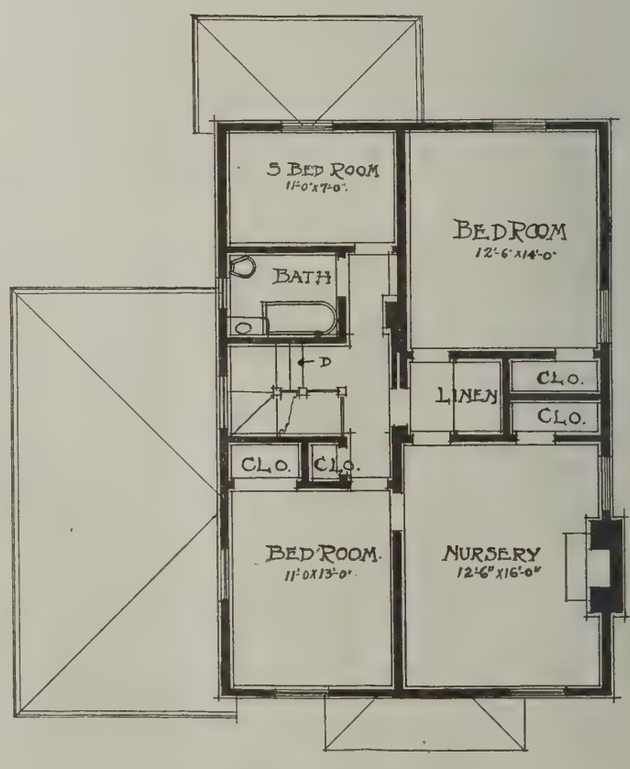


RESIDENCE AT HACKENSACK, N. J.

MANN & MAC NEILLE, ARCHITECTS.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

A RESIDENCE AT HACKENSACK, N. J.

On a slight elevation overlooking the beautiful Hackensack Valley, the architects selected the shingled side house as best harmonizing with the surroundings. As will be seen the shingles are the old fashioned hand-split shingles one inch thick at the butt and exposed twelve inches to the weather. The enclosed porch can easily count for an extra room summer or winter.



DINING ROOM, RESIDENCE AT HACKENSACK, N. J. MANN & MAC NEILLE, ARCHITECTS.

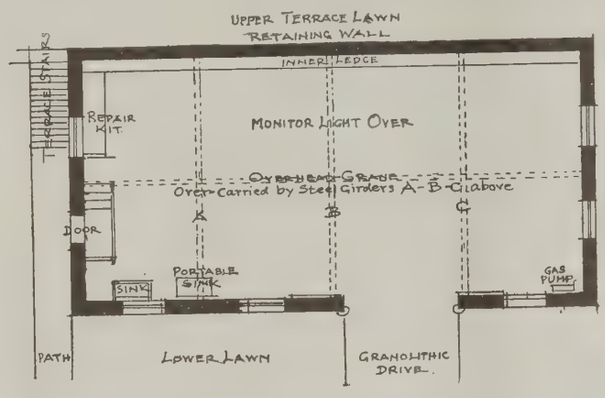


LIVING ROOM, RESIDENCE AT HACKENSACK, N. J. MANN & MAC NEILLE, ARCHITECTS.

PLANNING A PRIVATE GARAGE*

By. HERBERT L. TOWLE

Now let us consider the floor space in figures. To do anything of consequence around a car a width of ten feet is necessary, and an additional 2 feet is often useful. According to the length of the car, the minimum fore and aft length of a small garage must be 18 to 20 feet, and may be a little more for very long cars. This gives room to work around both ends, after allowing for headlights, folded Cape cart hoods, etc., and it gives a little leeway to avoid breaking the lamps when one drives in. If there are two cars abreast, the required width will be about 18 feet. If, however, the cars are to be washed in position, about 4 feet additional is needed to avoid splashing one car when the other is being washed.

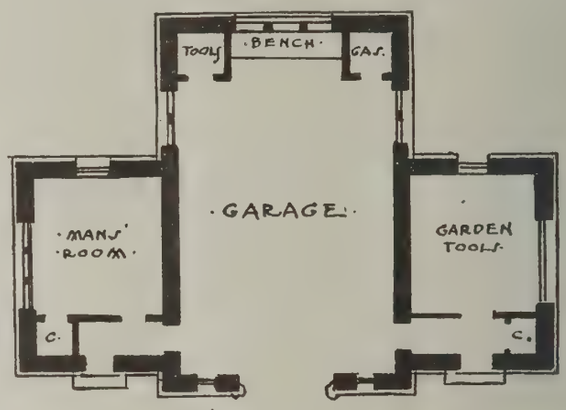


BY ALBERT WINSLOW COBB, SPRINGFIELD, MASS.

The bench should be 2½ to 3 feet wide, and from 6 feet upward in length, depending on the number of cars and the amount of work expected. Lockers, oil cans, etc., may be disposed in corners, but the gasoline pump and the washing hose should be near the door. An overhead trolley and chain hoist are useful. One end of the trolley should be over the motor, and the other near the bench. The machine tools, if any, should be near the bench, and they and the bench should have ample light.

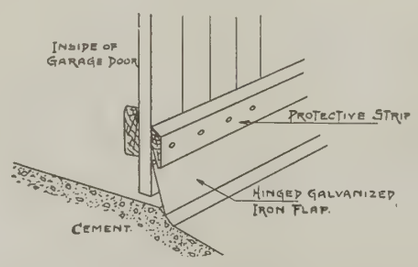
If the body is to be staged at one side for overhauling or painting, about 5 feet will need to be added to the length of the garage from front to back, or 3 feet to its width.

From these considerations we see that the minimum space required simply to house a runabout and provide bench room is about 14x20 feet outside. Even this is crowded; it allows no room for machine tools, none for swinging a sledge, and none for staging the body. It serves the requirements of the average owner who is satisfied to let the repair shop do most of the overhauling. For a touring car from 2 to 4 or 5 feet should be added to the length, and for two cars side by side the width should not be less than 20 feet.

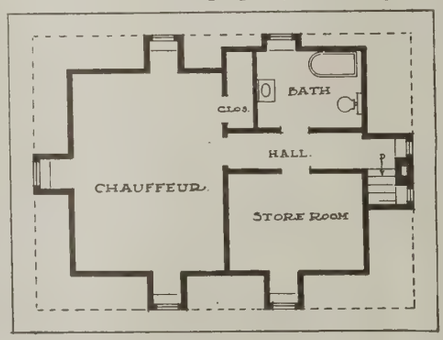


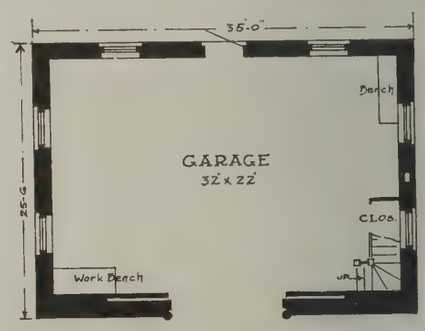
BY FRED. B. O'CONNOR, ALBANY, NEW YORK.

The above dimensions make no provision for heating, a subject which will be taken up later. Meanwhile we may remark that the heater should in all cases be partitioned off wholly from the room in which the cars are stored, and should be entered by a separate outside door, to avoid any possibility of explosive gasoline vapor reaching the fire. In the one-car garage a satisfactory arrangement is found by locating the heater at one side, with the shop space, as it may be called, beyond. It is even possible to run a curtain to screen the bench and tools from splashing when the car is washed indoors. A heater of some sort, it may be remarked, is essential for winter use in the latitude of Philadelphia and Chicago, as it is difficult to start an engine when the mercury sinks to 45 degrees, and it is physically impossible to do much work on the car at a lower temperature.



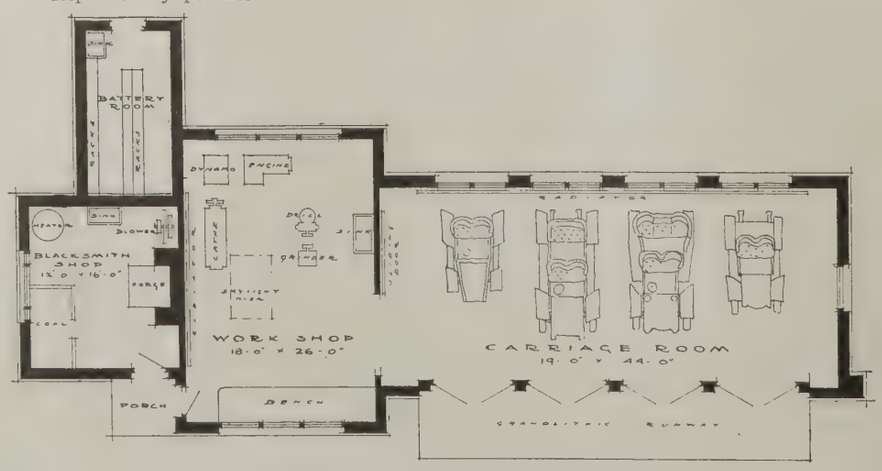
DOOR CONSTRUCTION SUGGESTED BY MR. TOWLE.



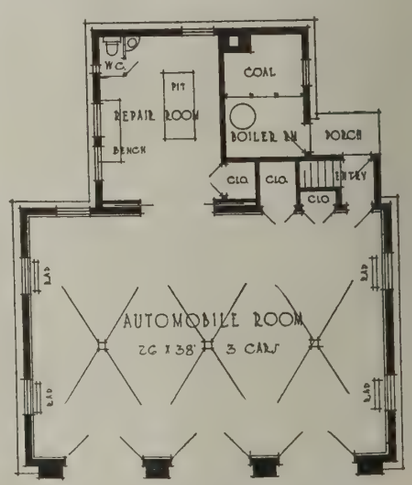


BY C. E. SCHERMERHORN, PHILADELPHIA.

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BY ANDREWS, JAQUES & RANTOUL, BOSTON.



BY BAILEY & BASSETT, PHILADELPHIA.







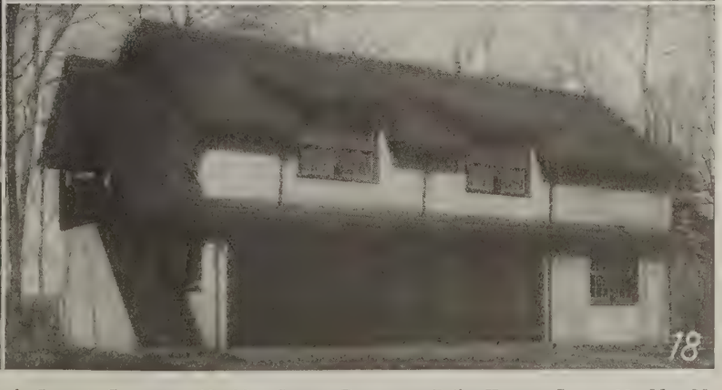












The owners of the garages shown are:
10—Mr. E. P. Harris, Montclair, N. J. 11—A Suggestion from the Atlas Portland Cement Company. 12—Mr. Gustav Baumann, Belle Haven, Conn. 13—Mr. M. Gaines, Englewood, N. J. 14—Mr. Charles Snead, Montclair, N. J. 15—Mr. Geo. B. Wallace, Fitchburg, Mass. 16—Mr. Thomas Buck, Oak Lane, Pa., C. E. Schermerhorn, architect. 17—Mr. W. D. Denegre, Manchester, Mass., Andrews, Jacques and Rantoul, architects. 18—Mr. Charles E. Gibson, West Newton, Mass., Chapman and Frazier, architects.

POWER MACHINES FOR THE WORKSHOP

BY GEORGE E. WALSH

THE carpenter beginning in a small way may be at first content with such hand tools as he has always had, and possibly one or two foot-power machines; but as his business grows, and he finds it possible to enlarge his capacity by taking larger jobs he begins to figure on the equipment of his shop with some of the simpler power machines. It is true that mills perform so much of the work today that formerly the carpenter did entirely by hand that the necessity for equipping the ordinary carpenter shop with expensive machines may not appear so urgent to some as to others; but if one is to do efficient work of a varied character a well equipped shop is the key to success. The carpenter who can take, and do, all sorts of jobs is more than likely to get the bulk of the best trade in any locality.

When we jump from hand and foot power woodworking machines to those operated by steam, gas or electricity, the question of what sort of power should be adopted is the first to cause worry. In a general way it was impossible for the carpenter to equip his shop with steam power unless it was run as a mill too, for the expense of installation and operation was too great. It has only been in recent years that gas and electricity have come in as a factor in the situation. For the small shop the question is reduced to the choice of electricity or gas. Steam is out of the question where the work is intermittent.

As to elecricity for shop operation of machines, it is largely a question of cost of current. If electric current can be obtained at very small cost, which is possible in many parts of the country where hydro-electric power is developed on a large scale from waterfalls, electricity is an efficient power for shop work. In using this power one pays only for what he uses, and there are no losses when the motor is shut down. Thus if one wishes to saw up a lot of lumber of certain lengths, he can turn on the current and start the machines going. When the job is finished the current is shut off and expenses cease.

If the shop is equipped with only one machine such as a table saw a single motor direct connected to the machine or belt-connected will suffice. This motor must have sufficient capacity to drive the saw at full load. If two machines are installed, another motor can be direct connected to this the same as the first, but when three or more are put up the question is whether it will pay better to have a separate motor for each machine or all the machines driven by a single large motor by shaft or belt. We know that when power is transmitted by belt and shaft there is a loss amounting all the way from 10 to 20 per cent. That is, this power is wasted in driving the shaft and in the friction of slipping belts and pulleys. This waste must be taken into calculation in group driving. On the other hand the initial cost of installation may be less than to purchase an individual motor for each machine.

In theory and practice it may be said individual motor drive is the most satisfactory where the tools and machines are operated only occasionally, but in a shop where the operation of most of the machines is uniformly steady the group-driven system by shaft and pulley is the most efficient. The first cost of a small motor is proportionately greater than a larger one, and where a separate motor is installed for each woodworking machine there must be a duplication of power. Thus if we have four motors of two horse-power each in a shop to drive four machines, we have a total of eight horse-power. Now a single motor of five or six horse-power would undoubtedly be sufficient to drive all four of the machines if they were connected up by shaft and belt. The total aggregate of horse-power of a shop equipped with separate motors is therefore greater than in another using the group system of drive.

But there are other compensations. If anything happens to the shaft or motor in the group system all the machines are put out of commission. Where separate motors are employed a single motor may get out of order, and only one machine is stopped. The group system of drive is clumsier than the separate motor method, for there must be constant connecting and disconnecting of shaft and pulleys, and this takes time and often a good deal of labor to adjust things. Belts will slip and get out of order, and even shafts have a habit of breaking down. If a sudden hurry job comes in which calls for the operation of a single machine, it may be that all the others are connected up and these must be disconnected before work can begin. With the separate motor a touch of a button or turn of a switch handle throws the current on, and the work begins, and when through the motor is stopped just as quickly.

If there is no special price for current, the average carpenter will find the gasoline engine cheaper than electricity. There has been a good deal of prejudice in the past in equipping woodworking shops with gas power. Some have an idea that the danger from explosions is great, and that, with shavings around, the gas engine threatens the whole shop. Without doubt the gas engine is just as safe as any other form of power, and it is being generally adopted for all kinds of woodworking concerns. But it must be properly installed and operated. The adaptation of the gas engine to the carpenter's shop has reached a point where it is handy, safe and efficient. Saw outfits, for instance, are already made with the gas engine attached to the table in such a way sawdust and shavings can fall on any of the exposed parts of the engine without causing fire or clogging. The dangerous parts of the engine are inclosed in such a way that a child could run one without causing a fire of any kind.

The gas engine is the most economical power producer we have, and it is equally adaptable to automobiles, boats, airships, and shops and factories. The gas engine has the same advantage that the electric motor offers. That is, when work stops the cost of power generation also ceases. There is no waste of energy while waiting for the next job. This economy of power must be considered, for in the long run it amounts to a good deal.

The gas engine is also used in much the same manner as the electric motor, either for individual drive or in connection with shafting or pulleys. For a single woodworking machine a small gas engine of one or two horse-power will answer all purpose, but in a shop with several machines the extra cost of power to drive all of them will be very small. A five or six horse-power engine will usually drive all the machines that a carpenter shop will have. It is very seldom that all of the machines will be operated at the same time. If we figure upon an engine capable of operating three-fourths of the machines at once we will therefore select one of about nine horse-power for a shop that is really a twelve horse-power one. In general factory practice this is not considered good practice. The horse-power needed is figured for the full capacity of the shop when all machines are in operation at once, and this would be the correct thing in a woodworking shop where the running of all the machines at once is frequent. But the small shop rarely needs all of its machines at the same time, and it is perfectly safe to figure on the smaller horse-power capacity to save initial cost.

The shafting, pulleys and belting should all be made as light as possible to do the work, for the loss of driving these must be considered. Extra heavy shafting and belts make for losses. The shafting should be run in a straight line, and the gas engine should, if possible, be placed in the middle instead of at one end. Thus in a shop of four machines, two should be on either side of the engine. It is much easier to turn a shaft with the load evenly divided on either side of the center than with all the load on one end. The extension of the shafting can then be made in either direction to accommodate more machines as they are added.

A short shaft for only a few machines requires no coupling and cut-off arrangements. It can easily be turned without loss of much power. The machines not in use are disconnected by throwing off the belts. But when the shaft gets long it pays to have a cut-off arrangement so that a part of the shaft can be left idle. This cut-off system is very simply arranged when the engine is placed in the middle of the line of shafting. The drive belt from the engine is connected to a short length of shafting or a jack shaft with a coupling on each end, attaching it to the line shafting in each direction. With these couplings and convenient levers half the line shafting can be cut off and the other half operated. The whole shafting can be thrown into operation by a touch of the lever and all the machines started up as needed. The extra cost of this coupling equipment will be more than paid for in a short time by the saving of the power and of time in operation. A well equipped shop that works efficiently and economically pays better in the end than another clumsily arranged, and the owner soon realizes that it is economy to spend a little more at the beginning and have everything in first-class shape.

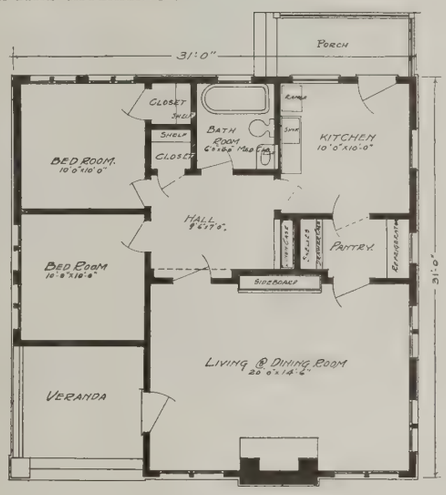


PERGOLAS IN THE WIDE STREET ADD TO THE PARK-LIKE APPEARANCE.

A CALIFORNIA BUNGALOW

Among the reasons for the charm and attractiveness of the bungalow are the possibilities for pleasing surroundings. It takes very little foliage to give a nestling, home-like effect, and when an entire district is laid out with the idea of harmonious surroundings, a little effort creates wonderful results. In the illustration shown herewith, the four-room bungalow is situated in a little park, and, although the buildings are rather close together the open spaces front and back overcome the appearance of crowding.

For the interior we have a very convenient arrangement, the large hall opening into all the rooms. No parlor would indicate the occupation of the whole house all the time, unless indeed the surroundings are so pleasant that one is tempted to stay outside most of the time. In a land of continual sunshine, where this bungalow is built, a parlor is really an unnecessary room, for one would not occupy it during meal time, nor would it be probably used for a bed room. Where the habit of sleeping out of doors, is strong, it is possible to effectually screen the porch and thus practically secure another room.



FLOOR PLAN.



PLACED WELL BACK FROM THE CURB, THE BUILDING IS EASILY ORNAMENTED BY PLANTS AND SHRUBBERY.

A SUBURBAN HOME

By LOUIS BAURY

THIS is one of the attractive suburban homes, situated within forty-five minutes of a large eastern city, which, while possessing all the essentials and characteristics of a $10,000 house, was built under contract for a trifle less than $5,000. The house, which has been occupied more than a year, is the work of William A. Lambert, a New York architect, who makes a specialty of houses that are both cheap and artistic. The low, picturesque treatment of the exterior is in pleasing harmony with the surroundings, the shingles, stained dark brown on the sides, with moss-green roof and white trimmings, combining to make a strikingly effective exterior.

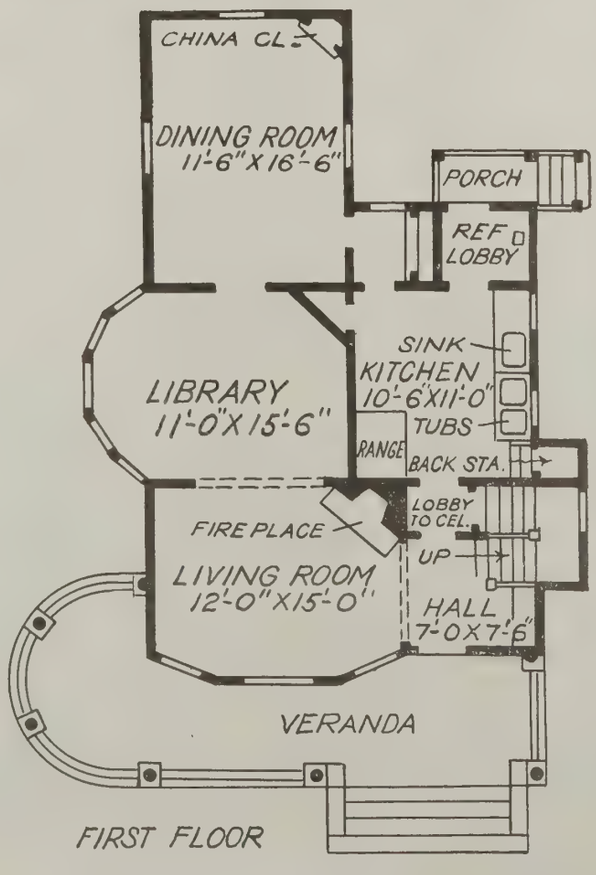


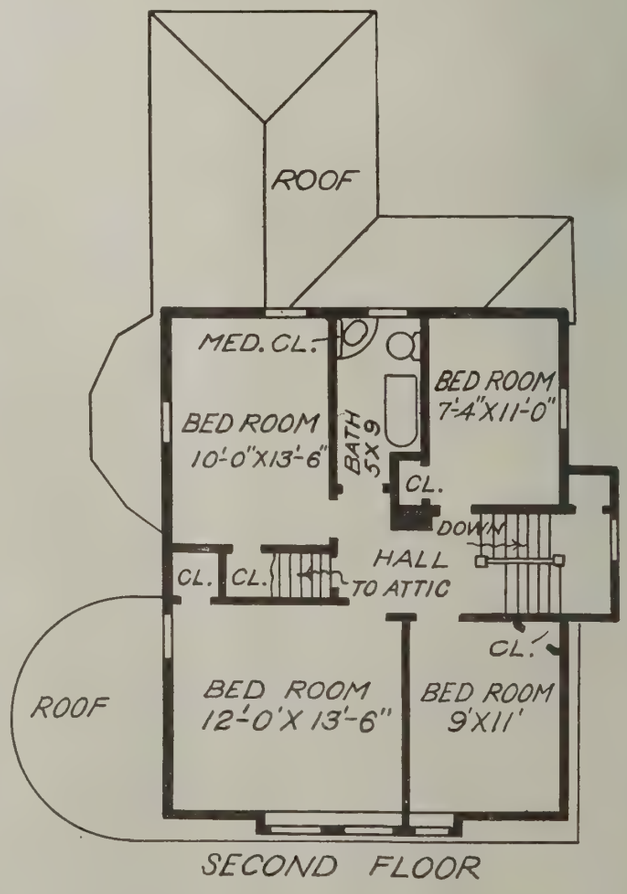


The little piazza, cuddled down in the southwest corner of the house, is large enough to serve as a playground for the children, or accommodate fairly good sized tea parties during the warm summer months, when eating out of doors is one of the pleasures of the country dweller.

The arrangement of the interior is eminently practical and convenient. One enters a cozy little hall, containing a staircase of oak, over which a stained art window sheds a soft, pleasant light. A long, low mission seat and railings, and newel posts, match the stairs. The family now occupying this house by simply piling the seat with cushions and throwing a rug across the floor space has given the hall such a comfortable, cheery atmosphere that it serves as a delightful lounging room.

The living room, library, and dining room are on the southern side and, by opening into one another, give an enlarged floor space of very pleasing appearance. In the living room is a tasteful fireplace and a parquet floor, two things which go far towards establishing an effective ensemble. In the library the cheery, homelike





atmosphere is preserved chiefly by means of a large bay window, through which the sun pours generously nearly all day and in the warmth of which all kinds of flowers thrive and blossom. A touch of dignity is lent by the columns between this and the living room.

The prevailing air of cheeriness extends into the dining-room, a large oblong place jutting out in the rear of the house. Windows on three sides admit a constant flood of light and sun; in one corner an attractive china closet is built, and the room is bordered by plate racks.

All three of these rooms, as well as the halls, are tinted, and the dining room is finished in burlap down as far as the plate rail. The ceilings are tinted in such manner as to harmonize with the woodwork, and, in the living room and library, heavy, old-fashioned beams stretching across the ceilings, give a rich, stately touch, which is not often encountered in houses costing as little as $5,000.

The remainder of the ground floor is given up to the kitchen and butler's pantry. The former is provided with a large cooking range, a white enamel sink and a spacious closet. The butler's pantry is compact and convenient, being fitted with the customary dresser and drawers.

One of the particular features of this floor is a platform connecting the main stairway with the back stairs, and forming what is known as "combination stairs," one of the most serviceable of devices in saving time and steps. The cellar is finished in concrete and has a complete steam heating apparatus, as well as coal and wood bins and storage space.

In the second story, there are four bed rooms, each large, airy, light and in every way sanitary; the two on the front of the house built out over the roof, thereby gaining a largely increased floor area. Each of these rooms have good sized closets and a splendidly arranged medicine chest is built into the corner of one of them.

The bath, sandwiched in between the two rear bed rooms, is of good size and has excellent ventilation through a large window. It is equipped with exposed plumbing, white porcelain-iron bath tub, an oval wash bowl of the same material, and an improved syphon closet. The woodwork is finished in white enamel, blending well with the fixtures. The floor is tiled, and the sides covered with metile, while the walls above are painted.

From this floor a staircase, uniform with that below, leads to the attic, which is floored and has one finished room, designed for the servant.

The windows on the first and second stories and in the attic are all fitted with hardwood wire screens, planned to stand more than the average amount of wear and tear from rough weather. The front and rear doors also have detachable screens, as have the cellar windows. Shades are provided for all windows, and the house is heated throughout, and lighted by both gas and electricity.

The exterior woodwork is painted two coats and the shingles then stained. Inside the woodwork in all the main rooms is stained, in mission finish, in dull brown, greens, and Flemish. Throughout are parquet floors, the whole combining to make a house of as much solidity as artistic effectiveness.

The detailed cost of this house was:

Carpenter work	$2,850
Masonry	925
Plumbing	325
Heating	300
Painting and decorating	210
Window screens	65
Gas and electric fixtures	85
Parquet floors	150
Electric wiring	65
Total	$4,975

A careful study of the accompanying plans will show how a few clever devices of the architect have caused a saving of nearly a thousand dollars, without detracting from the desirability of the house. Perhaps the most important is the extension of the second story over the piazza roof, thereby gaining a large amount of additional space at a saving of over two hundred dollars.

Another economical move was making one chimney serve for furnace, laundry, kitchen range, and fireplace. Lastly, the heavy beams in the library, which look so imposing and expensive, are nothing more than a part of the beaded floor of the rooms above. By allowing these beams to hang down, many square feet of plastering and a proportionate amount of outlay are saved.

A HUSTLING CONTRACTOR

By W. WEBB

BEING alert to the changes that are going on in our industry becomes one of the essentials that every carpenter, contractor or jobber should keep before him. If he understands and appreciates the fact that there is wisdom in doing things well, then he must appreciate the importance of making prompt deliveries, and of doing his work with alacrity. How to do this properly is one of the most important considerations that should be heeded by the man who has progressive ideas as to the conduct of his business.

He understands that when there is a contract to be let that unless he has been among the first in the field he will stand little show of gaining the reward of his labors. Once secured, however, the obligation of carrying out the tenets of the same demand more attention, and the greatest care. This includes all the details that are to become a part of the contract. One of these is in having the materials "on the job" with promptness. Upon this sometimes depends the future success of his undertaking. Let it become known that he is dilatory about this one matter, and the news will soon spread far and wide. It will be a source of annoyance and loss of business to him in all his future undertakings.

How is he to obviate this difficulty? By having his own team, is the most natural suggestion to make. Does he understand that the method of handling much of the modern day business is done along entirely different lines? With all due respect to the time honored horse, it is safe to assert that the day of this animal, for many purposes, is passing. Now the contractor who wishes to do hurry up work; to get material on the job with due haste, and who has no longer to depend upon the horse drawn vehicle, does so with his power wagon.

Does he understand that the motor wagon is replacing the horse drawn vehicle? That depends upon the way in which he views the trend of modern events. That depends upon whether he is a man of progressive ideas, or whether he is one who is still content to operate along the old ways of a generation age.

Time is now a factor that must be reckoned with in doing much of our work. It is as much the man who can do things quickly as can do them well that is in demand. If you operate a motor wagon in connection with your industry, the fact is soon made known to many, and the effect is at one like electrification. That means progress, and there is a certain prospect accorded the man who is a hustler.

The time, labor, cost and inconvenience saved by the contractor who uses a motor vehicle in his business is not to be compared with the opposite inconveniences that are met with by the man who still adheres to the old time methods. This is a fact that is worthy of consideration. The argument is made by some that the cost of operating a wagon of this type is too great to make it an advantageous mode of conducting that part of his business. How is the comparison when the cost of a horse, or a team is calculated? The motor wagon is only costly when in operation. The horse is still eating and still demands attention even after the work hours are past.

These are simply a few facts that have come to mind in the course of some rambles about cities and towns, and from observation of the methods that are pursued by the various contractors. It is always a notable fact that the man who is most prosperous is the man who takes the lead in doing things that count for the most in the end. It is observable that the man who is alive to the present day needs in the construction industry is the man who counts time as a factor that must be reckoned with, and who does not hesitate to adopt all means that will minimize and reduce such waste as is possible with means that are to be had if they are but sought out.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

(Continued from May.)

DEVELOPMENT OF SURFACES.

THE process of unfolding the surface of an object, such as the coverings for the surfaces of solids, etc., and laying it out on a flat plane is called development of surfaces. It will be found a very interesting subject and one with which the student should become thoroughly familiar. It is suggested as a means of more thoroughly understanding the subject that you develop and cut out some of these surfaces from cardboard so they can be folded up to form the exact model in which they are intended to represent.

Next we will develop the covering for this prism. Draw the bottom line of the prism over to the right and on it lay off 6 spaces, *qr, etc.*, equal to one side of the prism, or *op*. Draw vertical lines up from these points and project points *a, b, c* and *d* over until they intersect these lines as shown in *s, t, u, v, etc.* By connecting these points we have developed the covering for the side of the prism. The bottom is the same as the bottom of the prism, so it is drawn in as shown. The top is the same as that developed at A and for convenience is drawn in at the highest point of the covering. Here we have *vw* equal to *kn*. With *v* as center and *vw* as radius

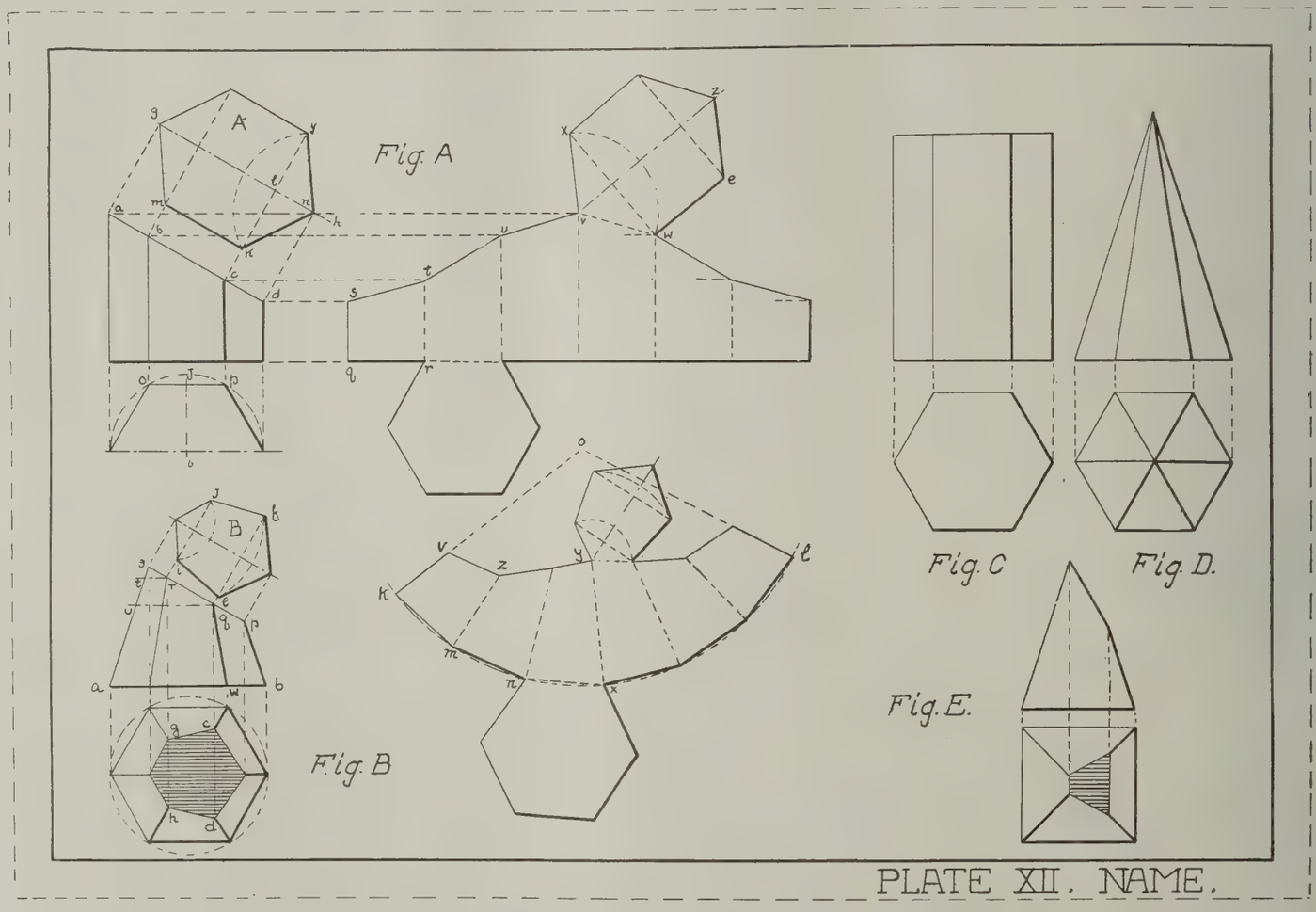


PLATE XII.

DEVELOPMENT OF SURFACES.

In Fig. A we have the hexagonal prism whose top is cut off at an angle of 30 degrees to the horizontal. First draw the half-plan and the side elevation, remembering that each side is equal to the radius of the circumscribed arc. Cut the top off at an angle of 30 degrees as shown in the drawing. It stands to reason that the sloping top of the prism will not be the same in shape as the bottom, so we must find its exact shape in order to determine the shape of the covering we wish to put upon it. We will view it at right angles to its surface and the result is shown at A. To draw it correctly, project points *a, b, c* and *d* at right angles to *ad*. Draw the center line *gh* parallel to *ef*. Set *kl* off equal to *ij* and draw side *km* parallel to *gh*. With *n* as center and radius equal to *nk*, draw the arc as shown and complete the view by connecting the points located.

draw the arc as shown. Make *wx* equal to *ky* and draw *vx*. Bisect angle *wvx* by the center line which should be parallel to *wx* if properly done. Make *we* equal to *mk*, and parallel to the center line. Draw *vz* equal to *ng* and finish the development.

In Fig. B we have the frustrum of a hexagonal pyramid, the top being cut off at an angle of 30 degrees to the horizontal. Construct the prism as shown, starting with the plan view. To draw this, first construct the hexagon and then draw diagonals from opposite corners of it. Project the point where they cross in the center up to form the apex of the pyramid. Project the corners of the plan up to the base line *ab* and connect these points with the apex. This forms the pyramid. With the 30 degrees triangle cut it off as shown and project the points of intersection with the sides down to the plan where they will cut the diagonals. When these points are joined we will have the plan view as shown. The section lines are put on for the sake of clearness. The sloping top at B

is developed in the same way as the one at A, remembering that *cd* is equal to *ef* and *gh* equal to *ij*.

To draw the development, first draw the arc *kl* with a radius equal to the length of a true side of the pyramid as from *a* up to the apex. Bear in mind that this side would be longer than from *w* up to the apex as you are looking at the latter as it slants away from you. Next lay off *km, mn,* etc., equal to a side of the base of the pyramid. Connect these points with each other and with point *o*. Continue by laying *kv* off equal to *bp* and *wx* equal to *as*. As we said before, *wg* is not viewed in its true length, but if it is projected horizontally over to *as,* a side that is shown in its true length, we obtain it exactly as it should be in the line *au*. Then lay *mz* off equal to *au*. Do the same with point *r* and *at* gives its true length. Lay this off on the development and repeat all of these lengths on the other side of *xy*. Connect these points. The covering for the top is put on in the same way as the covering for the prism and the bottom is self-evident.

On another sheet, or two, develop the surfaces for the solids shown in Figs. C, D, and E. Fig. C is a hexagonal prism, Fig. D a hexagonal pyramid, and Fig. E the frustrum of a square pyramid. No difficulty should be experienced in the working out of these problems as they are much more easily solved than the ones already explained.

In Fig. B is given a hollow cylinder whose top is cut off at an angle of 30 degrees, and the surface development of the same. Draw the plan and the side elevation and divide the plan up the same as was done in the case of the cone. Project points *1, 2, 3, etc.,* up until they cut the top of the cylinder as at *a, b, c, etc.* Draw the base line of the development *de,* and on it lay off the twelve equal spaces. Draw the verticals up through these points and project *a, b, c, etc.,* over until they cut these verticals. This locates points *f, g, h, etc.* Through these points draw a neat irregular curve, as shown.

Fig. C presents a problem. Here we have a cylinder, its top being cut off at an angle of 45 degrees. It is required to draw its development. As seen at A, a perpendicular view of the face takes the form of an ellipse. The method of locating the points shown on its edge, through which the curve is drawn, is left for the student to solve with the help of the numbers given. Notice that *ab* is perpendicular to the sloping top, and *cd* perpendicular to *ab*. The covering is developed in the same way as the one in Fig. B, but with the addition of the top and bottom as this cylinder is solid.

Fig. D is the drawing of a three-piece elbow. Only the side elevation is here given. The development of it is required. Draw the indefinite center line *ab* at an angle of 45 degrees, and draw *cd*

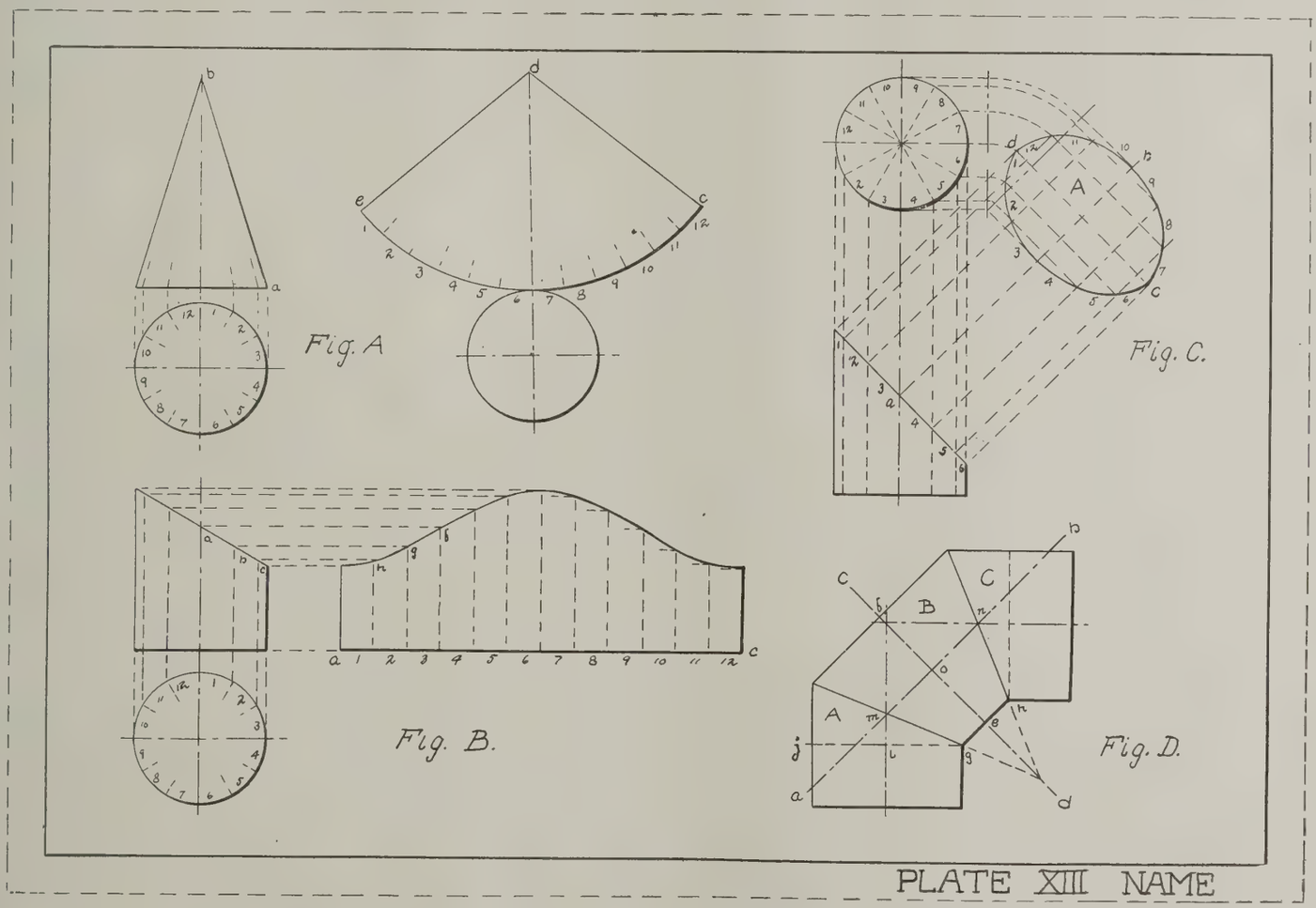


PLATE XIII.

DEVELOPMENT OF SURFACES.

On this plate we have a few problems in the development of cylindrical surfaces. There is a great similarity between these and those on Plate XII, but extreme care should be used in working them out.

In Fig. A we have a cone and its development. First draw the plan and elevation, making it any height desired. Next divide the circumference of the plan into any number of equal parts, in this case we have taken twelve. Next set the compass point at *a* and with a radius equal to *ab,* the slant height of the cone, draw an arc. Connect one end, as *e,* with *d* and with the dividers lay off the twelve spaces as shown, each equal to one of the divisions on the circle. It is easily seen that the more spaces the circle is divided into the shorter the arc between the points becomes, hence the nearer *ce* would approach to exactness. Connect *c* with *d* and finish the development by putting on the circular bottom.

at right angles to it. Lay off from *o, oe* and *of,* each equal to half the diameter of the pipe. Supposing *gh,* the length of the shortest element of the center piece known, draw through *e* a line parallel to *ab,* and set off the distances *ge* and *eh,* each equal to half this length. From *g* draw the horizontal *gj* and set *ig* and *ij* off equal to *eo*. Draw the verticals through *g* and *j* and through *f* draw a line parallel to *ab*. This gives us the intersection of the bottom piece with the center piece. The top piece is drawn in exactly the same way, working from the center lines of each member.

The development of this pipe is easily worked out if sufficient care and forethought is exercised in so doing. Pieces A and C are alike and are developed in the same way as the piece in Fig. B. Piece B is similar but it has the curve on the top and bottom. In developing it, it must be separated from the main body so that *cd* is a horizontal line.

(To be continued.)



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

ESTIMATING BY THE CUBIC FOOT.

From "Estimator," Yonkers, N. Y.

In reply to J. L., Staples, Minn.

In estimating the cost of building by the cubic foot method, the entire cost is comparative only; the contractor should make it a point never to use this method when he has time to take off the quantities in detail.

As a means of checking an estimate, it is an excellent method, but there are so many details entering into the construction of a building that it requires considerable experience to know what unit price to put upon the several structures.

As you will note in the July number, the price for cubic feet for cottages varies from 3c to 14c, all depending upon the detail of finish and construction.

In each of the prices quoted, you will note a difference in the construction and finish, which causes a difference in the prices.

As a general rule, a building is figured complete, including basement, walls, floors, roof, interior finish, painting, etc. The construction and finish being what is ordinarily settled in a building of that particular character. In taking the measurements for estimating by the cubic foot, it is the practice to measure about one foot below the basement floor and up to a point two-thirds of the distance from the eaves to the roof or to the ridge for the height, and to take the average for ordinary size on the ground for the other two dimensions, disregarding balconies, porches, chimneys, etc., unless they are of such a character and size as to make it necessary to include them.

If you will check up the cubic feet in the buildings you have erected and compare with the cost, you can easily find just what these buildings have cost per cubic foot, and this will give you a good basis for comparison for future work.

You can also figure the cubic contents of the various plans which have appeared from time to time in THE NATIONAL BUILDER, compared with the estimated cost, which will also give you an excellent basis for calculation.

STEEL SQUARES.

From Wm. P. T. Trenton, N. J.

Young framer, of Seattle, Wash., has evidently gotton hold of one of the real good, old framing squares of fifty years ago. The eagle square was made in Troy, N. Y., and was the standard square for many years, and I might say, that away back in the fifties it was every young carpenter's ambition to own a good eagle square, and in those early days, when dollars were as difficult to get as gold eagles are now, it was quite an event to purchase a reliable steel square. The old square was strong, true and very reliable, but, of course, the figuring and rules on it were antiquated, and difficult to understand. The Sargent square, No. 100, is very much superior in makeup, figuring, finishing and tables, and is very much better for present use than the good old Eagle. The square made by the Nichols Company of Ottumwa, Iowa, is another good square, and possesses many features that add to its value. One feature is that the corners of the square, including the ends of blade and tongue, are hardened, as hard as steel can be made, a process that prevents wear on the corners. This firm is also manufacturing a square in which the tongue can readily be disconnected from the blade, thus enabling the tool to be stowed away in a very small space. The square also carries a table on its surface, for getting the cuts, bevels and lengths for braces, rafters and hips.

LUMBER SYMBOLS.

From T. N. B., Chicago, Ill.

I reply to H. A. B., Cleveland, Ohio, with regard to lumber signs, the expression 18,803 8 in. No. 122 siding means, 18,803 square feet of No. 1 double V siding, 8 inches wide.

The expressions, 12/10, etc., are to indicate the numbers and lengths in which the material is to come. That is twelve pieces ten feet long, etc.

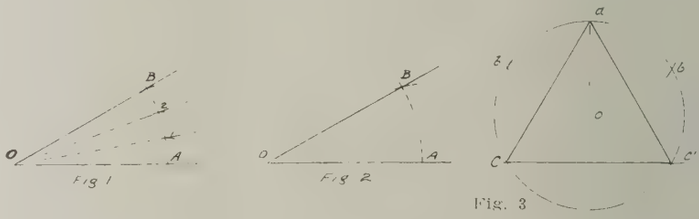
The expression S1S1E means that the lumber is surfaced or planed on one side and one edge, the other two surfaces being just as they came from the saw.

DIVIDING ANGLES.

From "Draftsman," Chicago, Ill.

In answer to W. G. L., New Haven, Conn.

There are several mechanical methods of dividing angles into several parts, but the simplest and quickest method is to describe an arc through the angle, using as long a radius as possible. With the dividers, space off the arc into the required number of parts and draw lines from the center "A" to the subdivisions.



FIGS. 1 AND 2.

To lay off a given angle, draw an arc, using the same radius as before. With the dividers or a compass, measure off the arc of the given angle and lay off this distance on the second arc.

To inscribe an equilateral triangle in a circle. In the given circle, Fig. 3, draw a line *o a* from the center to the circumference. Lay off this distance twice from *a* to *b* and *c*, and from *a* to *b'* and *c'*. Through the points thus found, *c* and *c'*, draw the lines to form the triangles.

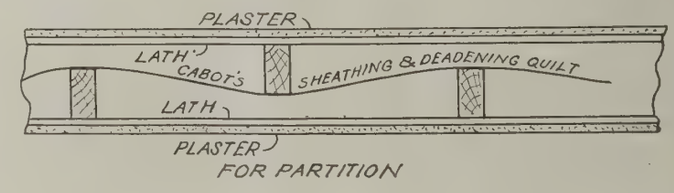
DEADENING FLOORS.

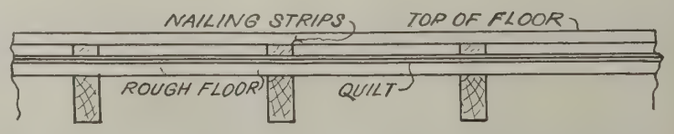
From "Builder," Chicago, Ill.

In reply to Fred, Flint, Mich.

The question of sound-proofing is rather difficult, as the sound may be carried through the air, or through the boarding of the floors and partitions. The method suggested by the manufacturers of Cabot's sheathing quilt is shown below. It will be noted that no part of the partition extends through, except at the top and bottom. This method should take care of any sound except that which originates on the floor. The same "Quilt" may be used between double floors, laying the quilt directly on the lower floor, and nailing the top flooring to strips which are simply laid on the quilt, care being taken that the flooring nails are not long enough to go through the strip into the lower floor.

"Linofelt," made by the Union Fibre Company, is a prepared deadener for the same purpose. Get the catalogues of these two firms and you will see the best way to use them.





QUESTIONS

HOSPITAL.

From a "Committee Man," Edmonton, Northwest.

I am one of a committee appointed to make inquiries, and arrange if possible for the building of a general hospital, and would like to get such information as will be of use to the committee in determining the "lay-out" of the building—which is to be of brick—and requirements necessary. It is intended to design the building so that it will serve a city of say 50,000 people and so arranged that at present it may serve 10,000 or 15,000 people, and can be added to as necessity requires. Any information or suggestions on the subject will be gratefully received.

MEASURING A CIRCULAR ARC.

From "Young Bricklayer," Dayton, Ohio.

Will some kind reader explain in this department, how to find the length of a circular arc, and oblige a new reader?

SIX, EIGHT AND TEN.

From "Country Contractor," Prairie Farm, Francis, Sask.

I have heard and read concerning a rule for squaring the foundation of a building by the use of a ten-foot pole from which the figures 6, 8 and 10 are used only. Please describe how this is done?

DAMP-PROOF WALL.

From "Plasterer," South Bend, Ind.

I wish to make a brick wall in a measure "damp-proof." There is less than fifty yards of wall surface, but at times, after rain in the spring and fall, it shows signs of dampness. Can I cure it by plastering it with cement, and if so, how will I proceed to get the best results?

TO DRAW AN ELLIPSE.

J. E. L., Shenandoah, Iowa.

Permit me to ask through your columns how to draw an ellipse, major axis 4½ inches in length, the minor axis 3 inches in length (with just a rule or square and dividers), the shortest and quickest way.

CUTS FOR DIFFERENT PITCHES.

From H. H., Emporia, Kans.

It would be valuable information to me if some one would explain how to get the different cuts and the lengths of the valley and cripple rafters; where, for instance, a third-pitch roof is joined to a half-pitch roof.

How do you get the cut for the foot of the common rafter of, say, a third-pitch roof running parallel with a half-pitch roof, and resting on the sheeting of the half-pitch roof? I want to know how to get these cuts with the steel square without making a drawing.

BUILDING A BALANCED RAILWAY.

From G. S., Clayquot, B. C.

I have to build a track to haul up provisions from the beach up on high land. The track will have about 2 inch rise a foot run. It will be a double track and one car filled with water. Shall on the down track pull up a load on the other. Now I would like the editor, or any other reader of THE NATIONAL BUILDER, who has had experience, to give his opinion if the scheme will work and if so, would like to have a plan how to arrange the drum and brake—in short, would like to have some information about it.

PLANS FOR GYMNASIUM.

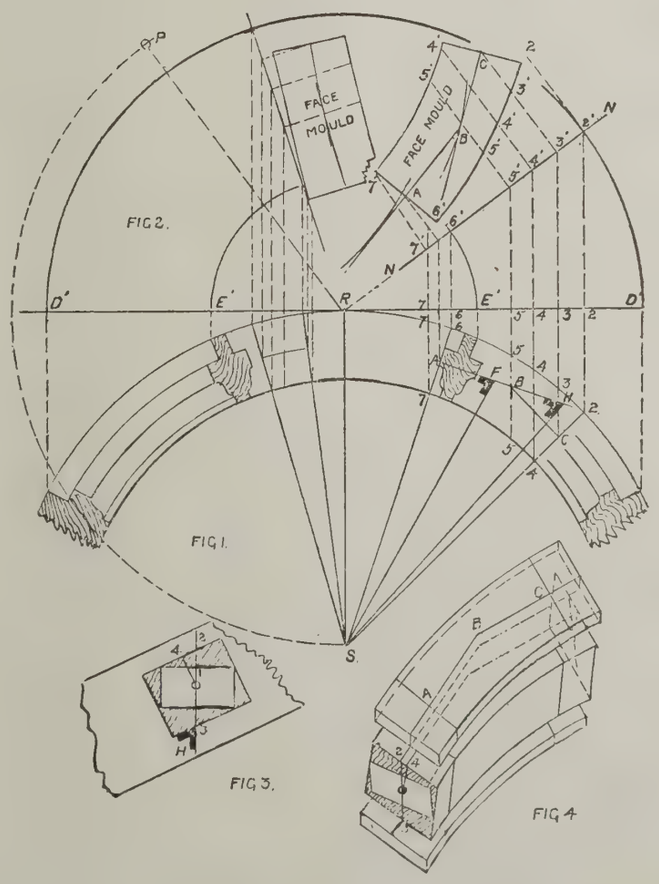
From J. W. A., Birmingham, Ala.

What is the usual floor space of a college gymnasium, where can I get any plans, especially floor plans for a gymnasium suitable for a college?

RADIAL BARS FOR CIRCULAR SASH

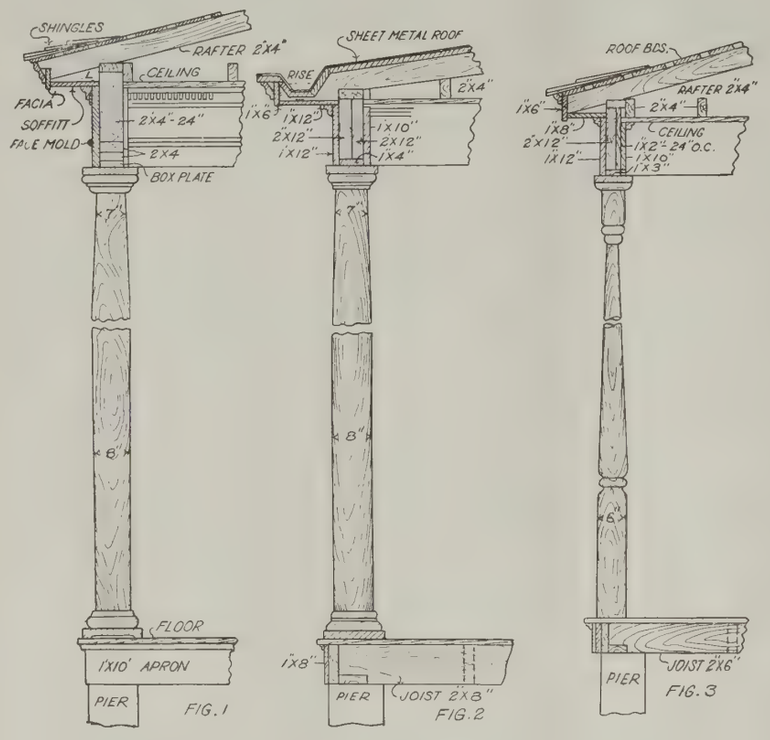
THE accompanying sketch shows a method of getting out the radial bars for a sash circle on plan and semi-circle in elevation.

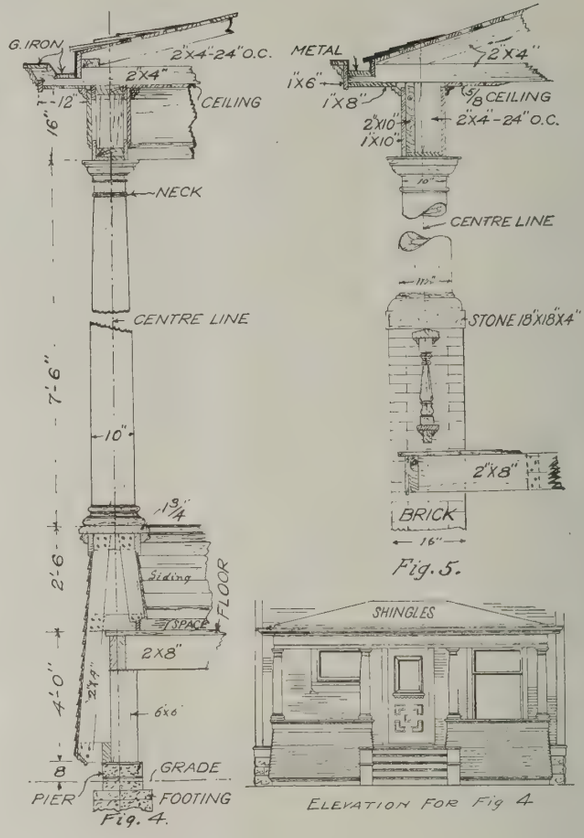
Fig. 1 shows the plan, and Fig. 2 the elevation above the springing. The semi-circle, D'D', Fig. 2, represents the rebate for glass, also the depth of the sinking of moulding on inside of sash. The shoulders on top end of each radial bar would fit against this. The semi-circle, E'E', will be the shoulders on bottom end of radial bars. N N represents the centre of lower bars. Make 2'2', 3'3'c, 4'4', 5'5', B5', etc., Fig. 2, equal corresponding figures, Fig. 1. Join A B and B C for tangents. Trace the outside of mould through 2', 3', 4', 5', 6', and the inside through 4', 5', 7'. Draw the lower joint through A square to A B, and the upper joint through c square to B C. A bevel for each joint will be required. From R draw the line R P square to N N, and make R P, Fig. 2, equal R S, Fig. 1. With P as centre, and for radius strike an arc to just touch the tangent, C B, on face-mould; with this distance in the compasses place one foot at S, Fig. 1, and cut either of the tangents on plan as shown at H. Then the required bevel is contained in the angle made by the lines AHS. Repeat the process for the joint at A, only touch the tangent A P on face-mould instead of C B. This bevel is shown at F. To find the thickness of stuff draw the bevel H across a piece of board (that being the sharpest of the two bevels), draw a square section of the bar square to this line, as shown by the unshaded part, Fig. 3; the shaded part shows the thickness of stuff. Leave a bit of stuff on each end of face-mould past A and C to allow for tenons. Cut the bars out to pattern of face-mould square through the plank, and mark the tangents on to it. Square the tangents across each joint as shown by 0 4, Fig. 3. Pass the respective bevels through the centre, o, as shown by 2, 3, Fig. 3. Draw lines on face of stuff from where the bevels cut the edge of joints parallel to tangents. The tangents on face-mould would be kept to these lines when applied for working inside and outside of bars. The application of face-mould on both sides of stuff is seen at Fig. 4. It is not necessary to describe the other bars, as they would only be a repetition.



FIVE STYLES OF PORCH DETAILS

BY STEVENSON





Porch building brings into play a great variation of details; when the carpenter is supplied with complete working plans and details for the job all these should be shown clearly.

There are, however, many cases where the carpenter is called upon to work out his own details and it is with this thought in mind that the writer offers the five sketches herewith shown, to aid the carpenter in this work.

I am not dealing with the platform and joist to any extent, as these are all pretty much the same in all cases and are fairly well understood by all carpenters.

What I wish to deal with mainly is the building of the box plates and cornice. Fig. 1 shows the frame for the box plate made with double 2"x4" at the bottom, and single 2"x4" on the top for plate, with 2"x4" struts cut at about 24" centers, the 7/8" facing boards being well nailed to this frame-work. L shows the bracket nailed to the rafter tail to form the lookout to receive the soffitt of the cornice; this is a good, suitable box-plate for a span up to 12'. Fig. 2 is two 2"x12", spiked together and cased in with 7/8" boards. This method should be followed for spans of 12' or over. Note the manner of framing for the gutter.

Figures 3, 4 and 5 are other methods that make very good plates for spans up to 12'. It must be remembered, however, that if the porch is to be a double decker, where a greater weight than the roof will be upon it, it must be made still stronger.

Figure 4 calls into play a little different detail at the base in order to provide for the splay in the siding as noted by the elevation, which the details clearly explain. Fig. 5 shows a brick pier above the top of handrail showing the detail of the rails and balusters.

A RIDGE VENTILATOR

BY F. W. LOASBY

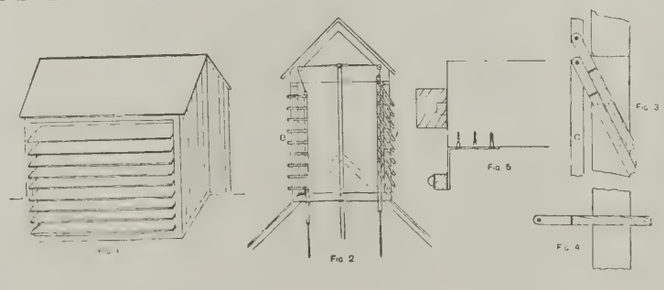
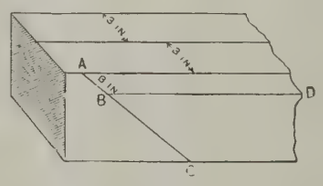


FIG. 1 is an elevation of a suitable roof ventilator, the dimensions being ruled by the size of the building to be ventilated. The framework is of 4½-in. by 3-in. pine posts, 6-in. by 3-in. sills, 4½-in. by 3-in. beads, the ends being boarded on the outside. The roof is similarly covered, and both are covered with zinc or other suitable roof covering. Fig. 2 is a section showing the louvres closed, giving permanent ventilation; on the opposite side they are open to the full extent. When the louvres are required to exclude ventilation, they are framed as seen in Fig. 3. Fig. 4 shows a louvre open to full; Figs. 3 and 4 are in section; Fig. 5 is a plan of the same louvre. On the edge at the end of the inside of the louvre boards are fixed angle iron brackets; the projecting ends are drilled to receive a small bolt by which each is secured to the operating rod C; this rod is of hardwood. To work the louvres a cord is attached to each end, and on the inside top end rail are fixed pulleys to receive the cords. In the center is fixed a double sheave lazy pulley, over which the two cords are passed, so that both sets of louvres are controlled over the same pulley. The position of the louvres being determined, the cords are secured to a cleat hook fixed at a convenient height from the floor; a cord fixed to the lower end of operating rod enables the louvres to be easily opened.

BACKING HIP RAFTERS



The enclosed sketch represents a stick 6x8, and the line A the foot of the rafter. Take half the face of the stick, which in this intsance is 3 inches, and mark from toe of rafter 3 inches along the line A. By this you have the point from which to draw the line B. This rule is correct every time.

STEEL SQUARE PROBLEMS

By J. E. NUITT

Being an interested and appreciative reader of the BUILDER and interested in steel square problems, as discussed therein, especially as applying to hip roofs, etc., I herewith forward some problems relative thereto, and hope some of your readers may gather some light on what is generally a puzzle to the "prentice" hand, or to that vast army who "just look it up." Abe Lincoln said that a "man's legs should be long enough to reach the ground," and should as sound principles admit of universal application, a hip rafter must be long enough to reach the common rafters at the right place, and cut in the right way to fit; and if the learner can be induced to consider one end of a hip roof as consisting of four triangles whose bases are the plates of the building and whose apex is the point where they join the peak of the common rafters, and comprehend the fact that the length or shortness of the triangle is determined entirely by the pitch of the common rafter, he will have the key to the situation.

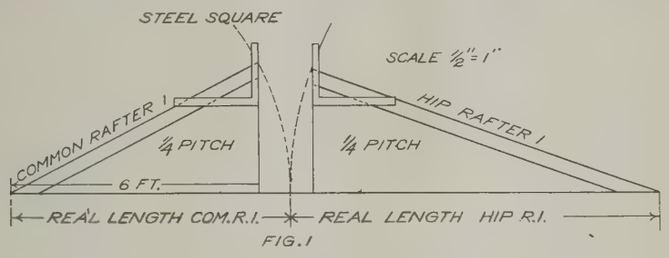


FIG. 1

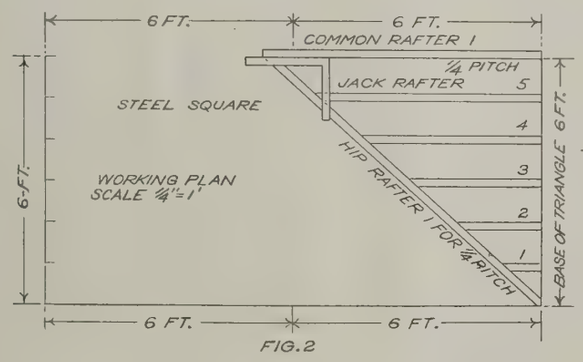


FIG. 2

I think it will be plain to anyone by the figures herewith shown, how to get the side cuts for both hips and jacks; also their lengths. They are just the same. This is to say, of course, that the side cut for the one-third pitch, for instance, is the same for that series of hips and jacks, while the plumb and bottom cuts for the jacks are the same as for the common rafters for one-third pitch.

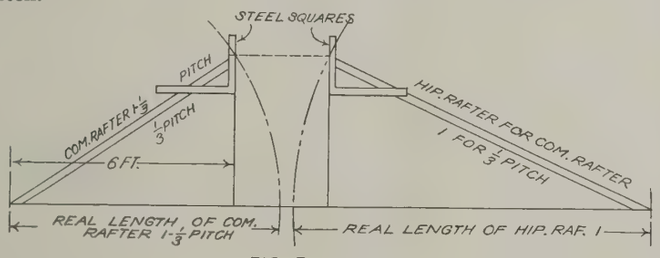


FIG. 3

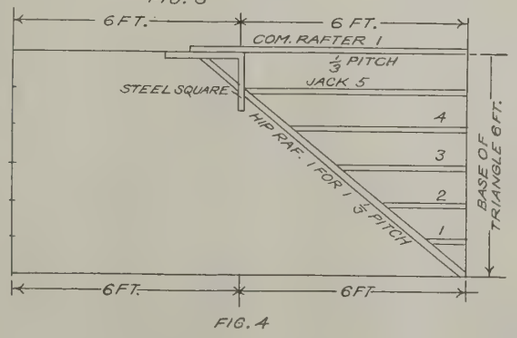
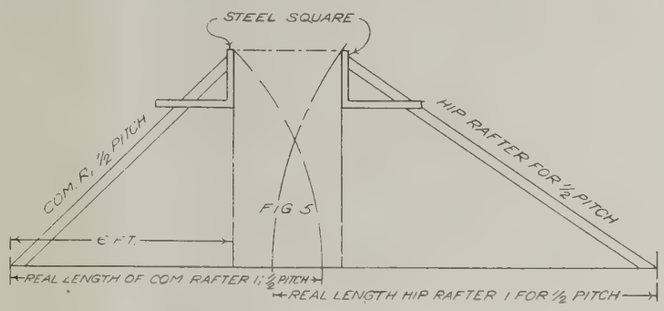


FIG. 4

Now, there are few practical facts about the square, which are very useful to know in connection with these problems. For instance, the cut for a quarter pitch is 6x12 for the common rafters. Now, as 12 is to the common rafter, so is 17 to the hip rafter, so long as the hip is square or regular. So then, as the cut for the common rafters for one-quarter pitch is 6x12, then the cut for the hip rafter is 6x17. Again, as the cut for one-third pitch is 8x12 for common rafters, the hip cut for same would be 8x17. Still again, as the cut for one-half pitch is, of course, 12x12, the hip cut for same is 12x17. But, Bulwer says, "We must first conjecture before we can experiment, and experiment before we can discover," so the novice will learn more by going to work than by any other means. None the less, others who have gone before have discovered many valuable facts and things which the beginner in any line will do well to avail himself of.



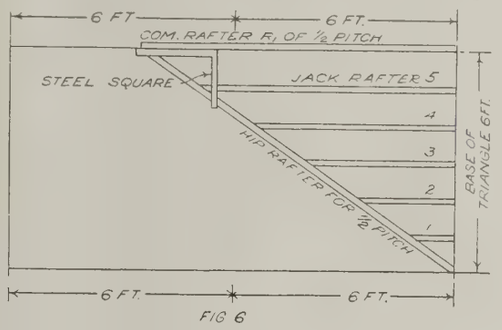
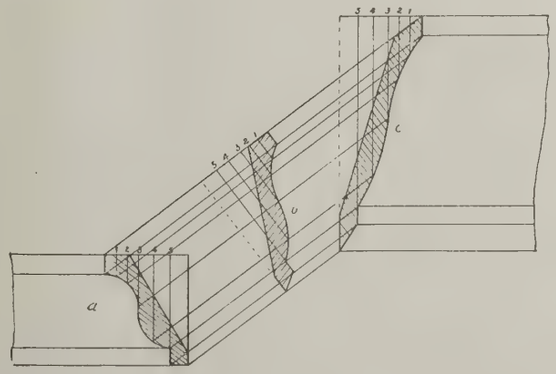


FIG 6

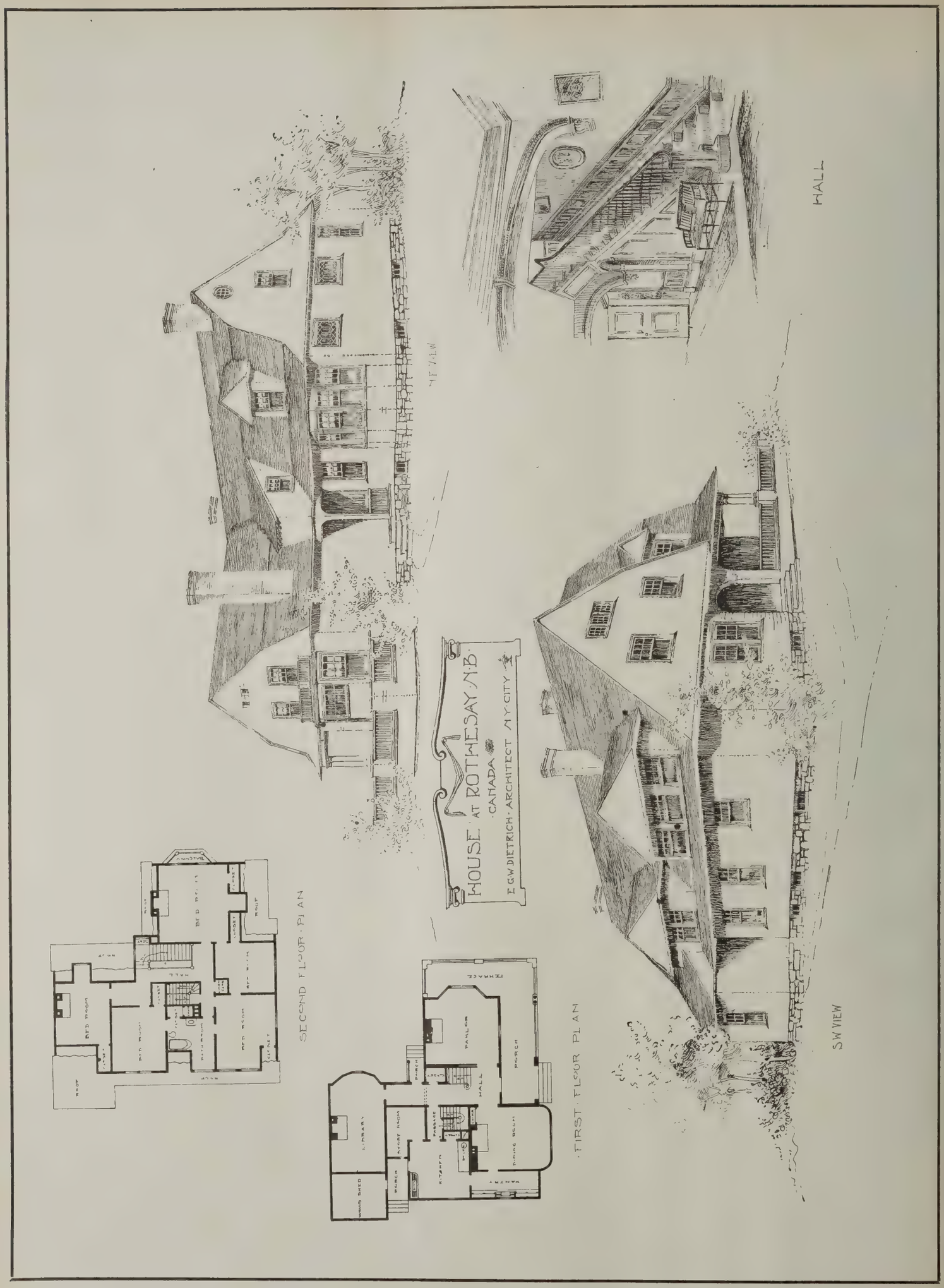
The steel square is shown in the "working plan" as laid across top of hip to give side cut for hip. Of course, this is also side cut for jacks. The horizontal view can hardly need explanation. The cuts can just as well be got with bevel rules, and for practical working, two bevel rules—one set for the side and the other for plumb cuts—are very handy, and I have found it very convenient to bolt two or more boards together upon which to draw the working plan, generally 1 in. to foot measure, and work the length for every piece. It is obviously necessary to draw only one-fourth of roof or one triangle, as shown in sketch.

If the operator will draw his plan and scale correctly, he will have but little measuring to do, and as for the square, he can lay that aside when he goes to frame his stuff, provided he has made his plan and can refer to it at a glance.

DEVELOPMENT OF A CIRCULAR MOLDING



Here is a bent sprung molding laid out to stand over the inside of a circle, and this time the development is made above the ceiling instead of below it. The reason for this is quite simple, although it is not always apparent at first thought. In the first example the top of the molding occupying the larger circle when in position must come on the long side of the blank, as shown at b o, while in the second case the top of the molding must necessarily conform to a smaller circle than the bottom and must be laid out on the shorter side of the blank, as shown at a b.


HOUSE AT ROTHESAY N.B.
CANADA
E.G.W.DIETRICH · ARCHITECT · N.Y. CITY
SECOND FLOOR PLAN
FIRST FLOOR PLAN
HALL
PARLOR
PORCH
LIBRARY
DINING ROOM
KITCHEN
PANTRY
TERRACE
SW VIEW

BOOK NOTICES

(Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

ALADDIN HOUSES.—"Direct from the forest to the home"—"Houses built in a day." An illustrated pamphlet published by the North American Construction Company, Bay City, Michigan.

This is a "lively" little pamphlet, showing some 150 plans, elevations, interiors, and detail illustrations of "knock-down" summer cottages and bungalows, varying in cost from $185.00 to $1,750.00. The prices named are for houses complete and ready to occupy, including all materials, painting and plastering. These prices are often less than the cost of the rough material.

MAPLE, BEECH AND BIRCH FLOORING.—Being the official maple flooring book containing concise and authentic information for architects and builders concerning the characteristics and uses of maple, beech and birch flooring. This is a handsomely gotten-up little brochure, well illustrated with colored pictures of various trees in their natural homes and conditions. It is published by The Maple Flooring Manufacturers' Association, 1308 Rector Building, Chicago.

CONCRETE REFERENCE BOOKS: Practical Silo Construction—Number 3 of the Series; being a treatise illustrating and explaining the simplest and easiest practical methods of constructing Silos of all types; with unpatented forms and molds. The data, information and working drawings given in this book should enable the concrete worker to successfully construct any of the most practical types of concrete Silos in use at the present time. 70 pp., limp cover, a score of practical illustrations, published by the Norman W. Henly Publishing Company, New York, N. Y., 122 Nassau St. Price, Postpaid, 50 cents.

The work is by A. A. Houghton, the well known writer on matters of cement and concrete.

This series of reference books are all terse and simple on the subjects which they discuss, and cannot fail of being mighty useful to all those who are in any way engaged in cement and concrete work of any kind, and who may be fortunate enough to own all, or one of them, as they are practical, up-to-date, and presented in simple and understandable English.

The series consist ot twelve numbers, two of which were noticed in these columns a few months ago. The numbers now issued, and before me as I write, are No. 1, Concrete Wall Forms; No. 2, Concrete Floors and Side-walks; No. 3, Practical Silo Construction; No. 4, Molding Concrete Chimneys, Slate Roof Tiles; No. 5, Molding and Curing Ornamental Concrete; No. 6, Concrete Monuments Mausoleums and Burial Vaults. The serials are all uniform in size, well illustrated, well printed on good paper, in good sized type; and will be sent to any address in the United States or Canada postpaid on receipt of price, either from the publisher's office, or from the office of this paper.

THE GYPSUM INDUSTRY.

[From Consul General Robert P. Skinner, Hamburg, Germany, together with data from advance chapters of United States Geological Survey publications.]

Pure gypsum is a hydrous lime sulphate having a chemical formula $CaSO_4.2H_2O$. Few deposits of rock gypsum large enough to be worked for plaster are, however, even approximately as pure as this. Gypsum, as excavated for a plaster plant, will usually carry varying and often high percentages of such impurities as clay, limestone, magnesian limestone, iron oxide, and silica. Where the material occurs in an earthy, granular condition, it is known as gypsite, and this form of the mineral may carry 10 to 20 per cent of impurities.

Process of Preparation.

Gypsum loses the chief part of its content of water when heated to 110° or 120° C., and is completely dried when the temperature is brought up to 170°. The burned gypsum, not entirely relieved of its water, hardens when mixed with water, the peculiarity which renders it so valuable. When the burning process is continued until less than 3 per cent water remains it is known as "dead-burned gypsum." All of the burning processes require a completely even heating of the material, especially if the pieces are large and of unequal size. When small quantities are being prepared they may be burned in iron ovens, after having been pulverized, this heating being continued until a metal plate held over the ovens no longer accumulates drops of water.

When large quantities are being prepared, the gypsum is burned in ovens in which the gases from the fire are prevented from coming into contact with the material. To obtain the finer products, the ovens are heated indirectly, or the necessary temperature is obtained with a wood fire, the ashes of which are removed, as in a bake oven, before the gypsum is put in place. Modern ovens are now on the market which provide for a convenient and economical handling of the raw material, which is manipulated in accordance with the above principles.

As it is much easier to crush dried gypsum than the natural rock, a process is used, where the manufacture of large quantities is concerned, which admits of the burning of pieces of considerable size. The pieces are first slightly heated and then crushed, and the powder subsequently reburned. By this method a quick-hardening material is obtained which is suitable for stucco work, plastering, or modeling processes. For the manufacture of the slow-hardening material, which is used for building purposes or laying pavements, the mineral is first heated to incandescence, after which it absorbs water very slowly, but after the expiration of a few weeks becomes very hard.

Production in the United States.

The quantity of gypsum mined in the United States in 1909 was 2,252,785 short tons, an increase of nearly 31 per cent over the production of 1908, which was 1,721,829 short tons, and an increase of more than 28 per cent over that of 1907, which was 1,751,748 short tons. The gypsum sold without calcining and used principally as land plaster and as an ingredient in Portland cement and in paint showed a large increase in quantity but a loss of about 11 cents per ton in value; but the material calcined for plaster showed both a large increase in quantity and an increase of 30 cents per ton in selling price at the mills. The total value of gypsum and gypsum products in 1909 was $5,906,738, as compared with $4,075,824, an increase of $1,830,914, or 44.9 per cent.

Exports and Imports of Gypsum in Germany.

The gypsum exported from Germany amounts to nine times the quantity imported. Of the imports, one-half is from France and consists of very special grades. The price realized on gypsum shipped into Germany will depend wholly upon the quality of the article offered.

THE MOST DIFFICULT BUILDING REQUIREMENTS TO MEET.

EVERY man that has been in the building and contracting business long, probably feels that he has been up against some pretty severe restrictions and specifications at times, and up against some requirements that were pretty hard to meet. Some have found it in connection with requirements for fireproofing, others have found it in the exact government specifications, some in one way, and some in another, but when it comes to a show-down, it is doubtful if any builder in the United States has ever been up against what is really the hardest requirements to meet in erecting a building. That may sound like drawing it pretty strong, but what would you say if you were required to put up a building proof against earthquakes, tornados, and fire?

That is what they have to contend with down in the Island of Martinique, where, it will be recalled by many, there were some disastrous earthquakes and volcanic eruptions a few years ago, and where there is ever recurrent disasters due to earthquakes, hurricanes, and volcanic eruptions. There has been trouble ever since the country was settled by the first French colony, and the one idea all the time has been to construct an edifice to withstand the hurricanes and earthquakes, and be as nearly fireproof as it can be made. They have tried a great many experiments down there, and now, according to a report from Consul Thomas R. Wallace, they have found the plan that is in pretty general use at the present day to be about the best thing along this line that it is practical to construct.

Here is how they do it: The buildings in the cities are mostly two stories with dormer windows in the attic, but no cellars. Wood frame construction is resorted to, that is, a sort of mill construction in which some fairly heavy framing is used, and it is very carefully and thoroughly braced and trussed. The corner posts are bolted to the sills and joists, with iron bars and rods, and virtually two sets of framing are put up for the lower floor. The spaces between the studdings on the first floor are filled in with stone and mortar, making a wall about 20 inches thick, which is faced on the inside with boards attached to a framework of wood. In other words, it is practically the same as if one should put up a very substantial false work to carry a concrete wall 20 or 24 inches thick, with the framework on the inside of the wall, and the boards making the outside and just leave it stand. Only, instead of regulation concrete, they seem to use merely stones and mortar to get weight and body, but they still want the wood and its bracing and bolting together to withstand the shock of earthquakes.

In other words, a stone or concrete or other hard material building, while it may stand hurricanes and be more nearly fireproof, it seems that it is more liable to damage through eruption and earthquakes than one in which there is a reinforcing frame of timber to hold it together.

The upper stories are constructed with what seems to be a double set of studding or extra heavy framing without any stone or mortar filling.

The walls are 10 or 12 inches thick and the studding is simply dressed and planed and not ceiled on the inside. There are iron bolts passing through the studding in the outer wall and big iron washers on the outside to hold the wall and the frame together firmly.

For the flooring inch stock is used generally in wide units dressed both sides and matched. The floor of the second story forming the ceiling of the lower story like the old pioneer houses in this country. The partitions are made of practically the same stock, but instead of extending clear up to the ceiling, they stop about 1½ feet short of it and the space is filled with an iron trellis to permit a free circulation of air.

There is very little window glass used, naturally, for hurricanes and earthquakes continually break it out. Doors and shutters are made with movable slats, of the type we know here as outside blinds, and often there are additional outside doors, like our stormdoors, to close up for security at night. It is the slats in the doors and shutters, however, that are depended upon during the day for both air and light.

The country houses are generally lighter in construction. They are made one story of frame surrounded by a veranda or porch with quite a lot of iron used for support and railings around the verandas.

Strange as it may seem, tiling is the general roofing material with them. It seems odd, too, where lumber enters so extensively into the building operations, for we generally associate tile with stone or brick buildings and wood shingles or other lighter material with the frame buildings.

Evidently, however, they need the fireproofing qualities of the tiling down there. Anyway, it is said that tiling is used more than any other roofing, but some slate and metal roofing and a few metal cornices may be seen.

BUILDING TRADES INTERESTS IN THE COURTS

A materialman has no lien for glass broken before any attempt to use it in the building, and the owner of the building cannot be held for the loss.—Pittsburg Plate Glass Co. v. Leary, v. 126 N. W. (S. D.) 271.

Under the provisions of the mechanics' lien law the "owner" of real estate on whose interest a mechanic's lien will attach is the person for whose immediate use and benefit the building, erection, or improvement is made.—Johnson v. Soliday, 126 N. W. (N. D.), 99.

While an employer may employ contractors to do the work which the law requires of him, he cannot delegate to them the exercise of that care which the law imposes upon him personally.—Winslow v. Commercial Building Co,, 126 N. W. (Iowa) 173.

A mechanic's lien will not attach to the interest of a vendor under an executory contract of sale whose vendee is in possession, and who makes improvements by erecting buildings on the real estate covered by such executory contract.—Johnson v. Soliday, 126 N. W. (N. D.) 99.

Where the obligation of a building contract survived the contractor and was binding on his estate, his surety in a bond conditioned on the performance of the contract was bound to the performance of the contract after the death of the contractor.—MacDonald v. O'Shea, 108 P. (Wash.) 496.

Where the employment of a superintendent for the construction of a building was necessary in view of the character and size of the building, the administrator of the contractor could employ a superintendent, and the surety of the contractor was liable therefor.—MacDonald v. O'Shea, 108 P. (Wash.) 436.

A building contract stipulating for the certificate of the architect as to whether breaches of contract have occurred, or whether payments are due under it, requires the party seeking damages for a breach embraced in the stipulation to allege and prove that a certificate was given.—Heidbrink v. Schaffner, 127 S. W. (Mo.) 418.

A contract for the erection of a building on sloping ground, higher in the front than in the rear, which stipulates that the foundation wall shall be four feet below the ground, is not complied with where the foundation in the rear is placed on the surface of the ground, and the contractor, by filling increases the level of the ground two feet above the bottom of the foundation.—Villhauer v. Gross, 122 N. Y. S. 520.

A building contract stipulating that the parties for themselves, their heirs, executors, administrators, and assigns agree to the performance thereof is binding on the administrator of the contractor; it not being contemplated that the building should be the product of the contractor's personal labor or skill either as a laborer, mechanic, or artist.—MacDonald v. O'Shea, 108 P. (Wash.) 436.

A surety on the bond of a building contractor, conditioned for the performance of the contract, stipulating that the contractor shall protect the property against liens, may pay lienable claims before the expiration of the time for filing the liens without waiting for the filing of the liens, and hold the contractor or his estate liable therefore.—MacDonald v. O'Shea, 108 P. (Wash.) 436.

Where the vendee in an executory contract for the purchase of real estate is in possession and erects buildings thereon, in which the vendor has no interest except by reason of his holding the legal title as security for the purchase price, and when such vendor is not a party to the purchase of the material or the construction of the improvements, the question of his knowledge of or consent to the furnishing of material or the making of the improvements is immaterial.—Johnson v. Soliday, 126 N. W. (N. D.) 99.

A contractor, in a building contract which stipulated that the owner on obtaining a certificate of the architect might terminate the contract and complete the work, and that the expense incurred by the owner should be audited by the architect, whose certificate should be conclusive, gave a bond conditioned on his performance of the contract. He abandoned the work, and the owner completed it and sued on the bond for the cost of completing the work. Held, that the owner need not allege and prove that the certificate had been given as to the expense of completing the work.—Heidbrink v. Schaffner, 127 S. W. (Mo.) 418.

A building contract, providing that the owner on a certificate by the architect of the contractor's failure to perform any of the agreements may, on three days' notice, terminate the contract and complete the work, and that the expense incurred by the owner shall be certified by the architect, whose certificate shall be conclusive, does not provide against the contingency of abandonment of the work by the contractor, and where the contractor abandons the work the owner may complete it without obtaining the architect's certificate; the word "agreements" being synonymous with the word "stipulations."—Heidbrink v. Schaffner, 127 S. W. (Mo.) 418.

In proceedings to enforce a mechanic's lien for installing the plumbing and part of the heating apparatus in a building, the contract relied on consisted of the plans and specifications, the written bids, and the oral acceptance. The plans and specifications provided that the contract, when awarded, would be for a perfect job, even though every item required to make it such was not specially noted in the drawings or these specifications, and that the contractor should furnish all labor, tools, and appliances necessary to complete his work according to these specifications and perform the work in a true, workmanlike manner in every particular so as to provide the building with a durable and mechanically perfect system. Held, that the contractor was only required to prove substantial compliance with the plans and specifications in order to be entitled to a lien, and he cannot be held responsible for any fault in architecture, but only for faulty workmanship or material, or failure to comply with the plans. —Ruddy v. McDonald, 91 N. E. (Ill.) 651.

The mere delivery of material by a subcontractor to a contractor at the latter's place of business, the latter never incorporating it in the structure for which it was bought, or even delivering it on the premises or to the control of the owner of such structure, is not a "furnishing" of the material for, in, or about the construction of the improvement, within St. 1898, §3315, giving the subcontractor a lien for materials so furnished; the intent in that respect being shown by the concluding sentence, imposing penalty on a principal contractor, who without consent of and with intent to defraud a subcontractor uses, or causes to be used, material for an improvement other than that for which it was represented to be bought.—Francis & Nygren Foundry Co. v. King Knob Coal Co., 126 N. W. (Wis.) 39.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

991,416. Sash-fastener. J. H. Bobbitt, Holstein, Neb.

991,371. Door check and closer. Jos. C. Reganassor, The Yale & Towne Mfg. Co., Stamford, Conn.

991,941. Chimney-top. Fred L. J. Boettcher, Washington, D. C.

991,768. Fire-escape. G. Busat, San Francisco, Cal.

991,605. Fireproof shutter. R. E. Byrne, assor. ½ to J. R. Cameron, Ottawa, Ontario. Can.

991,971. Reinforced concrete construction. Secondo Giletti, San Francisco, Cal.

991,635. Mold for concrete walls. A. C. Nielson, Chicago, Ill,

991,890. Sliding-door lock. Chas. F. Ritchel, assor. G. E. Greenbaum, New York.

991,755. Adjustable concrete form. B. F. Selbert, Mansfield, O,

991,674. Door-step. H. G. Voight, assor. Russell & Erwin Mfg. Co., New Britain, Conn.

992,733. Concrete construction. J. E. Gonzelman, assor, Unit Construction Co., Wilmington, Del.

992,554. Locking mechanism for emergency-exit doors. Edw. A. Freed, assor. 1-3 to F. Lundin and 1-3 to C. J. Forsberg, Chicago, Ill.

992,257. Fire-escape. D. J. Roche, Chicago, Ill.

993,227. Cellar door hinge. Jos. DeRose, Paterson, N. J.

992,760. Window screen. Chas. F. Dudley, Reading, Mass.

992,781. Door-operating device. Theo. P. Lallance, Huntington, W. Va.

992,812. Fire-proof door. Thos. P. Shean, Chicago, Ill.

992,996. Door-check. A. Stephan, Point Mills, Mich.

993,127. Wall construction. Robt. Tinsley, assor. The Pullman Co., Chicago, Ill.

PACIFIC COAST LUMBER MANUFACTURERS TAKE INITIATIVE IN TIMBER CONSERVATION.

The Pacific Coast lumber manufacturers have taken the initiative in an important step for the promotion of proper and conservative use of their timber supply. Practically all of the large manufacturers of lumber in the states of Oregon and Washington have entered into an agreement to manufacture odd, as well as even lengths in flooring, finish, and similar planing mill products. Heretofore, it has been customary to manufacture these products in even lengths only. Now, it is proposed to trim the manufactured lumber to lengths of odd numbers as well as even numbers of feet. Under the old system, a considerable portion of the lumber which came to the shaping machine was wasted and this action has been taken in order to save that waste.

Considerable opposition to this innovation has arisen among retailers and consumers. The retailer contends that it is impossible for him to dispose of odd-length material because of the common practice in the construction of wooden buildings, claiming that the initial saving of the manufacturer is transferred to the consumer. This is denied, however, because of the proportionally small amount of odd-length material which will occur under the new system, and because of the latter day practice of laying sub-floors of rough lumber and sheathing on the sides of the house before putting the finished material in place.

Because of the conservation element which enters into this question, the United States Forest Service has been recommending the adoption of odd lengths for some time past. The Portland office of the Service has recently made an investigation of the actual amount of unnecessary waste incident to the manufacture of even lengths only, and these figures show that under the old system the refuse burner consumed about two per cent of the total amount of the important forms of planing mill products which are manufactured from Douglas fir and other important forest species, in the states of Oregon and Washington.

When it is considered that about 750,000,000 feet of planing mill products are manufactured annually in the two states mentioned above, this two per cent assumes important proportions. The Forest Service is authority for the statement that 15,000,000 board feet of high-priced lumber can be saved annually in Oregon and Washington by the manufacture of planning mill products into lengths of odd feet as well as even. It would require the yearly growth of timber on approximately 30,000 acres of average timber land to produce the amount of lumber which this annual waste represents. The manufacturer is convinced that the waste is unnecessary. His greatest trouble now lies with a similar conviction on the part of the consumer, that odd lengths can be used as economically as even lengths.

BUILDING MATERIAL PRICE LIST

REVISED TO DATE

•—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce oc—Ontario cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common cedar. Cyp—Cypress. BM—Board measure. S 1 S—Sized one side. D 4 S—Dressed four sides. KD—Kiln dried. RG—Rough. C—Clears.

	Philadelphia, Pa. Corrected by N. E. Duffey.	Chicago, Corrected by J. H. Touchstone.	Los Angeles, California, by Courtesy of B. & O.	Omaha, Neb. Corrected by I. P. Hicks.	Southern Ontario. Corrected by F. C Frants.	Buffalo, N. Y. Corrected by J. W.	New York, N. Y.	Cleveland, Ohio. F. O. B. Yard Courtesy P. T. Co.	Seattle, Wash F.O.B. Mill or Yard Corrected by Courtesy F. T. Bradley
Dimensions, Hemlock Lumber	M ft. BM S 2 S	M. ft. BM S 2 S	M ft. BM RG	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S	M ft. BM Rough	M ft. BM S 2 S.	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	h $23.00	yp $20.00	op $22.00 to 24.00	yp $27.00	h $24.00	h$22.00	yp. $30.00	yp $26.00	F $11 00
2"x4" to 8" up to 16', No. 2	23 00	16 00	21 00	25.00	22 00	20.00	•	24.00	9 00
2"x4" to 8" 18 & 20', No. 1	26.00	21.00	23 00	28.00	26 00	26.00	30.00	28.00	11 00
2"x10" up to 16', No. 1	24.00	21.00	24 00	29.00	24 00	22.00	34.00	27.00	11 00
2"x12" up to 16', No. 1	•	22.00	24 00	31.00	25.00	23.00	34.00	29.00	11 00
2"x14" up to 16', No. 1	•	24.00	25.00	•	26.00	25.00	38.00	35.00	12 00
Each 2 ft. over 20 ft., add per M	2.00	1.00	1 00	1.00	2.00	1.50	For Dressing 3.00	2.00	up to 32'1.00
Select stock as above, add per M	•	5.00	10.00	•	•	•		•	2.25
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S	M ft. BM D 4 S.	M ft. BM S 4 S.	M ft BM D 4 S
1"x3" to 1"x8", No. 1	• $48.00	yp $35 00	rw $35.00	yp $46.00	wp $35.00	wp $48 00	wp $45.00	wp $48.00	F $30 00
1"x10", No. 1	*	35 00	36.00	44.00	40.00	49 00	cyp 58.00	50.00	32 00
1"x12", No. 1	*	40.00	37.00	48.00	42.00	50 00		50.00	32 00
1¼"x3" to 1¼"x12", No. 1	60.0C	42 00	50.00	50.00	45 00	48.00		52.00	32 00
1½" and 2" same as above	60.00	42.00	52 00	50.00	42 00	52 00		55.00	32 00
1" drop siding, No. 1	53 00	25 00	26.00 to 30.00	32.00	35.00	35 00	wp 45.00	49.00	22 00
½" lap siding, No. 1	37.50	18.00	18.00 to 20.00	30.00	30.00	36.00	cdr 30.00	37.00	rc 22 00
Enclosing and Fence Boards.	M ft BM S 1 S	M , BM S 1 S	M ft. BM D 2 S	M ft BM S 1 S	M ft BM S 1 S	M ft. BM S 1 S	M ft. BM S Rough	M ft.BM S 1 S.	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	apc $40.00	yp $18.00	op $25.00 to 30.00	yp $25.00	wp $30 00	wp $35 00	s $32.50	wp $37.00	F $11 00
1 x8" to 1"x10" No. 1	50 00	18 00	25.00 to 30.00	24.00	h 24 00	h24.00	1x6 27.50	39.00	11 00
1"x10", No. 1	50 00	18 00	30 00 to 35.00	24.00	24.00	26 00	1x8 28.00	34.00	11 00
1"x10", No. 2	45.00	15.00	25.00 to 30.00	22.00	22 00	24.00	1x10 30.00	35.00	11 00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D 4 S.	M t. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM. D 4 S.	M ft.BM D 4 S.	M ft. BM D 4 S.
⅛" T. & G. Flooring No. 1	yp $43.00	yp $30.00	op $40 00	yp $40.00	wp $40.00	yp $40.00	yp. $32.00	wp $35.00	$30 00
⅛" T. & G. Flooring No. 2	40.00	25.00	35 00	36 00	wp 30.00	35 00	26.00	30.00	25 00
Add for ceiling per M	*	1.00	1.50	2.00	1.00	1 00	wc 9.00	2.00	M ft 22.00
Add for partition per M	*	2.00	2.50	2.00	2.00	2.00	wc 9.00	2.00	22.00
⅛"x4", Ceiling No. 1	*	25.00	27.50	30.00	np 30.00	30.00	wc 25.00	31.00	22.00
	100 ft. run	100 ft. run	100 ft run	100 ft run	100 ft run	100 ft run	Flooring	100 ft run	100 ft run
4¼" Moulded Casing	wp $3.00	yp $1.85	rw or op $3.00	yp $2.00	wp 2.00	yp 3¼ $2 00	yp No. 1 $32.00	wp $3.00	$2.75
4¾" Moulded Casing	3.75	2.10	3.50	2.50	2.50	2.50	yp No. 2 26.00	3.25	2.75
7¼" Moulded Base	6.00	3.25	6.00	3.50	4.50	6¾ 4.00	Maple No. 1 52.00	4.20	3.50
⅛"x9½" Moulded Base	7.50	3.75	8.00	4.00	6.00	7/8x8¾ 5.00	" No. 2 46.00	6.00	4.50
1⅛"x4½" Moulded Window Stool	5.50	3.00	7.50	4.00	4.00	1⅛x3¾ 4.00	Oak No. 1 65.00	5.00	3.50
							Oak No. 2 52.00		
Miscellaneous List.	Per M.	Per M.	Per M	Per M	Per M	Per M	Per M	Per M.	Per M.
Shingles, No. 1	rc $16.00	rc $3.50	rw $2.75	$4.25	bs rc $3.75	$4.00	rc $5.75	rc $4.75	rc *A*c $2.00
Shingles, No. 2	13 00	3.00	2.00	3.75	*	3.50	cdr 4.00	4.25	*A*s 2 00
Shingles, fancy	18.00	5.00	rw 4.00	4.50	8.00	7.50	cyp 11.00	5.50	2 75
Lath, 4 ft., No. 1	6.00	yp 3.60	4.50	F 5.50	wp 5.00	h 4.00	4.25	5.25	F 1 75
Lath, 4 ft. No 2	4.00	2.75	3.50	5.00	s 3.75	3.80	*	4.75	1 75
Pickets, 1"x3"x4' 6", dressed	h 40.00	40.00	25.00	30.00	*	wp42.00	*	wp 45.00	22 00
Pickets, 1 x3"x4' 6", rough	30.00	*	20.00	*	*	38.00	*	30.00	18 00
	Piece.	Piece.	Piece.	Piece	Piece.	Piece.	Piece.	Piece.	Per 100.
6"x8' Post split	*	Cdr $0.13	rc $0.30	Cdr $0.30	*	$0.25	.28	Cdr $0.15	rc $12.50
8"x8' Post split	*	.20	40	.35	*	.30	.32	.22	12.50
8"x8' Post whole	*	.44	.50	.40	Cdr $0.30	.50	.50	.40	
6"x8' Post whole	*	.25	.40	.35	.25	.40	.45	.30	
Hardware List.	Cwt.	Cw	Cwt.	Cwt.	Cwt.	Cwt	Cwt.	Cwt.	Cwt.
Nails, wire, common	$2.25	$3.50	$3.00	$3.00	$2.85	$2 30	$2.25	$2.30	$2.95
Nails, cut, common	2.15	4.00	3.10	*	3.00	2.15	2.10	4.10	2.95
Nails, wire, fine finishing	2.45	1.60	3.50	3.50	4.00	3.50	2.50	2.20	2.95
Sash Weights, cast iron	1.50	1.50	1.60	1.50	2.25	1.60	New 1.50 S. H. .90	1.60	1.75
Tarred Felt Paper, best 2-ply	Roll $ .90	Roll, *	Roll *	Roll $1.00	Roll *	Roll .60	Roll $1.25	Roll $0.60	Cwt -$5.00
Tarred Felt Paper, 3-ply	1.15	*	*	1.25	*	1.20	1000' 0.95	.80	Cwt. 5.00
Red Rosin, Atlas brand	1.60	.90	*	.90	$2.50	0.90	1000' 1.15	1.20	*
Red Rosin, durable brand	1.25	.75	*	.75	.60	1 75	Per lb. .02½	.90	*
Black Neponset	2.25		*	*	2 50	2.50	250 ft. 1.15	2.60	*
						Courtesy, Buffalo Bldr's Supply Co.			
Masons' Supplies.	Per M.	Per M.	Per M.	Per M.	Per M.	Per M	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	$9.00	*	Hudson River	Not used	$6.50	*	*
Brick, blue, at kilns, No. 1	*	*	6.50	*	" "	" "	6.00	*	*
Brick, blue, at kilns, No. 2	*	7.50	6.00	*	New Jersey	" "	Pressed 22.00	*	*
Brick, white, delivered, face	30.00	7.00	*	7.50	*	7.25	" 25.00	$40.00	$45 00
Brick, red, delivered, backing	9.00	7.00	*	*	*	7.50	14.00	18.00	7 00
Brick, delivered, dry pressed	22.00	18.00	*	18.00	$17.00	18.00	25.00	22.00	35 00 to 45.00
Brick, vitrified, dry pressed	*	*	*	24.00	*	25.00	18.00	*	20.00
Lime, best gray	bu $0.27	bbl. $1.30	bbl. $1.80	bbl. $1.25	bbl. *	$ .80	bbl. $1.40	bu $0.27	bbl. $1.65
Lime, best white	.27	1.40	2.00	1.25	*	1.00	145 to 190 Atlas-	.27	1 85
Cement, Portland	bbl net 1.85	*	2.25	1.85	1.80	bbl. 1.50	1.50 pr bbl.in wood	bbl. net 1.60	Cwt. 2.25
Plaster, calcined	" " 1.90	2.40	2.25	1.80	bbl. $2 50	ton. 5.00	(In bags $1.80 per	ton 5.50	bbl. 2.50 to 2.95
Hair, 8 lb. per bush	.25	.25	0.48	.25	*	.32	bbl., 4 bags to bbl., with rebate of 7½ per bag.)	*	*
					Plaster (patent) $6 per ton. White Rock $11.00 per ton.				

NOTE—While these figures are approximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

MAXIMS BY MARK TWAIN

Noise proves nothing. Often a hen who has merely laid an egg cackles as if she had laid an asteroid.

Training is everything. The peach was once a bitter almond; cauliflower is nothing but a cabbage with a college education.

Habit is habit, and not to be flung out of the window by any man but coaxed downstairs a step at a time.

One of the most striking differences between a cat and a lie is that a cat has only nine lives.

The autocrat of Russia possesses more power than any other man on the earth; but he cannot stop a sneeze.

When I reflect upon the number of disagreeable people who I know have gone to a better world I am moved to lead a different life.

The true southern watermelon is a boon apart, and not to be mentioned with commoner things. It is chief of this world's luxuries, king by the grace of God over all the fruits of the earth. When one has tasted it he knows what the angels eat. It was not a southern watermelon that Eve took; we know it because she repented.

Be good and you will be lonesome.

Few good thinks are harder to put up with than the annoyance of a good example. It were not best that we should all think alike; it is difference of opinion that makes horses race.

Even the clearest and most perfect circumstantial evidence is likely to be at fault, after all, and therefore ought to be received with great caution. Take the case of any pencil sharpened by any woman; if you have witnesses you will find she did it with a knife, but if you take simply the aspect of the pencil you will say she did it with her teeth.

April 1. This is the day upon which we are reminded of what we are on the other three hundred and sixty-four.

The English are mentioned in the Bible: Blessed are the meek, for they shall inherit the earth.

Adam and Eve had many adventures, but the principal one was that they escaped teething.

There is this trouble about special providence—namely, there is so often a doubt as to which party was intended to be the beneficiary. In the case of the children, the bears and the prophet, the bears got more real satisfaction out of the episode than the prophet did, because they got the children.

There is no character, howsoever good and fine, but it can be destroyed by ridicule, howsoever poor and witless. Observe the ass, for instance; his character is about perfect; he is the choicest spirit among all the humbler animals, yet see what ridicule has brought him to. Instead of feeling complimented when we are called an ass we are left in doubt.

Consider well the proportions of things. It is better to be a young June-bug than an old bird of paradise.

Why is it that we rejoice at a birth and grieve at a funeral? It is because we are not the person involved.

All say, "How hard it is that we have to die"—a strange complaint to come from the mouths of people who have to live.

It is easy to find fault if one has that disposition. There was once a man who, not being able to find any other fault with his coal, complained that there were too many prehistoric toads in it.

When angry, count four; when very angry, swear.

The holy passion of friendship is of so sweet and steady and loyal and enduring a nature that it will last through a lifetime if not asked to lend money.

"Classic." A book which people praise and don't read.

The man with a new idea is a crank until the idea succeeds.

For two long hours he worked away
And shoveled to the street—
That night when he was fast asleep
It snowed about two feet!

Next morn, to get them clean once more,
He worked with might and main.
Came from the roof an avalanche
And filled them up again!

When ordered by the stern police,
Grim guardians of the law,
He shoveled out those walks once more—
And it began to thaw!

—Puck.

ATLAS OAK FLOORING.



Not so many years ago very few contractors and builders paid much attention to finding out who were the manufacturers of the building materials they were specifying and buying. Anything that the dealer gave them in those days was accepted, and if anything went wrong the matter had to be adjusted with the dealer, and he had to take it up with the manufacturer. The contractor and builder of today insists on knowing who the manufacturer is, of all the materials he is buying. Where materials are trade marked, it gives the contractor and builder more confidence in them, because it is an easy matter to take up any complaint on any material direct with the manufacturer. Builders have learned that manufacturers who trade mark their goods and materials have to stand back of that trade mark and give the right quality.

The "ATLAS" oak flooring is a trade marked material. Every piece of "ATLAS" flooring is stamped with the word "ATLAS." The manufacturers stand back of this trade mark, and architects and contractors in specifying and buying it know that "ATLAS" must be right in every respect.

Many local lumber dealers are handling and carrying in stock "ATLAS" oak flooring, but where a dealer will not supply the demand and insists upon substituting some other flooring the manufacturers of "ATLAS" will see that the contractor who wants their flooring can get it direct.

All "ATLAS" 13-16 flooring is thoroughly kiln dried, dressed, and matched, hollow back, bored, end matched, steel polished and wire bundled. All "ATLAS" ⅜ flooring is thoroughly kiln dried dressed and matched, end matched, steel polished and wire bundled. In addition to wire bundling "ATLAS" ⅜ flooring the manufacturers also pack it in crates when desired at an additional cost of only $1.50 per 1,000 feet. This insures shipments being received in unusually fine and clean condition and is well worth the small additional cost.

"ATLAS" oak flooring is manufactured by the Wildberg Lumber Company, Ninth and Eggleston Avenues, Cincinnati, Ohio. They will be glad to give full particulars to architects, contractors and builders about "ATLAS" oak flooring.

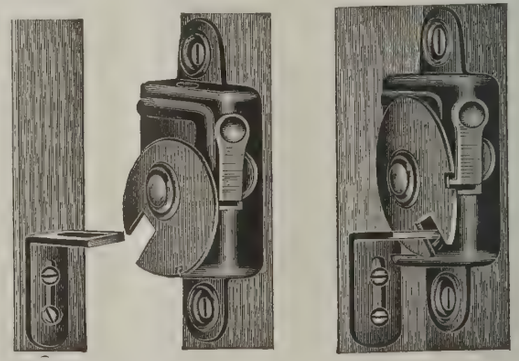
WATROUS AUTOMATIC SCREEN DOOR CATCH.

The E. L. Watrous Manufacturing Company, of Des Moines, Iowa, has lately put upon the market a new Automatic Screen Door Catch, known as the No. 21. The Catch has a lot of good points, which they claim make it superior to any other on the market. Those which they most desire to emphasize are:

1st. The ease with which it can be set, as it comes flush on the door and needs no templet or diagram, which appeals to carpenters, as they do not like to "fuss" with a small piece of hardware, and have to make several trials before they get it on straight.

2d. The POSITIVE LOCK is an extremely desirable feature, making a secondary fastener unnecessary. Though they offer the Catch both with and without the lock, the overwhelming majority of their sales has been made on the Catch with the Positive Lock.

3d. They have retained on this Catch the adjustable strike,



which they found to be such a winner on their $5 Catch, and have made the metal nearly twice as heavy, so that this Catch is really a lock that will stand a great deal of abuse before it can be broken. No mere accident will put it out of commission, but anyone trying to break in would find it easier to break the door than to break this lock.

4th. It is good workmanship throughout, and it "looks like the Money." You will find no rough or split corners. They have introduced a special new embossing so that the cam cannot drag over to one side and bind, and altogether, it is a good piece of shelf hardware.

NEW SALES HEADQUARTERS.

J. A. Fay & Egan Co., the woodworking machinery people, announce the discontinuance of their Greensboro, N. C., agency. The Chattanooga, Tenn., office has also been discontinued and a new suite of offices opened in the Candler Building, Atlanta, Ga. The new Atlanta office will handle all business in the states of North & South Carolina, Tennessee, Georgia, Florida and Alabama (outside of Mobile). This merger was made in order that the business of J. A. Fay & Egan Co. might be done direct with the customer, insuring prompt and careful attention to each individual.

The NORTHWESTERN TERRA COTTA COMPANY

Manufacturers of High Grade

Architectural Terra Cotta

Enameled Work a Specialty

Main Office and Works, 2525 Clybourn Ave.
Branch Office, Room 1415 Railway Exchange

CHICAGO, ILLINOIS



The A. W. True Residence, Hinsdale, Ill.

143 Cities USED "Stonekote" ROUGH CAST in 1910

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be: Gray, Silver Gray, White, Buff, Red, Brown.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce, CHICAGO, ILL.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary STEEL Medicine Cabinet



The Recessed Steel Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

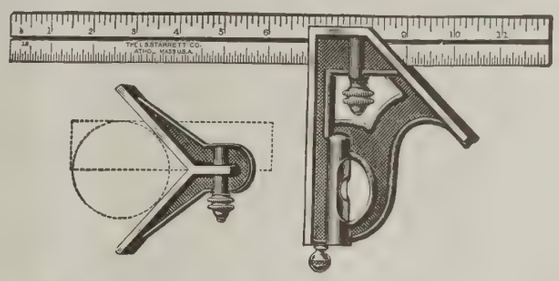
Four styles—four sizes. To recess in wall or to hang outside.

Send for illustrated circular



The Outside Steel Cabinet

HESS, 907 L Tacoma Bldg., CHICAGO
Makers of Steel Furnaces. *Free Booklet.*



STARRETT TOOLS

for Carpenters are made with just the same superiority in respect to accuracy, workmanship, design and finish as Starrett Tools for Machinists. And that's saying a good deal.

Complete Catalogue No. 18-M sent free

THE L. S. STARRETT CO., Athol, Mass., U. S. A.

ASBESTOS "CENTURY" SHINGLES

"THE ROOF THAT OUTLIVES THE BUILDING"

Look into the service record of Asbestos "Century" Shingles for yourself. You'll find that you can depend absolutely on their integrity.

They give the client a roof that needs no repairing or painting—no expense bills that arouse his ill-will and make him question the value of every other feature of the building.

Asbestos "Century" Shingles are the first practical lightweight roofing of reinforced concrete—made of hydraulic cement reinforced with interlacing asbestos fibres.



Asbestos "Century" Shingle Roof—Residence of Dr. Thomas H. Bowman, Harrisburg, Pa.; Harry B. Shoop, Harrisburg, Architect; James M. Bowman, Harrisburg, Contractor.

These shingles are weatherproof, fireproof, timeproof. Cannot rot, rust, crack, split or blister. They literally outlive the building—without repairs or painting.

You can get Asbestos "Century" Shingles in shapes and sizes to fit any architectural scheme. Three colors—Newport Gray (silver gray), Slate (blue black), and Indian Red. Ask your Roofer for new quotations. Write for booklet "K. & M. 1911."

The Keasbey & Mattison Company, Factors, Ambler, Pennsylvania

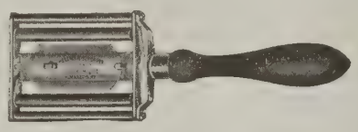
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE PULLMAN RAZOR STROPPER.

Were you ever shaved by a barber? Of course you were—and did you notice how he reached for his strop before he began to shave—once or twice while shaving you, and again before he laid his trusty razor down? Has it a poor edge to need so much stropping? No, it was the best he could buy, but it is necessary to strop the best razor frequently to keep it in shape.

You have a safety razor? Of course, almost every one has. But how about stropping? Do you use one blade three or four times, while the barber strops his a dozen, and then puts in a new blade—then get a dozen sharpened at once or buy new ones?

Why don't you give your safety razor as good treatment as the best common razor? Strop it at least before using, and just after.



You will be surprised at the result. But in order to strop the blade properly you must have a strop different from the old style.

The Pullman Mfg. Co., Rochester, N. Y., are placing on the market a new style of safety blade stropper, which permits the rapid sharpening of the blades. It consists of a handle having at the end a number of rollers through which the strop passes. The blade is clamped to a central bar, which is so adjusted as to hold the blade against the strop at the correct angle. The action of the strop automatically reverses the blade so there is no possibiliy of cutting the strop. The device is small, neat and compact and should last a lifetime. Every owner of a safety razor should have one.

CONCRETE ORNAMENTAL MOULDS.

Never before in the history of concrete work has the use of concrete been so great for ornamental purposes as at the present time. There seems to be no limit to the possibilities in this line and concrete lends itself so readily to the manufacture of concrete articles that it proves most attractive and a very interesting line of work.

There is a satisfaction about turning out a handsome piece of work that appeals to every concrete worker, and the immense profits in this line are also very satisfactory.

You can make a vase similar to the following illustration with about one sack of cement. This vase would sell for not less than $5.00 and every housewife wants a pair of these as soon as she sees them. This illustration shows one of the most attractive and beautiful lawn vases on the market at the present time. It is sold by the Northwestern Steel & Iron Works of Eau Claire, Wis., who are extensive manufacturers of concrete machinery of every description and their catalogue shows the largest line of ornamental moulds made.



It will pay contractors to have a copy of this book if for nothing else than for reference. It describes everything shown in the concrete machinery line and gives valuable information of every description.

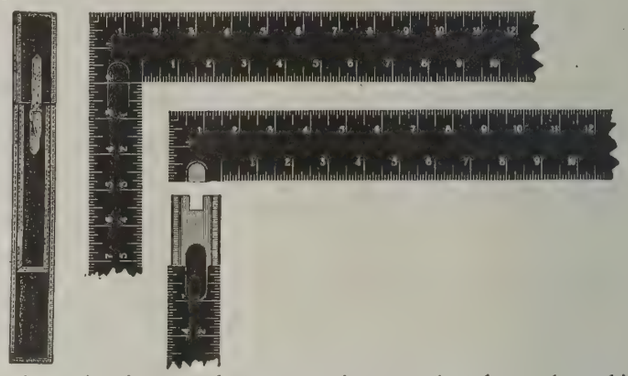
All moulds for ornamental purposes are made in four sections and are hinged so as to draw easily from the finished mould. The designs are clear cut and attractive in appearance and every contractor will do well to consider the establishment of an ornamental department in connection with their regular business.

Every article produced will prove an advertisement for their work and every live, up-to-date concrete man realizes that they cannot do business without advertising. There are a hundred and one different ways in which articles of this kind tend to bring added sales to their business, and will increase their profits to a large extent, and put their business on a more satisfactory and profitable basis.

THE NICHOLLS TAKE DOWN SQUARE.

The Nicholls Manufacturing Co., of Ottawa, Iowa, have recently placed on the market a new form of Take Down square, which possesses marked advantages over other forms now in use. In this square, the tongue separates entirely from the blade, so that there is no projection on the blade beyond the inside edge. This allows the square to be packed in a much smaller space, in fact, being only 2 inches by 24 inches. In putting together there are no screws or cams to adjust or come loose, but the tongue automatically locks securely into the blade without the use of any tools whatever.

One of the features claimed for this square is that it will always remain true, as the construction is such that the wear, occasioned by frequent taking apart, causes the two pieces to be more firmly held

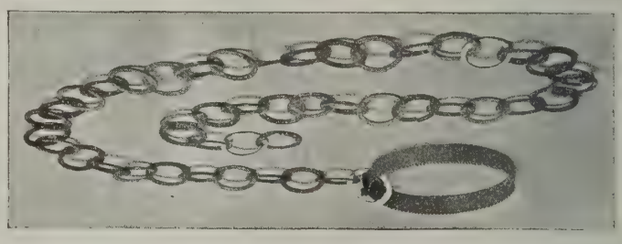


together. As the manufacturers make several styles and markings, this square can be obtained in the Nos. 3 and 100 Standard and No. 100 Rafter Framing in Oxidized Copper Black (white or yellow figures) Galvanized, Old Copper and Nickel Plated.

It will be noted that the No. 100 Rafter Framing Square has engraved on it the famous Nicholls Rafter Framing Rule, giving the cuts and lengths for common, hip, valley and jack rafters for seventeen different pitches. For those not familiar with this marking the Nicholls Manufacturing Company, Ottumwa, Iowa, offer to send a direction sheet describing their framing rule, as well as any other information regarding their famous squares.

FLEXIBLE HACK SAW BLADE.

This is not an illustration of a Dog Collar and Chain, but rather it shows the work of a Culley Flexible Hack Saw Blade, manufactured by the Simonds Manufacturing Company, Fitchburg, Mass., and Chicago, Ill. There were 47 separate rings made from a 1-ft. pipe, each ring slit and the chain formed. After making this num-

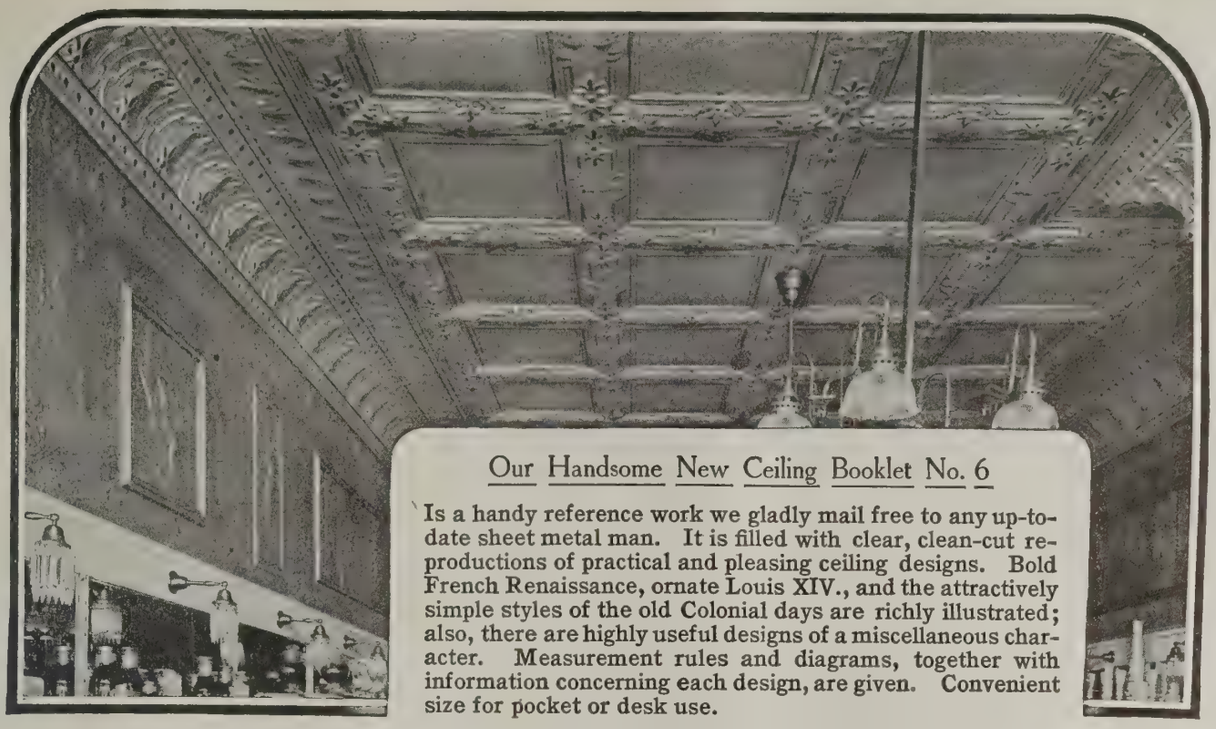


ber of cuts, the condition of the blade was so good that the teeth are clearly defined, even in this greatly reduced illustration. The remarkable flexible property of this blade is shown by its being bent in a complete circle.

HAVE YOU INVESTIGATED AMATITE?

Nobody who is buying ready roofing from time to time has any business to be ignorant of the fact that there is a very large and rapidly increasing amount of no-paint roofings coming into use. The painting feature was the only objection to the old-style smooth-coated roofing. Painting cost money and was very apt to be neglected in the interests of other matters that were more pressing—then, before the owner woke up, the roofings had begun to lose their waterproof characteristics, were absorbing water and being injured by frost. Accordingly, the advent of Amatite, with its practical mineral surface, was hailed with much satisfaction by ready roofing users, and the sales of the new invention have been increasing with tremendous rapidity. The simple fact that Amatite Roofing costs no more than the painted kind, will last as long and longer, and involves no maintenance expense whatever, made it a favorite with building owners all over the country.

Simply as a matter of relative economy and satisfaction, look up Amatite. You can do so very easily by simply addressing a request for a sample to the nearest office of the Barrett Manufacturing Company, New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland, Pittsburg, Cincinnati, Kansas City, Minneapolis, New Orleans, Seattle.



Our Handsome New Ceiling Booklet No. 6

Is a handy reference work we gladly mail free to any up-to-date sheet metal man. It is filled with clear, clean-cut reproductions of practical and pleasing ceiling designs. Bold French Renaissance, ornate Louis XIV., and the attractively simple styles of the old Colonial days are richly illustrated; also, there are highly useful designs of a miscellaneous character. Measurement rules and diagrams, together with information concerning each design, are given. Convenient size for pocket or desk use.

We will mail your copy tomorrow if your address reaches us by that time.

THE EMPIRE IRON & STEEL CO.

64 East Lake St., Chicago, Ill. NILES, OHIO 345 Fifth Ave., New York, N. Y.



SPECIFY AND LAY

"ATLAS" OAK FLOORING

FOR EVERY JOB

The workmanship is guaranteed the best, the grades high and the price low.

All "Atlas" 13/16 flooring is thoroughly kiln dried, dressed and matched, hollow backed, bored and matched, steel polished and wire bundled. All 3/8 flooring is thoroughly kiln dried, dressed and matched, end matched, steel polished and wire bundled. In addition to wire bundling "Atlas" 3/8 flooring, we also pack it in crates when desired, at a small additional cost.

If your dealer can't supply you with "Atlas" Oak Flooring—and every piece is stamped "Atlas"—write us direct. We will reply promptly, giving full information.

The WILDBERG LUMBER COMPANY

Ninth and Eggleston Ave.

CINCINNATI, OHIO

"BERGER'S Classik" METAL CEILINGS



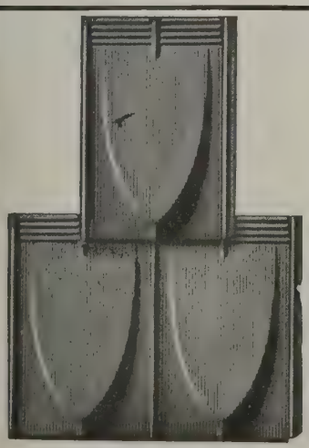
No matter what the building may be—school, church, office or home, you will find in Berger's Catalogue a ceiling particularly adapted to it. Among the dozens of classes and the hundreds of combination designs there is a handsome ceiling to completely harmonize with any room you wish ceiled.

There is good money for you in the agency for Berger's Classik Ceilings. Write today to the nearest branch for the large handsome catalogue.

The Berger Mfg. Co., Canton, Ohio

Philadelphia, St. Louis, Boston, Minneapolis, New York, San Francisco, Chicago, Atlanta

Also Manufacturers of Black and Galvanized Roofing, Eave Troughs and Conductor Pipe, Sidewalk Forms, Metal Lath, Tin Plate, etc.



STYLE B.
Showing Method of Laying

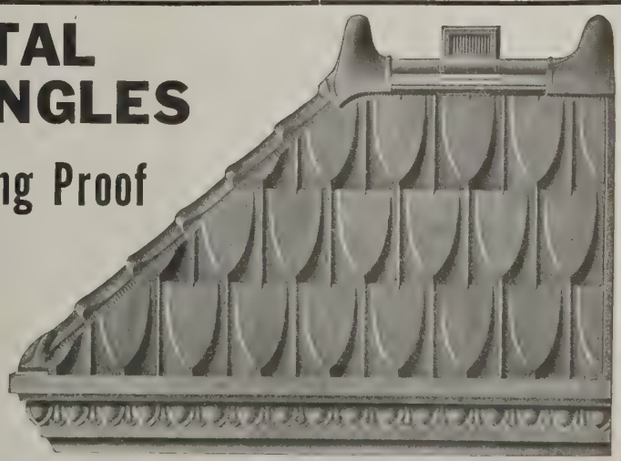
"TITELOCK" TRADE MARK METAL SHINGLES

Fire, Water and Lightning Proof

ASK FOR SAMPLES AND CATALOG

Milwaukee Corrugating Co.

MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

IDEAL IDEAS.

The May number of Ideal Ideas, published by the Ideal Concrete Machinery Company, of South Bend, Ind., and London, Ontario, Canada, shows the results of their recent prize competition for completed buildings.



Owner, Judge Smith, Trust Building, Ottawa, Canada; architects, The Bungalow Craft Company, Los Angeles, Cal.; contractors and block layers, Boyd Brothers, Osgoode, Ont. Erected at Brittannia Heights; frontage, 38 feet; depth, 38 feet; 1,850 8x8x16 inch faced blocks of rock and panel designs used. Building has concrete foundation, 9 rooms, hot water heat. Cost of block work, $750; cost of building complete, $5,400.

Through the courtesy of the Ideal Concrete Machinery Company we are able to reproduce the photograph receiving one of the prizes. There were several hundred entries from all over the world, and the prizes were distributed to Scotland, India, the Philippines, as well as Canada and the United States.

The purpose of the contest was to show something of the unlimited possibilities and great range of opportunities for the use of Ideal Concrete Blocks, and the results justified their most sanguine expectations. Many sent photographs showing the progress of their work, asking that they be not entered in the contest as their work was not as good as they expected to have it in a short time.

The contest emphasized the fact that while many were making blocks, they were not taking the care they should to secure work of the best quality. The workmanship in laying was in many cases not up to the standard, as one block mason was told when in quest of new work: "Of course, concrete blocks are all right—they may be waterproof, fireproof, vermin proof, repair proof, everlasting. and all that, but look at So-and-So's concrete block house, with its uneven mortar joints and the dauby work of the mason. It is fine inside, but outside it is a fright." The difference in care in just this point is largely responsible for the United States obtaining only five of the sixteen prizes.

We believe that any reader of THE NATIONAL BUILDER can obtain a copy showing the prize buildings by writing to the Ideal Concrete Machinery Company, at South Bend, Ind., or London, Ontario, Canada. Ask for Number 12, Volume I of "Ideal Ideas."

ANTI FRICTION BALL TIP BUTTS.

Builders are fast appreciating the solid merits of Butts equipped with accurately fitted Anti Friction Washers of a special metal, preventing any possible wearing away of joints, and in addition have a patented Non Rising Pin eliminating all trouble incident to partially lifted pins. Doors fitted with the McKinney Anti Friction Ball Tip Butts always swing freely and noiselessly, regardless of their weight.



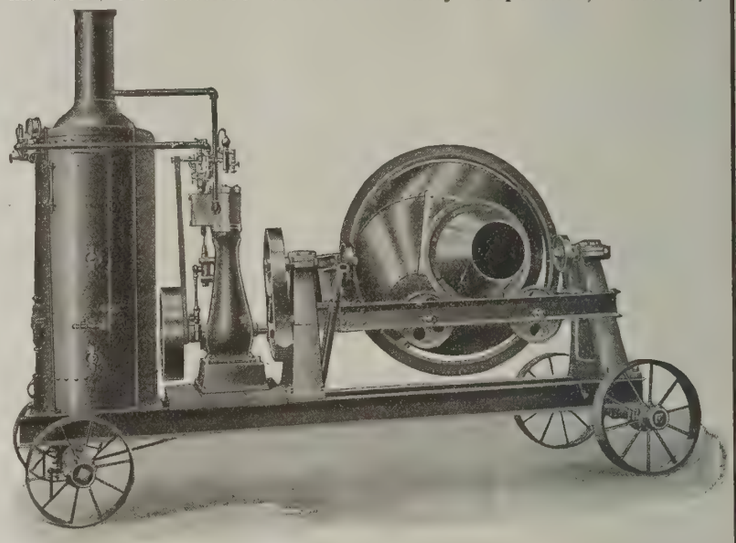
Although these Butts represent quality in every detail, their cost permits of their being used on medium priced buildings as well as the most expensive. The guarantee of the McKinney Mfg. Co., Pittsburg, Pa., represents a house of forty years' standing, owning one of the largest and best plants in the world. Strap Hinges, Barn Door Hangers, Track, etc., are also made under the same valuable guarantee. Their goods in all sizes and standard finishes are to be had of most hardware dealers, and builders and contractors are invited to send for the new 1911 catalogue and to ask their dealer for McKinney's Butts.

TRADE McK MARK

A NEW METHOD OF MIXING CONCRETE.

Engineers and architects are daily becoming more exacting in their requirement in constructions. The unquestioned efficacy of machine mixed concrete has the effect of specifications reading "all concrete must be mixed by machine." In order to get the best work, the contractor must show that he is accustomed to mixing by machine, and in order to carry out the work to advantage, he must use the mixer. So, the question is not a mixer, but which mixer is best for the character of work the contractor is building. The contractor on sidewalk work does not need, in fact, cannot use to advantage, the large mixer used in heavy foundation work.

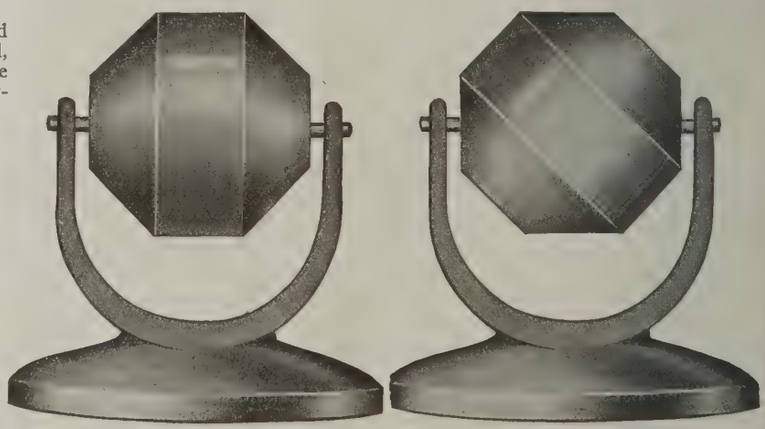
That the intending purchaser may decide which mixer to use in his work, the Waterloo Cement Machinery Corporation, Waterloo,



Iowa, have prepared appropriate literature describing the Polygon Mixers, Hoists and Contractors' Equipment. By the study of this catalog, the contractor is able to see how a slight expenditure for "permanent plant" is able to save money on even the smallest contracts. The use of a mixer stamps the contractor as progressive and will often obtain a contract at a preference in price.

In the Polygon mixers a new method of mixing concrete is used. This can readily be seen by reference to the cuts shown herewith.

In the Polygon, the shape of the drum provides all the mixing action necessary. When the drum containing a batch of concrete is revolved, the materials are thrown from one side to the other—endwise, sidewise, crosswise and everyotherwise. The process of mixing is thorough and rapid. The complete mixing of all the materials adapts it for dry as well as wet mixtures, and for aggregates of varying sizes. As the principle of mixing requires that every particle of material shall be uniformly coated with cement, it will be



seen that the "Polygon way" is close to the theoretical ideal.

The manufacturers claim that the concrete mixed by this method has a clean, smooth appearance, indicating the thoroughness of the mix.

While the Waterloo Cement Machinery Corporation makes a large list of mixers of various sizes and capacities, it is only necessary to show one in these columns. The machine must be portable and self-contained, and as shown, is ready for the severest work. When equipped for steam in this way, the boilers are made to meet the various state and city ordinances regarding the use of steam boilers. When desired a portable canopy can be added, protecting the engine and apparatus from the weather. Gasoline engines may be used, the nature of this power being particularly adapted to situations where the work is intermittent.

Interested readers of THE NATIONAL BUILDER are requested to write The Waterloo Cement Machinery Corporation, Waterloo, Iowa, for the complete catalog showing all the styles of mixers and other contractors' machinery.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

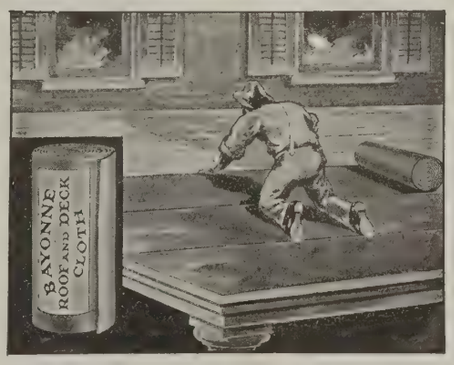
The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street, **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instruction for laying
SAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.

A Roof of Slate is the Best Roof You Can Buy



On Churches, Schools, Public Buildings, Dwellings, Barns or Buildings of any kind – a roof of slate improves property values and lowers fire insurance costs; and where drinking water is collected off the roof, **it is the safest roofing obtainable.**

—As a roofing material of solid rock slate still stands supreme; not because it **costs** less, for the **first** cost is a trifle more than for shingles, iron or felt, but because it **never** wears out nor requires repairs.

Sea Green or Purple Roofing Slate

is absolutely impervious to climatic conditions. It resists the action of air, water, snow, ice, fire, sun and lightning; it cannot warp, crack, splinter, or decay. It is perfectly water-tight, and once laid—will outlast the building it covers.

Write to Us for Delivered Prices

on all sizes and grades of roofing slate delivered at your nearest railroad station. Also prices on Slater's tools and supplies.

Ask for FREE Book of Instructions

We solicit correspondence—even if you won't require the slate until later. Write to us today—now.

American Sea Green Slate Company

"Roofs that Never Wear Out"

Box 150 **GRANVILLE, NEW YORK**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A MEASUREMENT DIAGRAM FOR METAL CEILING USERS.

Through the courtesy of The Empire Iron & Steel Company of Niles, Ohio, we have been permitted to print the following measurement diagram and data from that company's ceiling catalogue No. 6, which is now being distributed without cost to interested parties. We recommend that this article be clipped and filed for reference by those of our readers who have occasion to handle metal ceilings.

The diagram is self explanatory and if followed faithfully the resultant measurements will insure a perfect fit of all parts of the ceiling and consequently an attractive job. The rules given in addition should also be carefully noted.

RULES FOR MEASURING.

To the actual length of ceiling to be covered add the depth of cornice on each end wall. To the actual breadth of ceiling to be covered add the depth of cornice on each side wall. The actual Metal Ceiling required is found by multiplying these two results. For instance:

Length of room, 62', plus depth of Cornice, both ends, 16" + 16" = 64' 8".

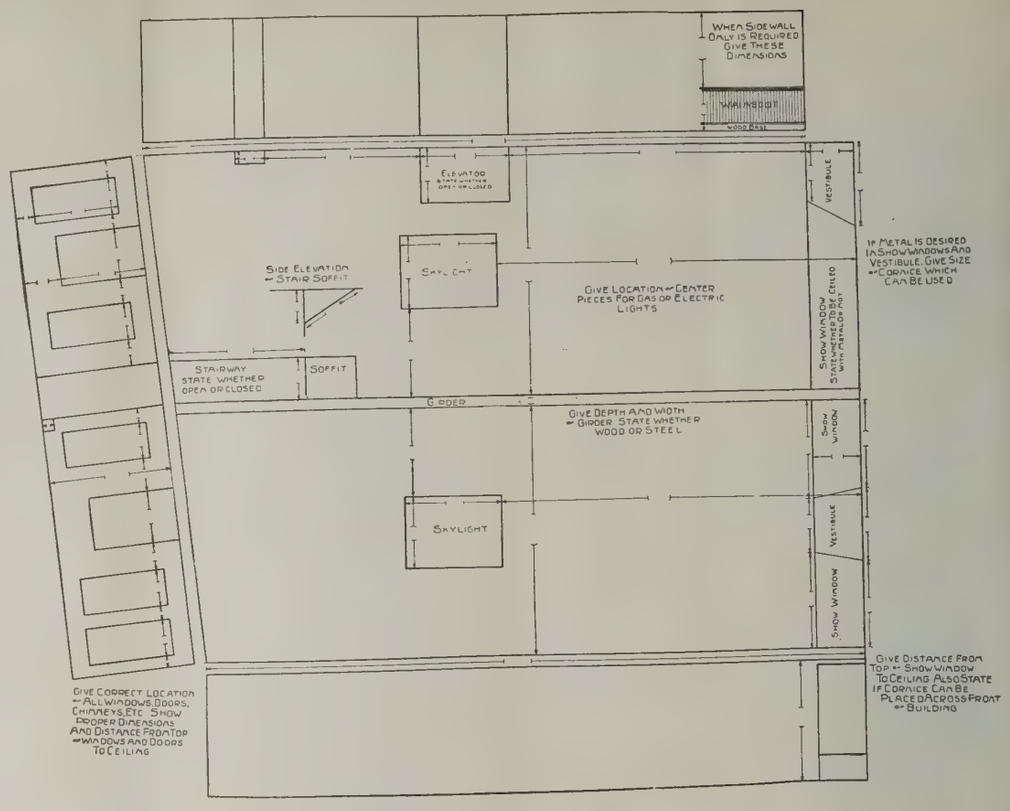
Breadth of room 20', plus depth of Cornice, both sides, 16" + 16" = 22' 8".

64' 8" × 22' 8" = 1,466 square feet of Metal Ceiling required.

Deductions are allowed only for large openings of 75 square feet or more, since fitting around openings is as expensive as covering them.

Beneath each combination illustrated in this catalogue is noted the depth of Cornice.

Measurements of both sides and both ends should be given, as rooms are frequently out of square. Be sure to locate doors, vestibules, chimneys and offsets, on a sketch to be sent with order or inquiry. Give the height of walls, and, separately, of the baseboard. All such fixtures as gas or electric-light drops must be placed so as to conform with the drawing and arrangement of the Ceiling.



MEASUREMENT DIAGRAM

UTILITY CRACK FILLER.

The greatest objection to the use of wall board has always been due to the fact that so many builders do not like to have to panel the walls and ceilings in order to take care of the joints between the sheets of wall board.

The Heppes Company, of 4502 Fillmore street, Chicago, Ill., have perfected an elastic filler known as Utility Crack Filler, which, when used to fill the cracks between the sheets of Utility Wall Board, manufactured by the same concern, entirely eliminates this objection.

Utility Wall Board, having practically no contraction and expansion when applied to the walls and ceilings and the joints filled with Utility Crack Filler, make a smooth surface on which wall paper or burlap can be successfully applied.

The Heppes Company is known as one of the most up-to-date manufacturers in the country, and this recent improvement, together with other important features of Utility Wall Board, makes it one of the most popular building materials known to the contractors, builders and architects of this country.

If you have never seen a sample of this economical, durable and artistic wall lining, it will pay you to write them for a sample today. It's worth your while.

Complete information concerning Utility Wall Board and Utility Crack Filler may be obtained by addressing The Heppes Company, 4502 Fillmore street, Chicago, Ill.

WATERPROOFING MATERIALS WELL WORTH CONSIDERING.

Among the many different brands of waterproofing materials now on the market, the H. W. Johns-Manville Company, 100 William street, New York, are offering a line of fabrics, felts, cements and coatings know as J-M Waterproofing Materials.

These materials, which are the result of this firm's half century of experience, careful study and unexcelled facilities, are especially made to meet every condition in waterproof building construction and have been effectively used for waterproofing underground tunnels, walls of brick and concrete buildings, dams, reservoirs, swimming pools, etc., with much success.

J-M Waterproofing Fabric is strong, loosely woven burlap impregnated with pure asphalt. The asphalt not only clings, but becomes locked into the fabric, and it is claimed that a few layers of this fabric makes a waterproof course of great strength, ductility and elasticity that remains intact and resists moisture even when cracks occur in the cement work.

J-M Waterproofing Asbestos Felt is made of pure asbestos fiber, thoroughly impregnated with pure asphalt. This fabric, being composed of only mineral substances, contains nothing to decay or deteriorate, and is therefore best adapted for waterproofing all exposed and foundation construction work. In addition to being waterproof, it is also positively acid, mould and rot proof. The asphalt is of a peculiar nature, and has wonderful cementitious characteristics. It is used cold and hot and does not run, shove or creep, and will not become brittle in high or low temperature.

This combination produces a waterproofing fabric that is especially serviceable where continual dampness prevails.

One of the most perfect water and dampproof materials made by this concern is their J-M Waterproof Coating. This is a combination of carefully selected materials of the highest grades, which, when applied, makes a film unimpenetrable by moisture. Aside from being inexpensive, it does away with furring and lathing and makes a positive bond between plaster and brick or stone walls. This coating protects plaster from strains due to dampness, also from discoloring by fireproof tile walls. Damp cellars and walls coated with this coating are made clean, sweet and useful. This coating can also be used in place of so-called non-straining cements, for stain-prooving marble, granite and limestone.

This concern has issued a little booklet explaining fully the merits of their waterproofing materials, which they will gladly mail to anyone on request.

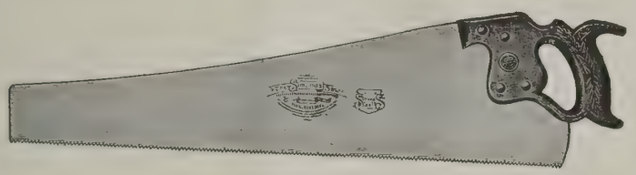
HY-RIB.

Under this appropriate heading, the Trussed Concrete Steel Company, Detroit, Mich., are sending out the sixth edition of their Hy-Rib handbook, showing the value of this fabric in all parts of buildings of various characters and particularly for use in the construction of silos, tanks and conduits.

For the convenience of the reader, the book is subdivided into various sections, such as that for General Data on Hy-Rib, Applications to Floors and Roofs, to Walls and Sidings, Partitions, Ceiling and Furrings, Building Construction in General, Special Tools and Clips for Hy-Rib, etc. The detailed working drawings show exactly how the material is applied to building work. Illustrations are made from photographs showing the use of the material in construction.

Only those directly connected with the building trades have a conception of the manifold uses to which concrete, and especially re-enforced concrete, is being adapted. Not only in massive foundation work to support heavy structures, but in the walls and partitions as well. The danger from fire, as well as natural deterioration and decay, is causing engineers and architects to adopt it more and more in places where it is necessary to balance tects t oadopt it more and more in places where it is necessary to balance the naturally great comp.essive strength of the concrete by adding metal re-enforcement. Such places as walls, partitions could be built of solid concrete, but in order to be stiff enough would have to be very thick and bulky. The addition of re-enforcement allows a much thinner and lighter wall. In the proper design of structures where a thin wall or partition is desirable the engineer has a wide opportunity to display his ingenuity. To aid him this book is prepared.

WHY NOT GET A SI-MONDS HAND SAW FOR YOUR WORK NOW?



You have read so much and heard so much about the Simonds Hand Saw that now it is time for you to try it.

Remember that the dealer who sells you a Simonds Saw is empowered to guarantee it fully in every respect and your money will be refunded if the Saw is not entirely satisfactory.

Remember that there is a variety of styles from which to choose; different lengths, points, straight back or sway back.

Remember the Simonds Hand Saw is made of Simonds Steel and each Saw is packed in a separate case—a distinctive feature.

Remember that the workmen who make Simonds Saws are the most skilled men at this trade.

If it will help you we will tell you the name of the dealer near you who sells Simonds Hand Saws, or, if there is none near you, we will quote you a price on a saw delivered direct from the factory. Just fill in the coupon below, clip it out and mail it to us. The quickest way to get a Simonds Hand Saw.

SIMONDS MFG. CO.
Fitchburg, Mass.

As per your advertisement in the "National Builder," send name of nearby Dealer selling Simonds Saws. I desire a Saw, Length.....

Point.....

Signed.....

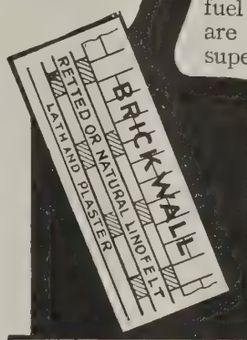
Street.....

City..... State.....

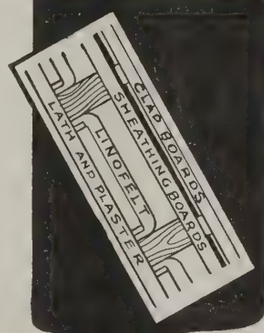
Sheath Your Houses With LINOFELT

Linen-Felt made from Flax-Fibre

38 Times More Effective Than Building Paper







BUILD houses that keep the outside *out* and the inside *in*, that keep *out* the cold of winter and the heat of summer, that keep *in* the warmth in winter and the cool in summer. Put up houses and buildings that keep out sound, the rooms of which are quiet and restful. Getting these features will add less than one per cent to the cost of your house, will add more than 40% to its comfort and living value and will effect a constant saving of 40% in all fuel bills. Architects, contractors and carpenters are the ones able to appreciate most the superiority of **Linofelt** because they know how unsatisfactory is ordinary building paper.

These Plans Show The Method

They show you clearly the practical and simple method of insulating walls and floors with **Linofelt.** Every carpenter, every builder, every architect realizes just what these little plans mean. They are keen to the advantages of building according to these methods. They know how important such efficient insulating of walls, floors, ceilings and partitions is to *all* classes of homes and buildings. We might emphasize residences, office buildings, hospitals, school buildings, stores, and buildings constructed for manufacturing purposes. These must have the uniform warmth in winter, coolness in summer and the quiet all the time that **Linofelt** insures.

Anyone who knows **Linofelt** immediately becomes enthusiastic about it—because it has so many delightful features. It is an insulating quilt. No other is as light as **Linofelt** cubical contents considered. It comes from the same source as linen. It is made from flax in the largest flax market in the world—Winona. It is odorless, chemically clean, as sanitary as a surgical dressing.

We have had made comparative tests of **Linofelt** and other sheathing mediums for sound deadening qualities. We will send them on request. The same sound heard 200 feet through ordinary building paper is heard only 2 feet away through **Linofelt.** Tests prove **Linofelt** more than 38 times as effective as building paper for all uses.

Let Us Place All The Data In Your Hands

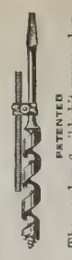
Let us send you an attractive book for Architects, Contractors and Carpenters showing **Linofelt** in all forms, telling how it is made, showing and explaining plans and methods of using **Linofelt,** illustrated with excellent photographs of residences and buildings built with **Linofelt,** located in different climates. Let us send you this meaty book because it also tells in like manner of Lith Board and Rock Wool. Let us acquaint you with our Service Department, our own engineers, who have a world of experience in insulating work, who have pursued it under all sorts of conditions for a great many years, who are fully equipped and qualified to be of the greatest assistance to you in your work, whom you can consult at any time regarding any of your work *gratis.* Let us send you a **free** sample of **Linofelt** so that you can see it with your own eyes and feel it with your own hands and have a close realization of its extreme effectiveness, have a firm knowledge that it will do *more* than we claim it will do. Get the book, the service, the sample by writing to us today. **Please ask us for the name of the dealer nearest your home.**



Union Fibre Co.

Manufacturers
30 Union Avenue, Winona, Minn.
The Philip Carey Co., *Distributors*
Cincinnati, Ohio
Branches and Warehouses in all the large cities in United States, Canada and Mexico.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



PATENTED

The peerless flexible-bit-gauge when it comes in swift contact with the wood; it will not mark the wood or slip in any way, or interfere with chips as other bit-gauges do which can be used successfully for boring mortise locks. Just the thing for dowels

Nickel Plated, 30 Cents

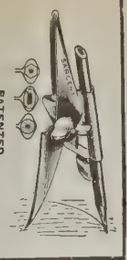
We refer dealers to Sargent Hardware Co. Mail orders promptly filled on receipt of price. Postage stamps accepted by

POTTER BROS

Specialty Manufacturers

612 West 110th St., NEW YORK

Patent just allowed on a Feed-Flange Auger-bit that will revolutionize the boring bit trade. Will incorporate or otherwise. Several other commanding metal specialties. Most liberal terms to manufacturers.



PATENTED

Steel points can be moved up or down to suit pencil. The Peerless Setter. Broad point for plasterwalls, etc. Sharp point for Quirks and Mouldings. Will hold any shape pencil equally well. This Scriber will hold a framer's pencil, thus doing away with breaking of pencil point.

Polished Steel, 50 Cents. Nickel-Plated, 35 Cents. Five Cents extra with Oval Pencil.

AUTOMATIC SASH HOLDER

saves cord, weights, pulleys and materials—no pockets—easier to install—for old or new windows. Send for sample and catalogue today. Agents wanted. Sold by the hardware trade or direct from 277 Broadway, New York.

Automatic Sash Holder Co.

Producers of — **ROOF SLATES** BLACK GREEN PURPLE RED

Slate Blackboards Guaranteed Strongest and Best Finish

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PHŒNIX INSIDE SLIDING BLINDS

COMFORT CONVENIENCE ECONOMY

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.
Write for Catalog P-T.

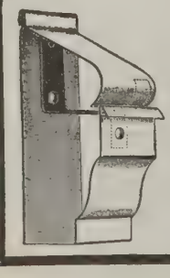
PHOENIX SLIDING BLIND CO., PHOENIX, N. Y.

BUNGALOWS

Over 4,000 Builders and Architects bought copies of the second edition of "California Bungalow Homes" during 1910. Half of them wrote back that the book was worth many times its cost. New (3rd) edition is just ready. Price $1.00 postpaid. Send for a copy. The Bungalow *is the thing*, and this is the only book published which shows the REAL California Bungalow inside and out. Better send at once.

Smaller book, showing 38 Bungalows and floor plans, 25 cents postpaid.

The Bungalowcraft Company, 407 Chamber of Commerce, Los Angeles, Cal.



Cassens Ideal Eaves Trough Takes Water Only

The Ideal completely overcomes the disadvantages of the old style open gutter. It satisfactorily catches and carries away the water that falls on your roof. Its use insures clean, healthful cistern water. Leaves, trash, gravel, etc., cannot enter it. Neither can birds build nests in it. Therefore it is never clogged. Ice will positively not break down the trough

A unique and important feature of the IDEAL is that it will not fill with snow and ice. When it sleets the small opening (about one-eighth inch) is quickly closed. This prevents the bursting of the trough, also of the down spout. When it thaws the ice melts, and the entrance opens automatically before the water from the roof reaches it.

The Ideal can now be erected with a Wire Hanger if face-board has mouldings.

Special Propositions to Contractors, Builders and Architects

WRITE FOR FREE BOOKLET

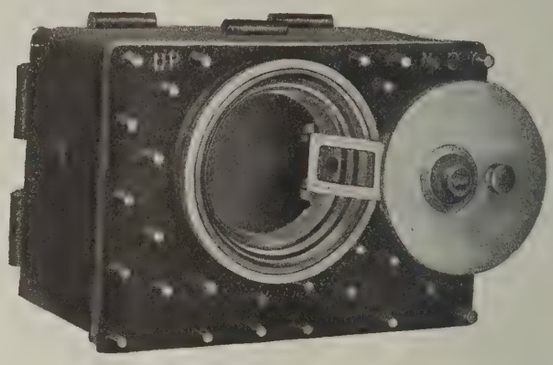
CASSENS MANUFACTURING CO., Edwardsville, Ill.

THE GALE WALL SAFE.

To protect one's valuables, we must consider the dangers which confront them. There is the ever present danger of burglars and petty thieves, and there is the constant danger from fire. There is also the danger of valuable papers being lost through misplacement in books, files, drawers, etc. At house cleaning time, little effort is made to carefully look over large bundles of papers, boxes, etc., but it is left to chance that no valuables are thrown out.

Protection against all of these dangers can easily be secured in large, cumbersome safes or vaults, but the average householder or tenant has no such amount of valuables as would warrant the purchase of such large pieces of equipment.

For the convenience of those wishing a safe place for ordinary valuables, papers, etc., the Willis Manufacturing Co., of Galesburg, Ill., are making a wall safe of unusual merit. They are made in several sizes, having a capacity of from 320 to 880 cubic inches, and are intended to be built in the walls or partitions of either frame or brick houses. When installed only the circular door is exposed,



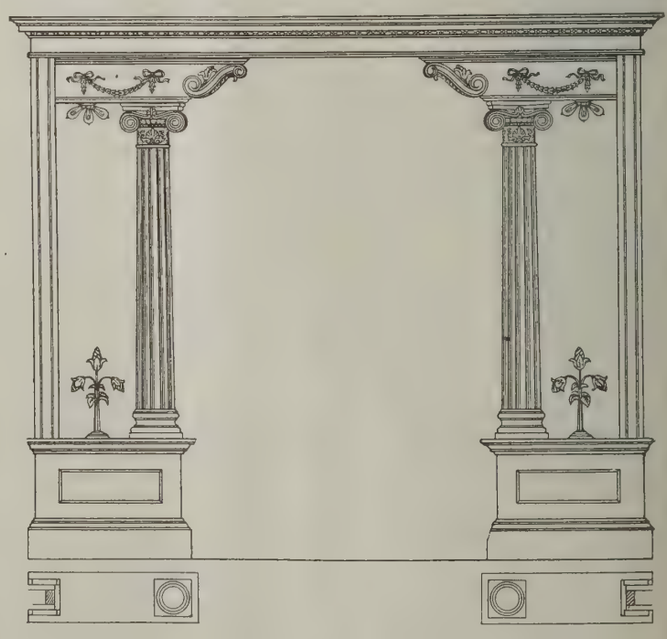
having a three tumbler combination lock of improved mechanism. The makers claim the locks are unpickable and are capable of an indefinite number of changes.

For protection against fire, the safe is lined with asbestos lumber, which, with the resulting air-spaces, insures perfect safety.

Don't leave your valuable papers, notes, receipts, etc., lying around where they will get lost or destroyed. Write to the Willis Mfg. Co., Galesburg, Ill., and get their information and prices on the Gale Wall Safe.

GRILLES, COLONNADE OPENINGS AND CONSOLES.

The catalogue number 19 of the Chicago Grille Works, 826-836 Wells St., Chicago, Ill., shows an excellent line of grilles, parlor colonnade openings, consoles, etc. The experience of the Chicago Grille Works in this line of material is based on many years of manufacturing and designing. They have always kept up to date in designs and have never cut down the size of the columns used in their openings from what they should be to mere curtain poles. They have always manufactured from the best materials and the sizes of columns, dowels, etc., have always been in proper proportion no



matter if this did mean a little more expense to them in getting the work out.

The policy of the Chicago Grille Works has been to give their customers the best materials, prompt shipment and fair treatment in every way and there are many of the best contractors and builders, not only in Chicago but in many other cities and towns, who will thoroughly agree to these claims.

The accompanying plate number 102-C.-18 illustrated here shows that the Chicago Grille Works is giving special attention to electric wiring, the connections being shown both on the pedestals and on

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SIMPLE, SCIENTIFIC SASH VENTILATOR

Practical proven device for putting pure air in, poor air out. Does not disfigure windows nor offer projections interfering with dusting or washing windows, non-rustable brass throughout. Adjustable to any air current. No drafts, dust or insects.



Results far better than from costly cumbersome affairs formerly used. Retails at $1.25 each.

Write for the big special discount made to National Builder readers.

Tested for three years by experts. Users are delighted. Get the facts and keep the profits.

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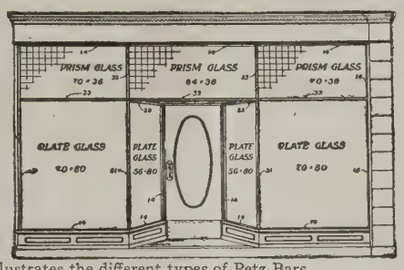
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IDEAL MFG. CO., - ERIE PA.

It Backs Your Reputation

A careful examination of Petz Bars and Corners will convince any architect or builder that he can recommend it with safety to any customer, large or small, who is erecting a modern store front. It combines style, strength and safety. It allows of easy installation, will not break glass, and gives perfect ventilation. Those who have used it all endorse it in highest terms.

We desire only a chance to convince you. Write us about your requirements, or ask us for our booklet on "Modern Store Front Construction." It describes and illustrates the different types of Petz Bars.



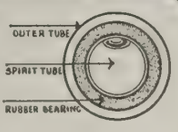
DETROIT SHOW CASE COMPANY

Sole Makers

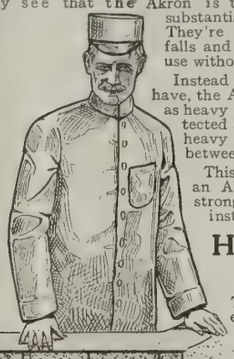
481 Fort Street West - - DETROIT, MICH.

AKRON LEVELS DON'T BREAK

When you buy an Akron Level, you get one that you can be as careless with as you like—it won't break every time you accidentally drop it.



Study the construction of an Akron Level and you'll instantly see that the Akron is the strongest and most substantial level ever made. They're designed to stand the falls and jars incidental to daily use without danger of breaking.

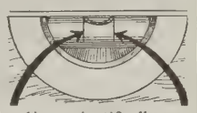


Instead of a thin, easily broken spirit tube, as most levels have, the Akron has a double spirit tube. The inner tube is as heavy and strong as ordinary levels have and it is protected and made doubly strong with an outer tubing of heavy steam gauge glass, with elastic rubber bearings between the two tubes.

This one feature alone should warrant you in buying an Akron Level, but there are several other equally strong reasons why the Akron Level is best of all. For instance:

Here is the Exclusive Easy Reading Feature

The two fine silver lines around spirit tube, one at either end of bubble when it is exactly in the center, makes the Akron the easiest-to-read level in the world. No other level has this exclusive feature which shows L-E-V-E-L, or otherwise, instantly, and can be seen at a considerable distance. No other level is so scientifically accurate, or so well adapted to every use that a level can be put to.



Akron Eclipse Levels are made in 33 styles and sizes for carpenters, masons, concrete men and everybody who uses a level.

And yet, with all the big advantages possessed by Akron Eclipse Levels, they cost no more than the ordinary kind.

Sold by Hardware Dealers Everywhere

If your dealer does not sell Akron Eclipse Levels, write us for catalog, mentioning your dealer's name. You want the best level that money can buy, so find out about Akron Eclipse Levels before you purchase. Write us today. A postal will do.

The Baker, McMillen Co.
Dept. A, AKRON, OHIO
U. S. A.



It's A Question of Cost

and the first cost is not all important—it's the first cost plus repairs.

"Buckeye Brand"
RED CEDAR SHINGLES
Reduces Roofing Cost

because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

R. J. MENZ LUMBER CO.

SEATTLE, WASH., U. S. A.

Pacific Coast Lumber and Timber Lands — MENZ TIMBER GOLD BONDS — Buckeye Brand Red Cedar Shingles

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THIS ROOF WAS LAID 20 YEARS AGO



CORTRIGHT METAL SHINGLES

WE are creating such a demand for them that they are rapidly supplanting wood shingles everywhere.

The use of wood shingles is already prohibited in many sections, because of their lack of fireproof qualities.

The modern roofing is **Cortright Metal Shingles** because they have every good quality a first class roof should have.

The contractor who handles **Cortright Shingles** in his section is getting the business.

Are you equipped to meet this growing demand?

If not, write for our special proposition to contractors.

Cortright Metal Roofing Company

PHILADELPHIA AND CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



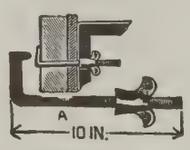


This PORTABLE FIREPROOF GARAGE is the only absolutely fireproof portable garage. Made entirely of galvanized steel. No wood. As handsome and substantial as masonry at one-fifth the cost. Lasts a lifetime. You can put up or take down in a few hours. All parts interlock and no frame work or foundation is required. *Every inch a substantial, fireproof, portable building.* By the **PRUDEN SYSTEM** of Portable Fireproof Construction we also build ideal cottages, hunting lodges, boat houses, work shops, etc. Every Pruden building is *guaranteed*. GET OUR FREE CATALOG. Write us the name of your auto and model number for catalog and price of suitable size garage. Write today.

METAL SHELTER CO., 5-50 W. Water Street, St. Paul, Minn.

WHAT WOULD YOU SAY if you had Wall Brackets that would last a lifetime?

The Taylor Steel Scaffold Bracket



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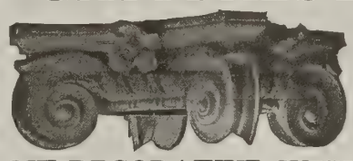
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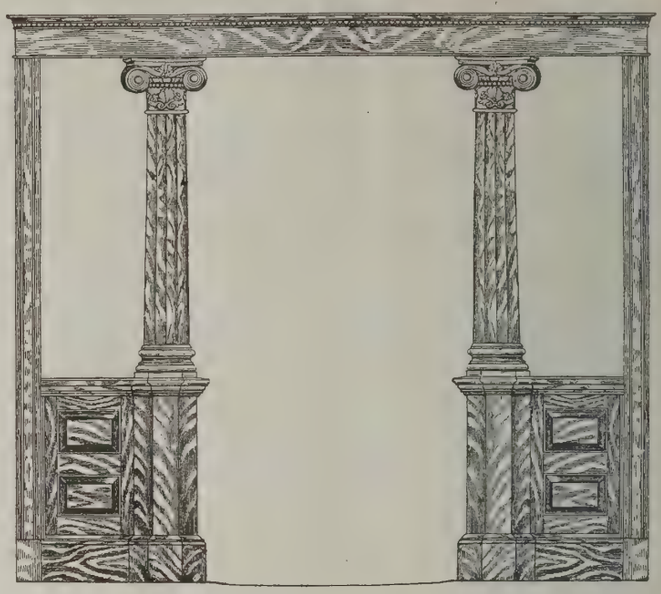
add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG No. 16

It contains many beautiful designs of Consoles, Columns and Grilles.

NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

the beam brackets. Plate No. 55-C.-18 shows a neat arch design for an opening between a stair hall and parlor, where a little more privacy is needed by the home owner. This arch, as well as the other, is made in various widths and heights, each in proportion to the open-



ing to be filled. The catalogue is issued by the Chicago Grille Works shows many other fine designs, such as these two, and can be had to make selections from upon request.

AUTOMOBILE TURNTABLES.

In the construction of a small garage a turntable is a great convenience, in a large one it is necessity. This statement would apply nearly as well to stables, where most of the readers of THE NATIONAL BUILDER are familiar with the efforts necessary to turn carriages around in close quarters.

As manufactured by the Lansing Wheel-Barrow Company. A turntable is not a difficult piece of equipment to install and the simple construction insures freedom from repairs. When properly installed, the table can be used as a wash stand, the water running freely over the smooth top and finding its way out through a trough at the edge of the pit.

Nor is it necessary to put the turntable in the garage. It can with equal facility be placed in the driveway in front of the door; this allows one to drive into the garage when in a hurry, or if time permits the car can be turned before entering the garage, and to be ready for leaving the garage under power.

The use of a turntable is more than a matter of convenience. A large part of "tire trouble" results from turning and twisting the car in cramped quarters, such as are usually met with in the cities. The cost of repairs due to a slip on a dark night, tearing off the doors



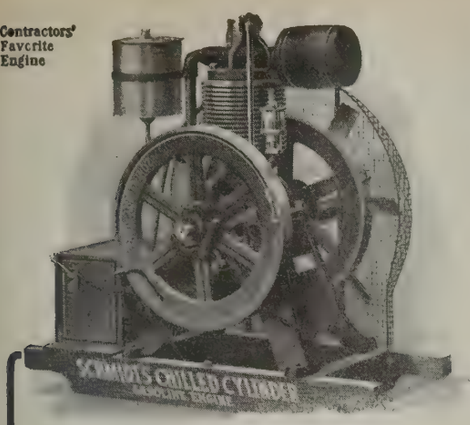
of the garage or smashing the top or guards will soon equal the cost of the turntable. The approach to the garage is not always a broad level stretch. Only too often there is a sharp turn or a steep grade with obstacles on one or both sides. A turntable is then the only practical solution.

When the garage must open directly on the street, as it must in most city garages, the danger not only to the street traffic and pedestrians but to the automobile itself, makes a turntable a real investment. A backing automobile receives scant courtesy especially when unnecessary, and these trouble are entirely preventable.

If you neglected to install a turntable when you built your garage or if you are about to build one, write to the Lansing Wheelbarrow Company, Lansing, Michigan, and ask for "Talks on Turntables." You will find it interesting and instructive.

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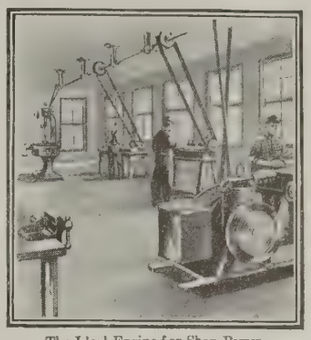
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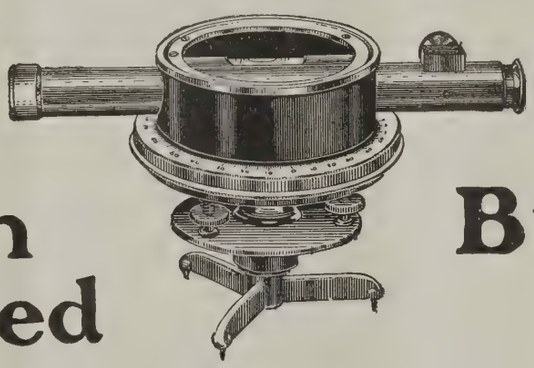
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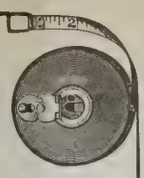
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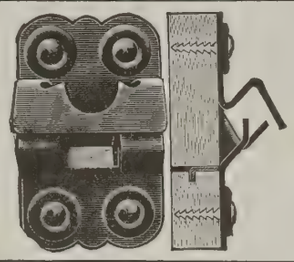
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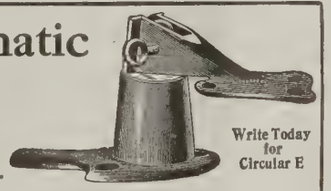


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Cannot slam or blow off.
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No blinds to trim or catches to interfere.
Will hold blind—open, half open or closed.

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Two styles, for brick or wood buildings

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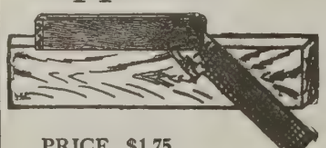


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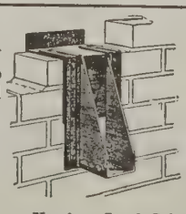
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Van Dorn's Steel Joist Hanger Has no Equal



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Structural Steel and Ornamental Iron Workers

No. 1—Steel Joist Hanger for Wood Header.

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CORTRIGHT METAL SHINGLES.

Practically every reader of THE NATIONAL BUILDER is interested in roofing, and we are pleased to be able to announce that the Cortright Metal Shingle Advocate will be sent free for one year by the Cortright Metal Roofing Co., 50 N. 23rd St., Philadelphia, Pa. The fact that an American home catches fire every three minutes, should lead everyone to try to reduce the fire risk. A large, too large, proportion of fires start from the roof, and by making that part of the building incombustible as well as rain and wind proof, the metal shingle is doing excellent work.

Remember, you can get your name on the list free by mentioning NATIONAL BUILDER to the Cortright Metal Roofing Company, 50 N. 23rd St., Philadelphia, Pa.

CANADA'S ASBESTOS SUPPLY.

[From Consul A. E. Seyfert, Owen Sound, Ontario.]

According to an official report, Canada produces 82 per cent of the world's supply of asbestos. The companies operating asbestos quarries and factories in Canada are capitalized at $24,290,000. In 1880 only 380 tons of asbestos were produced in the Dominion, valued at $24,700; in 1909 the output was 63,300 tons, valued at $2,300,000. In 1909 2,000 men were employed in the asbestos industry, and received wages amounting to $1,350,000. In the Black Lake quarries, in the Province of Quebec, there are 451,000,000 tons of asbestos rock in sight. The Russians are the only real rivals as regards extent of asbestos resources, but are heavily handicapped by the excessive cost of transportation of $35 to $40 per ton from the Russian mines to London. Serious competition is not feared by the Canadian companies on this account.

The asbestos slate or shingle industry is being developed by the plants in Canada, and predictions are made that in a short time 75 per cent of all the asbestos produced in the Canadian quarries will be used for asbestos shingles. The asbestos-slate business is only five years old, but during that time the demand for this article has increased enormously, and large factories are being established to supply the demand for this new roofing material.

HOW TO SELECT DRAWING INSTRUMENTS.

Under this heading the Keuffel & Esser Co. are sending from their general office and factory at Hoboken, N. J., a dozen or more pages from their catalogue. The pamphlet describes in detail their grades of drawing instruments, especial attention being paid to the construction of the Pivot joint of their dividers and compasses.

Many architects and draftsmen are familiar with the Keuffel & Esser Co. goods, and others should inform themselves as soon as possible.

WARM, COOL AND QUIET DWELLINGS.

Under this appropriate heading the Union Fibre Co. of Winona, Wis., are sending out a fine catalogue describing their products and illustrating their use as applied to structures of many kinds.

Of course we want a house warm in winter, cool in summer and free at all times from internal vibration from room to room and from floor to floor. But the question is, how can these results be best obtained. The use of insulation makes a house warm in winter by preventing the cold winds from penetrating and preventing the heated air from escaping. Wrapping a blanket around a house keeps out the cold air, and keeps in the warmed air exactly on the same principles that we wear clothes. The saving resulting from the use of proper insulation, such as Linofelt, soon exceeds the cost of



the installation, besides the greater comfort obtained through its use. What is true in winter is also true in summer, the protective effect of the insulation keeps the warm air outside, and makes the interior cool and comfortable on the warmest days.

It would be impossible to build a tight wall thick enough to prevent any air passing through, but this might not prevent the changes in temperature or the passing of sounds and vibration, for instance if the partition was of sheet metal. By the use of a preparation such as Linofelt, the passage of heat and vibration are also stopped, making the walls and partitions practically sound proof, as well as guarding against changes in temperature.

Insulation should be used whenever it is desired: first, to guard a building against changes of temperature, keeping it warm in winter and cool in summer; second, to prevent sound passing from room to room or from floor to floor, as in schools, hospitals, conservatories, public halls, etc.; third, to keep cold places cold, as refrigerators, ice houses, cold storage, refrigerator cars, etc.; fourth, to prevent condensation of moisture on walls and ceilings.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



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at Less Than Dealers Ask For Pine

Despite the growing scarcity of Oak, which has been seized upon by lumber dealers and manufacturers as a pretext for raising prices on Oak Doors, Interior Finish and Flooring, we are actually selling the very finest qualities and grades at **less than dealers charge for Pine.** Years ago the Gordon-Van Tine Company arranged for the output of large tracts of the best Oak timber in America. **Our customers profit by our foresight.** We are actually selling Oak to carpenters and contractors at less than the same material would have cost you **ten years** ago. The cut in prices not only affects **Oak Doors,** but extends through the whole line of **Oak Finish and Interior Trim.** A further reason for our low prices on Oak is the big scale on which our goods are manufactured, and our small selling expense.



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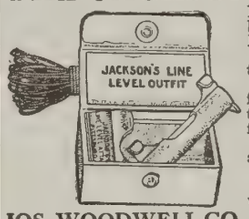


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Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

This is possible because the Aluminum Line Level weighs only one-fourth ounce and is easily and quickly attached to a line. Levels thus taken are guaranteed to be accurate on a stretched line from one to forty feet. Besides, from its construction, it can be used as a Pocket Level.

This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

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It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

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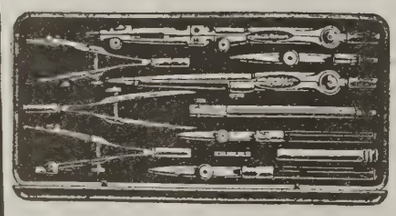
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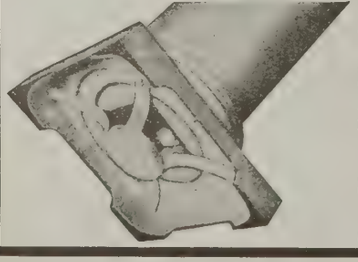
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Are You Going to Build?

Don't forget to remind your architect to specify the Zimmerman Iron Base, the only one with a center bearing.

It ventilates the column, thereby preventing checking or opening and does not allow water to stand at the base to cause rot.

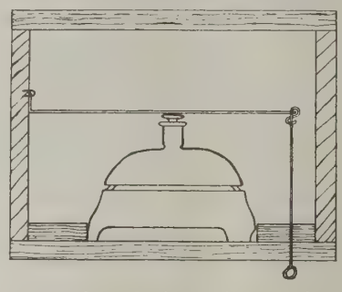
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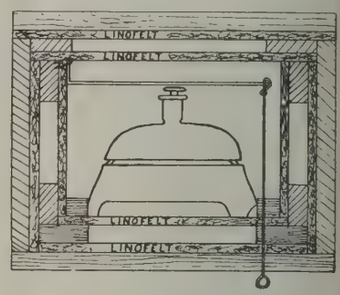
Syracuse Corner Block Factory

SYRACUSE, N. Y.

The city building, as well as the farmhouse, must be protected, the large schoolhouse in the city needs insulation no more than the barn or stable in the country. It is a well-known fact that cows will give more milk on less feed when kept in a warm barn. A garage must be kept warm to prevent the radiator from freezing, and it is almost impossible to start a motor when the gasoline is chilled.

The Union Fibre Co. of Winona, Wis., are manufacturing the insulating material known as Linofelt, particularly adapted to the work mentioned above. Linofelt is a quilt used for building purposes, composed of a filler of chemically treated flax fibres, quilted between two sheets of building paper. Waterproof paper, asbestos paper, and other coverings are furnished for particular uses. Linofelt is regularly finished in two styles, the first consists of rolls three feet wide containing two hundred square feet to the roll. For placing between studding, a special form is used either sixteen or





twenty-four inches wide, having the edges prepared for nailing or fastening to the studs, thus furnishing a substitute for back plaster.

To determine the efficiency of Linofelt for sound proofing, a well known architect who seldom takes things for granted, made the test boxes shown below.

Two small wooden boxes alike in every particular were constructed, both containing bells, the familiar kind which are sounded by striking buttons attached to the clappers. A lever with a wire extending through the bottom of the box provided means for ringing the bell. One box was made of wood only; the other lined inside with two layers of Linofelt tacked lightly to strips.

The bell in the box without Linofelt could be clearly heard when the wire was pulled, nearly as far as though the bell were unconfined. The bell in the second box could not be heard more than two feet distant.

Linofelt is kept in stock in all the large cities and the manufacturers, the Union Fibre Co. of Winona, Wis., will be glad to send any additional information regarding the use of their material. The catalogue mentioned above is well worth close study to anyone interested in making their homes more livable, as it shows how the material can be applied to both old and new buildings.

ECONOMICAL VENTILATION.

Pure air as conducive to health and happiness, needs no explanation. Even in spring and summer, rainy and cool days necessitate window closing to the discomfort of many homes, offices, stores and school houses.

The Ideal Manufacturing Co. of Erie, Pa., are making a simple, yet perfect ventilator, which has all the advantages of the large, cumbersome and costly devices previously on the market. It is handsome, easily installed, free from the defects of the ordinary ventilators, and is very effective in operation.

That the readers of the National Builder may be acquainted with this excellent ventilating device, the Ideal Manufacturing Co. is making a special price for June inquiries. It will be saving money to investigate.

WOODWORKING MACHINERY.

No. 713 of The Mechanic, the house organ of the H. B. Smith Machine Company, Smithville, N. J., is of considerable interest to users of wood working machinery. Particular attention is shown in this number of their No. 107A extra heavy nine-inch outside molding machine. This machine is built for the heaviest work, planing 9 inches wide on material 12 inches thick. Many devices for accurate work and safety are found on this machine.

We understand that the H. B. Smith Machine Company will send this magazine free to interested parties.

NOVO ENGINES.

Scarcely a building is erected in which a pump is neither used during construction nor installed as a part of the permanent plant. During the construction there are springs sometimes met with, frequently a water main or sewer breaks and floods the excavation, and the use of a pump at such times alone frequently pays for itself many times over in the lives and property saved, as well as the saving in time during construction. Under the high-speed requirements of modern construction, handling the water is among the ordinary risks connected with the contract, and the contractor must be prepared for emergencies when a pump is the only solution.

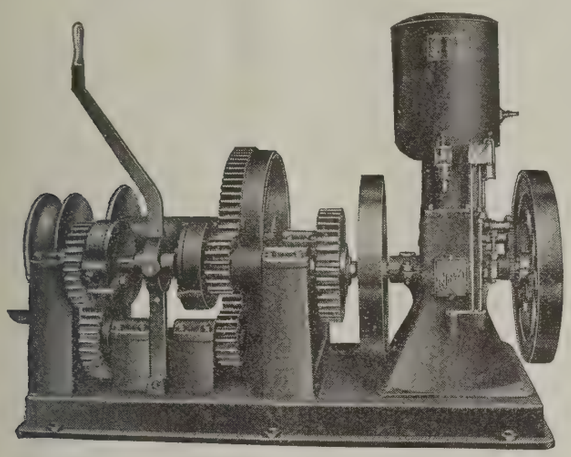
As the height of buildings increases, the contractor must provide means to get his material to the upper floors. Steam hoists have been tried, but the high speed necessary soon shakes the outfit to pieces. Electric hoists are ideal for many places, but the current cannot always be obtained. Gasoline hoists possess many advantages over other forms of power. Their horsepower is high for the weight of outfit, while their speed is high and adapted to intermittent use. When the contractor has a small shop it is imperative to have power for his machines. Most woodworking machinery is run at high speed, making gasoline power ideal. It is intermittent, for which work gasoline is on an equal with electricity and hours ahead of steam.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

On the farm water must be provided for the stock and should e ready for extinguishing fires. The combustible nature of many arm products, such as hay, straw, grain, etc., renders some protection ecessary, but how often we see fine building destroyed when a few allons of water would save them.

These are among the emergency requirements, it is true, but they ust be met, and it is just as well to cut down the number of costly ossible emergencies.

But there is a new danger confronting the farmer which will ave a direct bearing on the high cost of living. The importation uring the last few years of injurious parasites, insects, moths, etc., lready costs this country millions of dollars annually. No one thing



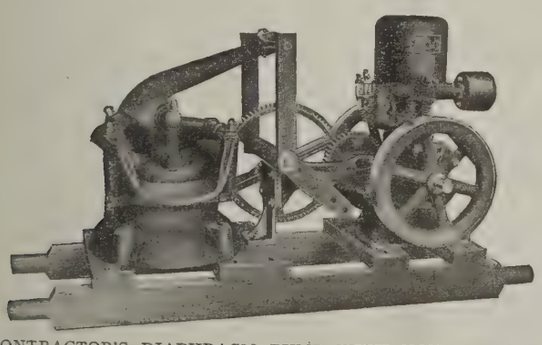
No. 1 HOIST WITH 5 H. P. NOVO ENGINE.

an help the situation as much as spraying with the various prepara- ons known to be helpful. A proper pump for spraying is an invest- ent which will mean saving many times its cost every year.

The Hildreth Manufacturing Company of Lansing, Mich., claim at in the NOVO they have perfected the small gasoline engine. hree sizes only are made, from two and one-half to five horse power, nd by concentrating their efforts on these sizes they are able to roduce what they claim to be the simplest, most reliable and satis- actory engine on the market.

The NOVO is the result of years of study and experiment, based n sound, well-established principles, and combining the best features f modern practice. Space prevents more than a brief statement eyond the fact that the motor is built for hard, consistent and con- nuous work, on any of the work mentioned above, as well as running ream separators, pneumatic water systems, cement mixers, feed rinders, and all light farm and contracting machinery. The engine ove is self-contained, a complete power plant, ready to set up at ny time or place, and needing no pipe, tank or fittings.

One of the novel features of the construction of the NOVO is e manner of cooling. Only a small amount of water is used, oviating the necessity for tank or fan. The engine can be left out l winter without danger from the weather.



CONTRACTOR'S DIAPHRAGM PUMP WITH NOVO ENGINE.

For the purposes mentioned above the NOVO can be obtained the engine only or connected with any of the machines men- oned. For the common purposes, such as hoists, pumps, etc., the se is made in one piece, making the entire engine self-contained. or general use, such as contracting, the value of this feature in rtability is apparent. We are able to show two forms of this novel gine, and the manufacturers, the Hildreth Manufacturing Company, ansing, Mich., will be pleased to send their catalogue or other esired information upon request. Users of small power machines ould investigate this engine.

To Mark Tools

Coat the tools to be marked with a thin covering of wax, hard llow, or paraffine by warming the tool slightly and rubbing the ax over the surface until it melts. Allow it to cool and make the esired marks with a sharp instrument such as a scratch-awl or eedle point set in a handle. Now, pour on nitric acid, which ill quickly etch the desired design. As soon as the marks are deep ough, wash off the acid and warm the tool until the wax melts nd can be wiped off.



Learn to Fill BIGGER SHOES!

Don't be satisfied with merely pushing a saw and driving nails Be a *master* of your craft. Learn to *plan* as well as to work—to use your *brain* with the *same skill* that you use your hands.

Learn to fill a *big-salaried* job—the kind of a job that hundreds of other men, with no more natural ability than you, are filling with ease and success.

HOW YOU CAN DO IT

You can *master every detail* of your line of work, *every branch* of building construction, *every angle* of architecture and carpentry—can do it in your spare moments and at almost no expense at all. You can have the knowledge and experience of over *four score experts* at your command, ready for instant use whenever you want it—can fit yourself to *fill any first class position above you that you desire*—simply by allowing us to place in your hands this great ten volume set *without your sending us one cent in advance.*

This Cyclopedia of Architecture, Carpentry and Building

is the most exhaustive, comprehensive and *practical* work on the building trades that has ever been published. It covers *every detail* of building construction from common carpenter work to reinforced concrete and steel; from masonry to heating and ventilation; from specifications and estimates to building laws and superintendence. It covers all the *practical* things that you *want* to know, all the things that you've *got* to know if you're going to be a success. It contains over 3,000 drawings, full page plates, diagrams, etc., has 4,670 pages, is bound in handsome half morocco and printed on special paper in large clear type—10 massive volumes—titles engraved in 23 karat gold. No *carpenter, contractor* or *building owner can afford to be without it a single day.*

Learn the Vitally Important, Practical Facts About

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Heating
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Ventilation
Steel Construction
Elevators
Architectural Drawing
Freehand Drawing
Making Blue Prints
Wiring Door Bells
Burglar Alarms
Sheet Metal Pattern Drafting
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Lettering

GET THESE BOOKS AND SEE FOR YOURSELF

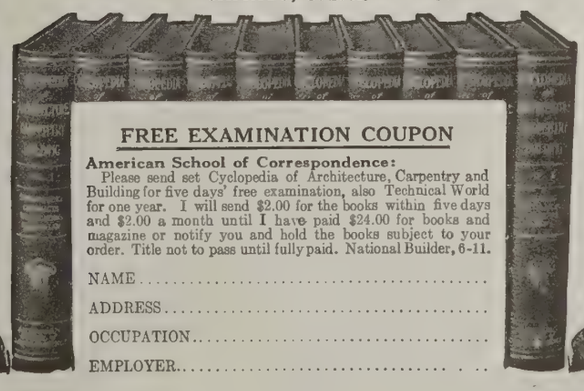
just what they are *before you send us a single cent.* Look them over carefully at your leisure. Keep them for five days before you decide whether you want them or not, and then if you don't believe that *each volume* is actually worth more to you than the price of the *entire set* send them back at our expense and the transaction won't cost you one penny. If you *do* decide to keep them, our charge will only be $24.00, spread out thin in easy payments of only $2.00 a month.

We don't *ask* you to buy these books on our description of them. We don't *ask* you to trust *our* judgment. We simply ask you to *get the books and see for yourself.*

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ORDER PROMPTLY and we will include for one year, as a monthly supplement, the Technical World Magazine, a regular $1.50 popular, illustrated magazine.

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American School of Correspondence:
Please send set Cyclopedia of Architecture, Carpentry and Building for five days' free examination, also Technical World for one year. I will send $2.00 for the books within five days and $2.00 a month until I have paid $24.00 for books and magazine or notify you and hold the books subject to your order. Title not to pass until fully paid. National Builder, 6-11.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

With Its Back to the Wind and the upward sloping opening in the back taking the full force of the wind, the Iwan Volcano Revolving Chimney Top makes a sure draft on the chimney.

Mountings can be bought separately and the hood and vane can be made in your shop according to patterns furnished free with all iron mountings. Sizes 6 to 12 inches.

Prices and catalog sent promptly.

Iwan Brothers, 1509 Prairie Avenue, **South Bend, Ind.**



ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS



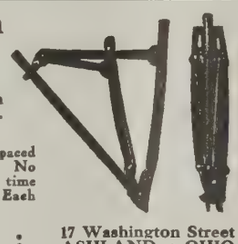
and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa

1000 Pounds Easily Carried on

THE ASHLAND Folding Scaffold Put up with Four 10d. Nails.



Strongest and Best Bracket made. Instantly adjustable to any spaced studding or pitch of roof. Can be used on any kind of siding. No pins or bolts used in adjusting. No boring holes in siding. Saves time and money on every job. Special Discount for First Order in Each Locality. Write for Circular N and Prices.

Ashland Folding Scaffold Co., : 17 Washington Street ASHLAND, : OHIO

"Diamond N" Expansion Shields



Have increased holding power on account of the corrugated ribbed exterior surface.

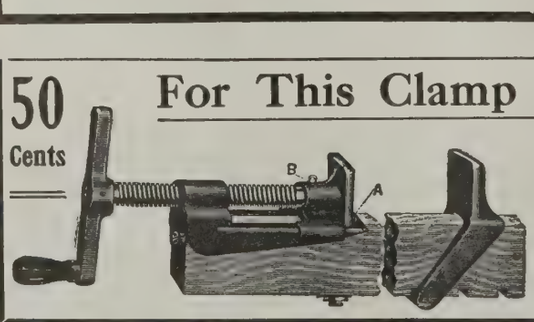
Securely clamped together without the use of springs or wires.

A better shield at the same price.

DIAMOND EXPANSION BOLT COMPANY

90 West Street, corner Cedar, - - - NEW YORK

50 Cents For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO. 321 N. May St., CHICAGO

CALDWELL SASH BALANCE



Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.

UTILITY WALL BOARD.

Wall board offers many advantages over other forms of lining and finishing buildings. While many of these are apparent to the readers of the NATIONAL BUILDER, there are some things about Utility Wall Board which appeal to special lines. The writer was looking over the latest catalogue of the Heppes Company while on a train. When the page showing a garage came up, a fellow passenger exclaimed: "That's just what I've been looking for. I want to line my garage, which is of sheet metal, and that is the first thing that looks like it would do the work." In a building of this character the heat of summer must be kept out as well as the cold of winter. It is in such places that Utility Wall Board is especially valuable.

In the stables and barns, as in the garage, wall board is of great value. Being windproof as well as waterproof, it adds greatly to the comfort of the live stock. Most especially, the harness, carriage and feed rooms should be lined for protection from dust and dirt.

But not alone in the stables, garages, and outbuildings is the board available. Every room in the house is better for a lining of this character. So many are the advantages that we can only refer to a few, leaving it to the practical readers of the NATIONAL BUILDER to find more ways in which to use this excellent material.

The billiard room has always been a place of interest to the builder. When the walls are plastered there is danger of damage from cues, chairs, etc. Wainscoting is expensive, while wall board takes the place of both, as it can be panelled to represent burlap or other finish, and its tough, fibrous composition renders damage extremely unlikely, and repairs easy.

Attic rooms usually have so many corners and angles that their finish is the despair of the plasterer, unless the arrises are covered to hide the crooked lines. The naturally plain surface of Utility Wall Board allows its use here to perfection, and a small amount of panelling gives an artistic finish to an otherwise unsightly room.

How many times we see the laundry tucked away in a corner of the basement where the rough walls and unfinished ceiling do not add comfort, if indeed they do not injure the clothes. An ideal laundry room built in the basement and lined with Utility Wall Board will please the women folks. When given two coats of oil paint, the walls are proof against steam and moisture.

Every room in the house has its use for Utility Wall Board. In the living room an artistic effect can easily be obtained by using Utility Wall Board for side walls and ceiling, with box ceiling beams and side wall panel strips stained with mission stain, the panels painted to harmonize with the finish of the woodwork. By stippling, a burlap effect can be obtained and, in fact, the decorator has the widest range in selecting the finish, as the board takes either oil or water colors readily.

For bedrooms, it is customary to fill the joints between the sheets with Utility Paste Filler, when it presents a perfectly smooth surface for painting or papering.

When we come to the bathroom, our preference is really for tile, isn't it? But when we learn the cost we decide we will find something cheaper. Utility Wall Board readily lends itself to sanitary finish, as an enamel finish can be easily applied, which will permit washing the walls as often as required. The peculiar composition of the board makes it efficient as a sound retarder, so that the noise of running water is seldom heard outside the bathroom.

Among the advantages of Utility Wall Board is its easy application. A novice can apply it over plaster or other finish, or can nail it directly to the studding. The variety of sizes in which it comes makes it possible to order sheets to cut to advantage, thus utilizing almost every square foot of it. Contrast this to the rubbish left by the plasterer. An ordinary workman applies the board much faster than a lather can prepare the walls for the plasterer, and the work is finished without the delay in time, the cost or annoyance due to the wet plaster.

To guide the intending purchaser, the Heppes Company, 4516 Fillmore St., Chicago, will send their complete catalogue relative to their products. Complete instructions for measuring are given, and it is well worth having this information on file.

FARM AND SHOP POWER PLANTS.

In this age of machinery every effort is being made in industrial lines to reduce the lines of labor of both man and beast. So much so, that the term "horsepower" is almost a misnomer and a quasi-mythical term handed down to us from the ages before mechanical power became a possibility. In factories, both large and small, little attention is paid to hand labor, and only the most delicate adjustments are left for the skill of the hand and eye of the trained workman.

In the smaller shops, there is still considerable dependence on hand methods, but here, too, the power machines are rapidly filling the place of hand and foot power machines.

On the farm mechanical methods are applied to many operations heretofore left to nature. Cream is separated from the milk as soon as milked, instead of allowing it to rise in the old fashioned way. Ice is made by machine when wanted, instead of being cut when the weather permitted. The reaper and harvester have taken the place of the scythe and sickle, even as the threshing machine replaces the threshing floor and the flail.

In arid and semi-arid districts, the crops are watered when they need it, thus supplementing the natural rainfall, and even replacing it entirely. Many districts blossom in almost tropical verdure under mechanical irrigation.

It is but natural, therefore, to seek the best power for use in these many places. Handwork is too slow and laborious, animals are not sufficient to do all the work, the steam engine is cumbersome and cannot be easily transplanted, besides requiring expert attendance all the time. Electric motors require current from outside sources, making the service costly, and so the mind naturally turns to the gasoline engine. This motive power possesses the qualities of portability, small weight for high power and speed, low cost of operation, always ready for instant use, adaptable for any purpose within the range of its power, and needs no expert engineer to operate it successfully.

Foremost among the manufacturers of gasoline engines for power on the farm and in the small shop; we find Schmidt Bros. Co

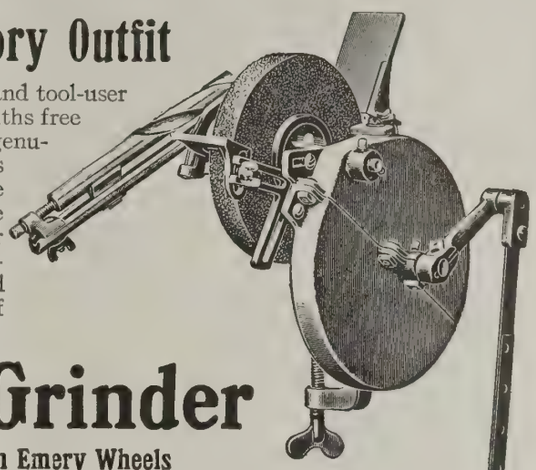
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

6 MONTHS FREE TRIAL



Special Offer on Shop and Factory Outfit

We want every carpenter, every shop, factory, contractor and tool-user to try this grinding, buffing and polishing outfit for six months free—a whole half year for you to find out how this perfected genuine Carborundum grinder saves tools, saves time, and earns money for any shop, factory or individual tool-user. We want you to prove these facts on your own tools. The whole half year's use will cost you nothing. Try it free for 6 months is what we ask and prove it is a big money-maker for you. Then send it back, if you wish—no hard feelings if you do. Send back the coupon at the bottom of this page for our 6 months' free trial offer.



Luther Diamond Tool Grinder

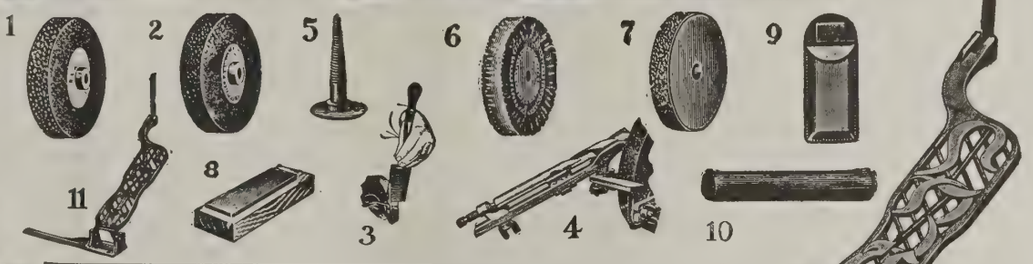
25 Times Faster Than The Grindstone—6 Times Faster Than Emery Wheels

The wheels of this grinder are genuine Carborundum. Nothing is so hard as Carborundum except the genuine diamond. Wheels actually made of genuine diamond would cut no faster. In reality Corborundum c ystals are artificial diamonds, made by fusing the elements of real diamonds in the electric furnaces at Niagara Falls, in which fire brick melts and runs like butter. In this *utmost* heat, Carborundum crystals get a temper and sharpness that cuts hardest steel or toughest malleable iron as emery does copper. Carborundum wheels do not glaze—they peel steel away in tiny shavings at lightest touch—no hard pressure necessary, no frictional heat, no water cooling necessary, no danger of drawing temper. Genuine Corborundum wheels do not get soft in spots, wear lopsided or glaze. They will outlast any number of emery wheels, saving that much money. They make it so easy to keep tools keen and bright, that tools are kept that way, and that means more, faster and easier work. They will not draw temper and tools last longer, which means another saving—to say nothing about the time saved in sharpening. But don't take our word—prove these facts by a half year's free use of this splendid outfit.

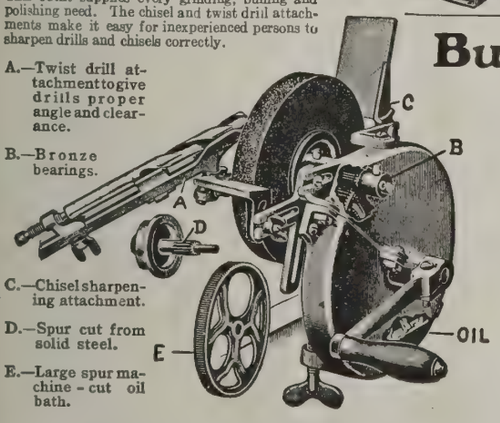
11 TOOLS IN ONE

This special offer on our shop and factory grinding, buffing and polishing outfit is a remarkable value—the greatest reasonably priced grinder offer ever made. This outfit, on which we will make a 6 months' free trial offer, consists of one Mechanic's Special Luther Diamond Tool Grinder with the following accessories;

1. One Rough Genuine Carborundum Wheel
2. One Fine Genuine Carborundum Wheel
3. One Chisel Grinding Attachment
4. One Twist Drill Attachment
5. One Polishing Spindle
6. One Buffer
7. One Polisher
8. One Oil Stone
9. One Carborundum hone in leather case
10. One Carborundum scythe stone
11. One foot power attachment



This outfit supplies every grinding, buffing and polishing need. The chisel and twist drill attachments make it easy for inexperienced persons to sharpen drills and chisels correctly.



A.—Twist drill attachment to give drills proper angle and clearance.

B.—Bronze bearings.

C.—Chisel sharpening attachment.

D.—Spur cut from solid steel.

E.—Large spur machine-cut oil bath.

Built Like a High Grade Lathe

The Luther Mechanic's Special, forming the basis of this Special shop and factory outfit, is built for a lifetime of service—has steel and malleable construction, dust-proof, bronze bearings, machine cut spur gears, bearings run in oil bath—speed 2,500 revolutions per minute. Carborundum wheels guaranteed 5 years.

Read what others say

Elmwood Haynes, of the Haynes Automobile Co., says: "I have found your machine a very satisfactory device."

Most Practical Grinder Made

I received the Carborundum Grinder and am highly satisfied with it. I consider it the best and most practical all-purpose machine so far manufactured.
ALLEN STOODLEY, Goldfield, Nevada.

The Best Grinder

I am well pleased with your grinder. It is the best grinder we have around here.
E. N. EARLES, Beallsville, Ohio.

What Neighbors Say

Your grinder does everything you claim for it and more too. I have shown it to my neighbors and they say it is one of the finest things they ever saw.
LEW KNUSTON, Leland, Ill.

Just As Represented

I have just received the grinder and find that it is just at represented. I am very well pleased with it.
C.H. THOMPSON, Cheyenne, Wyo.

Return this Coupon for 6 Months FREE Trial Offer on Special Shop and Factory Outfit

By returning this coupon you will not put yourself under any obligation whatever. We will send you full details of our Six Months' Free Trial Offer, and full description of this splendid grinding, buffing and polishing outfit, also the reprint from McClure's Magazine telling the interesting story of the discovery of Carborundum. Everything we send is free, and puts you under no obligations. If you want to increase shop production, save time, or make your work easier, let us tell you about this grinder.

Send back the coupon today.

LUTHER GRINDER MFG. CO.

55c Madison Street - - MILWAUKEE, WIS.

COUPON

LUTHER GRINDER MFG. CO.,
55c Madison St., Milwaukee, Wis.

Please send me free and prepaid your free Carborundum booklets and 6 months' free trial offer on special shop and factory outfit.

Name.....

Address.....

Dealer's Name.....

Address.....

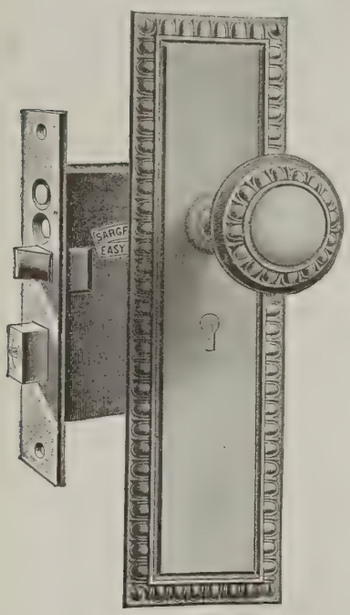
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Engine Works of Davenport, Iowa. In their latest catalogue and price list are shown many of the conditions when a motor of this character is well nigh indispensable. The novel points of construction make it especially valuable for places where the use is intermittent and where unskilled parties must operate it. The manufacturers claim that owing to its simplicity and reliability, this engine is particularly adapted to farm use for churning, separating, sawing wood, cutting fodder, etc., and can be easily rigged up to run a small woodworking shop.

The catalogue is well illustrated and contains prices and the liberal terms on which the engine is sent for approval. On request from the readers of the NATIONAL BUILDER they will send the engine for ten days' trial before the first payment is made. But send for the catalogue and see for yourself how much labor can be saved by this little machine.

FRONT DOOR SET.

The Rehm Hardware Co., 1502 Blue Island Ave., Chicago, state that they are having quite a demand for their 5308 Front Door Set, which is shown here. The lock of this front door set has a cast bronze metal front, antique copper finish, 5-16 swivel spindle hub, bronze metal bolts and steel keys. The latch and dead bolt are operated by one key. The knobs and escutcheons are wrought bronze metal, antique copper finish.



Special attention is called to the fact that the night latch and the dead bolt are operated by one key. This is something quite new and will be greatly appreciated by the property owner. This front door set will add greatly to the fine appearance of any door or room. While the knobs and escutcheons of this set are wrought bronze metal, and everything else about it is of the highest class, yet the price is exceedingly reasonable

The Rehm Hardware Company will be glad to quote prices on either a few sets or a complete bill for builders' hardware for any residence or building. They carry a very large stock of fine builders' hardware, make prompt shipment and endeavor in every way to give their customers the best values for their money.

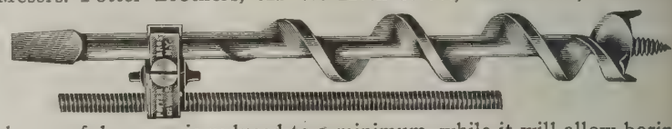
BURMITE ROOFING FOR IMPORTANT BUILDINGS

Bermingham & Seaman Company, with general offices at 1208 to 1226 Tribune building, Chicago, Ill., is meeting with a very gratifying demand for its Burmite material for roofing and siding, some of the most important buildings recently erected or under way in the northwest making use of this material as a roof covering. The utility of a high-grade prepared roofing for buildings of all kinds, and for roofs, whether flat or steep, appears to be well established. In addition to its cheapness, some of the advantages of a first-class rock-surfaced roofing are that it is not affected by climatic changes, nor by storms of wind, ice or hail, all of which are more or less destructive to roofs in general. Some of the important buildings roofed with "Burmite" include the Pioneer Press office building, a modern 18-story skyscraper which is regarded as one of the finest in St. Paul, Minn.; the warehouse of the W. J. Hoy Construction Company in the same city; the recently erected $250,000 St. Charles Hotel at Pierre, S. D.; the mammoth new lumber shed of the McMahon Lumber Company at Fergus Falls, Minn.; many of the depots of the Minneapolis, St. Paul & Sault Ste. Marie Railway; the warehouse of the Nicholas & Shepard Company at Fargo, N. D.; the new factory of the Towle Syrup & Refining Company, St. Paul, and many others.

THE PEERLESS FLEXIBLE BIT GAUGE.

When boring for mortise locks, dowels, etc., it is necessary to use great care not to bore too deep, as one unnecessary turn may strike a nail, cut through the stile or weaken the door. Many of the devices for gauging the depth of the hole are unreliable on account of springing, slipping or scraping, marring the work, etc. Others are limited in their range and will not permit of boring the full depth of the bit.

By the use of the Peerless Flexible Bit Gauge, the manufacturers, Messrs. Potter Brothers, 612 W. 110th street, New York, claim the



chance of damages is reduced to a minimum, while it will allow boring with any bit or twist drill to within three-quarters of an inch of the chuck of the brace. As there are so many places when this attachment, which can be put in any bit in an instant, can be used to advantage, every carpenter and woodworker should have one. While your dealer probably has the PEERLESS in stock, should there be any trouble finding it, write to the manufacturers at above address.

WOOD DISTILLATION.

The annual federal report on the statistics of forest production says that during the year 1909 there were consumed in the United States in the processes of wood distillation 1,256,157 cords of wood by 147 plants, as against 977,844 cords by 131 plants in 1908 and 1,282,120 cords in 1907 by the same number of plants.

The wood-distillation industry is concerned with the manufacture of such products as result from the heating of wood so as to produce volatile distillates and solid residue. Two distinct processes of manufacture, known, respectively, as the destructive process and the steam process, are in general use. In the former the wood is heated to such a temperature that the fibre is destroyed and new products are formed. In the latter the volatile substances are removed from the wood by treatment with steam, which does not destroy the fibre. Each process is modified to some extent for special uses.

The wood-distillation industry is naturally divided into two branches, "hardwood distillation" and "softwood distillation," and the statistics are presented separately for each class. With few exceptions, the establishments engaged in the former are confined to the Northern and Central states, chiefly Michigan, New York, and Pennsylvania, while the latter branch of the industry is located principally in the South Atlantic and Gulf states, especially Alabama, Florida, and Georgia.

Thirty-one establishments were reported as engaged in softwood distillation in 1909. Though the distribution according to states has changed greatly in the past three years, the total number is the same as in 1907 and only one more than in 1908.

Softwood distillation as an industry is still to some extent in an experimental stage. A number of the processes which have been tried have not proved uniformly satisfactory, and consequently estabishments have been abandoned or removed to more suitable localities. The total value of all the products of distillation amounted to $8,328,484, of which the value of charcoal was $3,509,019; wood alcohol, $2,082,253; other products, $2,637,212. These last products include tar, turpentine, oils, and pyroligenous acid.

The city of Yonkers, through its common council, has appropriated $10,000 for mural decorations in the council chamber of the new city hall, and in order to obtain these paintings the Honorable James T. Lennon has appointed as Art Commissioners, Rudolph Eickemeyer, Jr., G. Howard Chamberlain, and Charles H. Israels. For this purpose the Art Commission is instituting a public competition, for which competition a copy of the program may be obtained from the Art Commission of the city of Yonkers, care of James V. Mahoney, Board of Contract and Supply, City Hall, Yonkers, N. Y.

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15M

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Why the Buyer of Amatite Never Complains

WHEN a man buys ordinary ready roofing he usually neglects to paint it and after three or four years he comes back to the dealer with a protest. It is human nature to neglect painting roofs.

When a man buys Amatite Roofing he lays it on his building and in three or four years it is still as good as new and does not need any paint. He forgets he has such a roof but no harm is done by that.

There is nothing to neglect in the case of Amatite. Amatite has a peculiar surface—a sort of plastic concrete made of pitch and mineral matter.

This surface is plastic enough so that the material can be rolled up into handy rolls in the usual manner and handled just like any other ready roofing. When unrolled on the roof and nailed down it presents to the weather a continuous surface of mineral matter and pitch. On this surface wind, rain, storm, heat and cold have little effect. Year after year it looks up to the sky undisturbed and unaffected. It costs nothing to maintain and relieves the owner from all responsibility.



Dealers can improve their business by selling Amatite and buyers make a good bargain when they buy it. The price of Amatite is less than that of most painted roofings of less weight and durability.

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To Prove to You

the high, standardized construction and composition of Carey's Roofing, we want to send you

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THE PHILIP CAREY MFG. CO.

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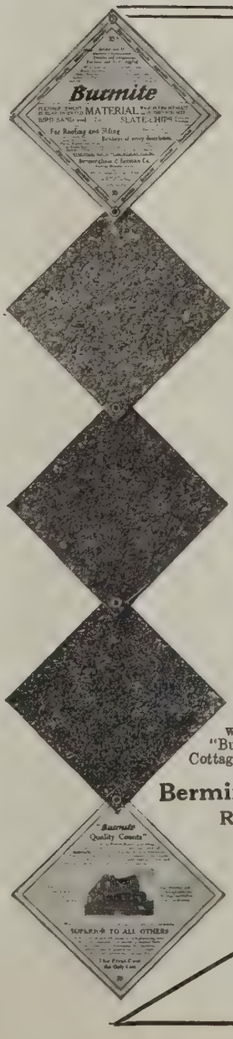
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Everybody interested in a Material for Roofing and Siding Buildings should have them, because they show exactly the reasons for the great success of

READY TO LAY

Burmite

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FLEXIBLE-CEMENT BURLAP INSERTED **MATERIAL for Roofing and Siding**

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Roof Insurance for 15 Years

Recognized and acknowledged to be the most Durable, Practical and Inexpensive for use on Buildings of any kind of construction. **Guaranteed for 10 years without Coating,** and if properly laid will last from 20 to 25 years. **"Burmite" lasts longer than shingles—costs less, lays smoother, looks nicer and requires no paint to preserve it. Can be laid over old shingles or tin;** is odorless, will not "run" on steep roofs; and on account of its unusual flexibility, is especially well adapted to flat or uneven surfaces, used in any climate, can be applied in cold or hot weather without danger of buckling, expanding or contracting. WRITE TODAY for Samples and Booklet, "Burmite Quality Counts," illustrated with buildings printed in colors showing beautiful effects of "Burmite" applied as a Roofing and Siding on Residences, Cottages, Summer Homes, Bungalows, Garages, Barns, etc.

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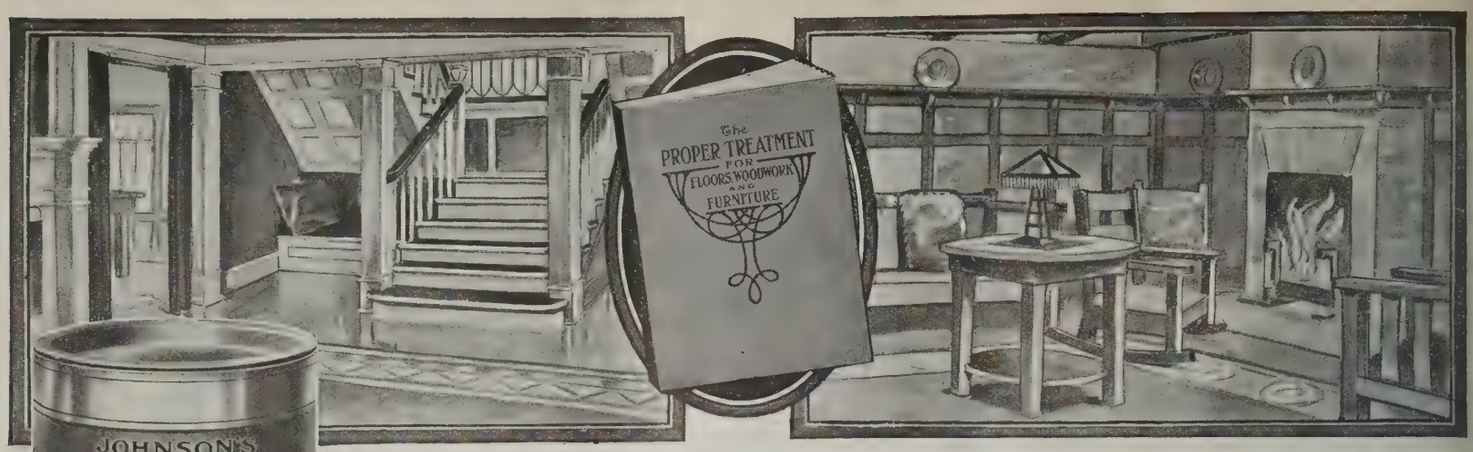
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This flat wood finish opens a new field for the painter. He can now give his customers the beautiful, artistic, flat, hand-rubbed effects that have always been so high-priced on account of the labor—at prices that are within the reach of everyone.

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For giving this rubbed effect to new woodwork, apply Johnson's Flat Wood Finish over Wood Dye, Paste Wood Filler, or Varnish—for old woodwork or furniture having a gloss or varnish finish, simply apply a coat of Johnson's Flat Wood Finish. It is not necessary to remove the old finish before applying the new—and one coat *thoroughly brushed in* is sufficient.

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Gallons	$3.00
Half Gallons	1.60
Quarts	.85
Pints	.30

One Gallon is sufficient for 500 square feet

FREE Let us send you free a test can of Johnson's Flat Wood Finish and a copy of our Instruction Book. We want every painter—you—to know all about this most important development in wood finishing materials. We will send you a free sample so you may try it yourself at our expense and be convinced. Write today or fill out coupon for sample of Johnson's Flat Wood Finish and panels of wood finished with it.

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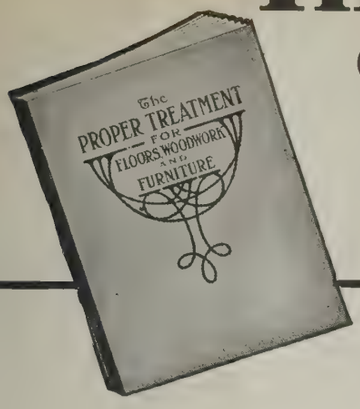
The Wood Finishing Authorities

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Instruction Book

On Wood Finishing and Generous Samples FREE

To Painters



WE HAVE just gone to the expense of publishing a hand-book on Wood Finishing especially for our painters. This Instruction Book gives full information about finishing all wood—soft or hard—old or new. There is no point it does not cover. It tells you just how much material you will need for any work so that you can easily figure out your estimates.

We want a copy of this Instruction Book in the hands of every progressive painter. Write today for your copy which we are holding here for you. Remember we will send it absolutely free and postpaid. You are placed under no obligation whatever.

We will also send you FREE samples of JOHNSON'S WOOD FINISHES. After you have tried our brand we know that you will never use any other, for our wood finishes will ALWAYS give your clients satisfaction—you will never have a dissatisfied customer if you finish all of your work with "Johnson's" standard finishes.

Johnson's Wood Dye

is made in 15 popular shades as follows:

No. 126 Light Oak
No. 123 Dark Oak
No. 125 Mission Oak
No. 140 Early English or Manila Oak
No. 110 Bog Oak
No. 128 Light Mahogany
No. 129 Dark Mahogany
No. 130 Weathered Oak
No. 131 Brown Weathered Oak
No. 132 Green Weathered Oak
No. 121 Moss Green
No. 122 Forest Green
No. 172 Flemish Oak
No. 178 Brown Flemish Oak
No. 120 Fumed Oak

Gallons $3.00—Half Gallons $1.50

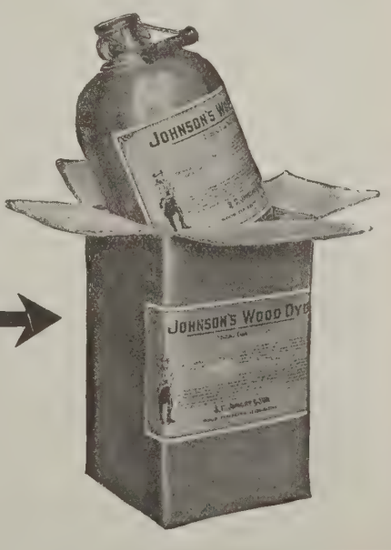
Johnson's Wood Dye penetrates deep into the wood fixing a deep, rich, permanent color which will not fade or rub off. It never raises the grain of the wood, and is very easy to apply, as it does not show laps and streaks even when used upon the softest woods.

Over the dye apply two coats of JOHNSON'S PREPARED WAX with a cloth and polish with a dry cloth or weighted brush. Prepared Wax gives that beautiful, lasting, artistic polish about which all of your customers are asking you.

GO TO YOUR LEADING PAINT DEALER for free samples of Johnson's Wood Dye and Prepared Wax. If your dealer hasn't the samples, write us for them, mentioning your dealer's name and the shade of dye of which you wish a sample and we will see that you are immediately supplied, free and postpaid.

S. C. Johnson & Son, [Dept. NB-6] Racine, Wis.

"The Wood Finishing Authorities"

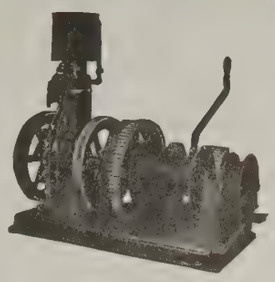


We show here an illustration of our new gallon and half-gallon package of Wood Dye. Both sizes are packed in a carton which can be safely shipped by express to all points. This package is very easy to handle. Unused material may be kept absolutely airtight in it.

Be sure to write us for free samples and the INSTRUCTION BOOK if your dealer cannot supply you.

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SIMPLE, STRONG, DURABLE

The most economical method for elevating building material. Two sizes, 4 and 6 horse power.

Contractors send for Bulletin No. 5 and get our proposition.

Also a full line of engines from 1 to 35 horse power.

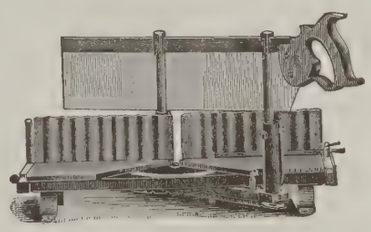
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Made of STEEL - Cannot Break

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Automatic Stops for holding up saw

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It tells all about the different systems of heating and explains the principle and contsruction of the

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Send for this free furnace book today. See why the Jahant gives more heat from less fuel, is easily regulated and requires very little attention. The Jahant is sold direct ready for you to install with our set of free tools.

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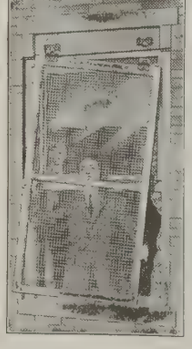
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BEATRICE



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KEES-GOSSETT DETACHABLE SUSPENSION **HINGES**

Try a pair to hang one of your own window screens.

After that you'll always use and recommend them.

Ask on your letter-head and we'll send a sample set free if you mention your hardware dealer.

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Screen swung out to wash windows

From an Economy Standpoint

STAR HACK SAW BLADES

FOR MACHINE USE 12 x 5/8

Surpass all other Blades. Eliminate carrying in stock Blades of varying widths and thicknesses with different numbers of teeth to the inch. They are made of the best material.

POSSESS GREAT STRENGTH AND DURABILITY.

Ask for and insist upon getting the Blade with the ★

ALL DEALERS KEEP THEM.

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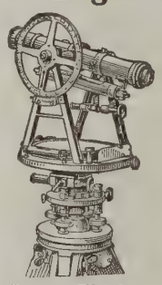
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"UNIQUE" Direct Black Print Paper. The best on the market, requires only one bath. Samples and quotations sent on request

Write for complete catalogue vol. 300 B.

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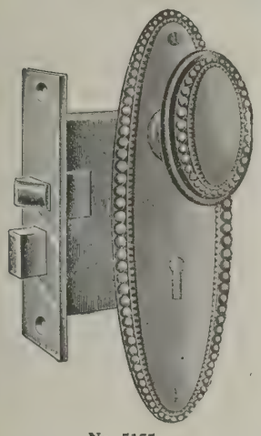
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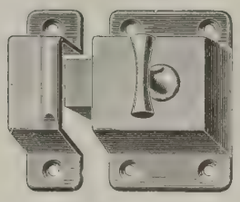
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We Can Save You Money
ON
BUILDERS' HARDWARE

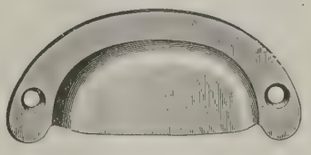


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No. 5155—Inside Lock Set. Steel, Old Copper Finish. Per Set.....$0.37



No. 2436—Cupboard Turns, Wrought Steel, Old Copper Finish. Per dozen.....$0.95

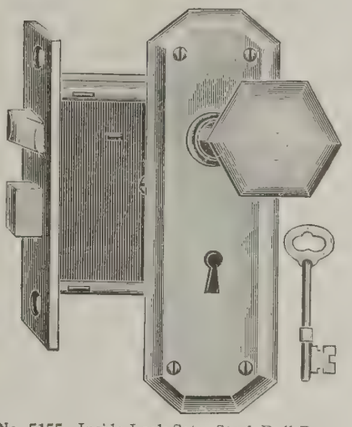


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No. 2330—Drawer Pulls. Steel, Old Copper Finish. Per Dozen.....$0.22

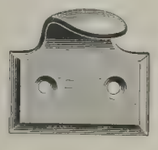


1⅜ x 5 inches

No. 8383—Bar Sash Lifts. Dull Brass Finish. Price per Dozen.....$0.50
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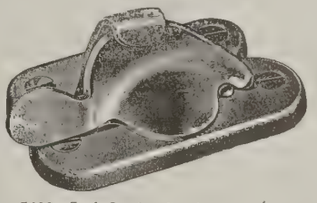


No. 2368 -Sash Lifts. Wrought Iron, Old Copper Finish per doz....$0.15

FREE to Contractors and Carpenters our new Illustrated Catalog and Net Price List.

We do not sell to Contractors or Carpenters in Cook County, Ill.

REHM HARDWARE CO.
1503 Blue Island Ave., CHICAGO, ILL.



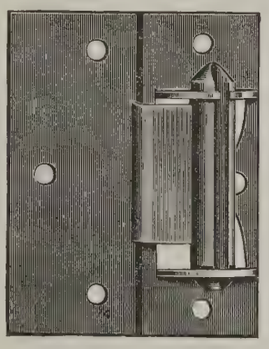
No. 5493—Sash Locks, Steel, Old Copper Finish. Per Dozen.....$0.50



Samson Spot Sash Cord

IS made of extra quality fine yarn, and warranted free from imperfections of braid or finish. It can always be distinguished by our trade mark, the Colored Spot. Carried by all dealers. Send for samples and tests.

Samson Cordage Works
BOSTON, MASS.



Diehl's Separable and Reversible Hinge No. 20

This hinge is designed for storm and screen doors. The door may be swung at right angles and lifted from its bearings without removing the screws, as the shank slides through the small slot in the upper ear so that it makes it very easy to change from storm to screen doors and from screen to storm doors without removing the hinges. Hinge No. 20 is made of open hearth wrought steel, 14 gauge, and finished in black baked japan or oxidized copper.

A Sample Set of Hinges will be sent upon receipt of 25 cents in stamps.

The Diehl Novelty Company SHEBOYGAN, WISCONSIN

Mention National Builder.

ORR & LOCKETT'S CABINET MAKERS' BENCH



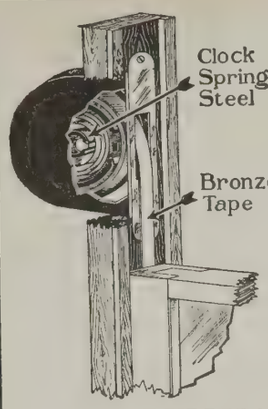
THIS illustration shows our regular Cabinet Makers' Bench. This bench is made entirely of maple. The top is made of 2¼ inch strips glued together to prevent its warping. The working top of the bench measures 78 inches long and 24 inches wide. We also make a smaller size, 66 inches long and 20 inches wide. These dimensions do not include the screws. **34 inches high.**

NOTE—We furnish with this bench our Continuous Screw, Rapid Action Roller Nut Vise. The simplest and best screw vise on the market. Jaws 10 inches wide, 4 inches deep, opening 12 inches.

Price of Bench including Vise.....$14.00

ORR & LOCKETT HARDWARE CO., 14-16 W. Randolph St. CHICAGO
Established 1872

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5,000,000 Pullman Sash Balances

In daily use and less than 100 repairs on all of them in a year. Do you know of anything that is used at all that wears as well? No more expensive than cords and weights, far more modern, neat and smooth working. Can be installed anywhere. Carry any weight window.

Sold by Dealers Everywhere
Send for Circular

PULLMAN MFG. COMPANY
10 Allen Street :: :: :: :: ROCHESTER, N. Y.

WHEN YOU GET TO **SASH CORD** USE
SILVER LAKE

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

Was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869



Mr. Carpenter and Builder

Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY
1442 N. Eighth St., ST. LOUIS, MO.

LET US SEND YOU THIS BOOK FOR
FIVE DAYS FREE TRIAL

Send no money—just mail to us your name and address. Your book will reach you by return mail. Keep it 5 days—use it—then either send One Dollar or return the book.

Standard Handbook of
ESTIMATING DATA

Every Man in the Building Trade needs it.

READ WHAT OTHERS SAY:

Your Standard Handbook is the best book of its kind ever written. For all the **30** years I have spent in estimating and building I would not be without it for twice the cost.

Name .....

Address .....

THE BUILDERS' AUXILIARY COMPANY, 325 Old South Bldg., Boston, Mass.

---

the VOLTZ UNIVERSAL SASH BAR



Makes any angle, allows for settling of building—keeps windows from frosting. The most beautiful, practical and durable bar in the world. Made in metal.

"Holds with a grip of iron, yet with a touch of velvet." Glass set from the outside. **More good features explained in our catalog—it's fine—send for a copy before you build or repair.** Write today.

VOLTZ MFG. CO.

1102-1104 S. 8th Street, :: St. Joseph, Mo.

HARTMANN-SANDERS CO.



Originators of the
"Lock Joint" Stave Columns

Universally Recognized

As the leaders in Architectural Beauty and Quality.

When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.

We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty.

But we are glad we stood the test, **that's why** we are selling more columns today than ever before.

Ask for Catalogue "T"—it's worth having for any **Home Builder**

We manufacture a full line of porch material and Interior Hardwood Columns.

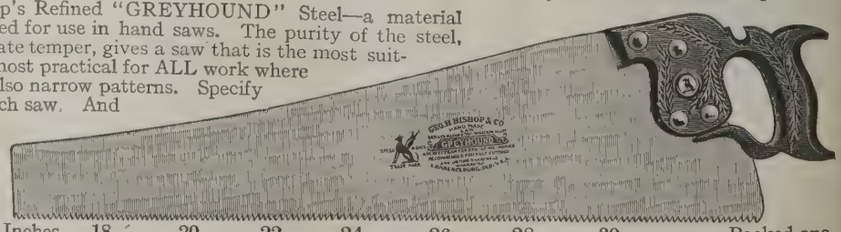
2155 ELSTON AVENUE - CHICAGO, ILL.

GREYHOUND HAND SAWS



The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.



Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana

Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

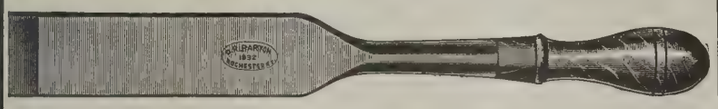


E. C. S.
KEEN KUTTER
Special Slim Taper Files

Particularly adapted for filing fine saws. These files are cut with a very thin edge and are in every respect the equal in quality and cutting of the larger sizes.
Every one guaranteed, and, if not entirely satisfactory, money refunded. If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY (Inc.)
Div. No. N. B. St. Louis and New York
U. S. A.

Last a Lifetime and Give Satisfaction to the End!



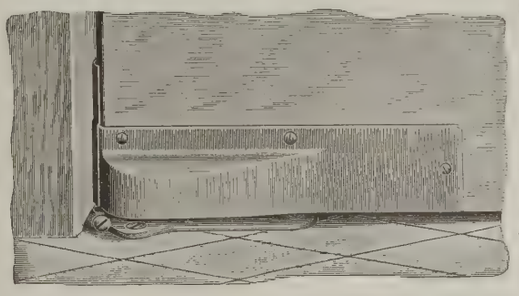
The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. R. BARTON 1832 ROCHESTER, N.Y.

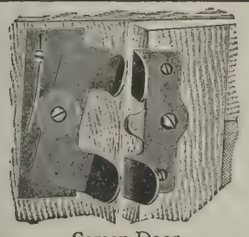
MACK & CO., Sole Makers
Brown's Race **Rochester, N. Y.**

1910 "Standard" Floor Hinges



sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio

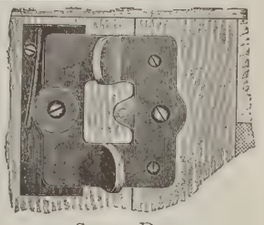

Screen Door

THE SENSIBLE SCREEN DOOR CATCH
A New Idea

The Sensible is the Catch that catches securely but quietly—prevents the door from warping, keeps out the flies, and reduces the noise of slamming to the minimum. Note the simple adjustment. Illustrations in this advertisement show catch one-third of actual size. Write for prices. Sample set mailed upon receipt of 25 cents.

MANUFACTURED BY

R. G. Winter Manufacturing Co.
2104 Vliet Street, : : MILWAUKEE, WIS.


Screen Door



THE LUXURY OF A LAKE TRIP

Where will you spend your summer vacation? Why not enjoy the charms of our Inland Seas, the most pleasant and economical outing in America?

Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; four trips weekly between Toledo, Detroit, Mackinac Island and way ports; three trips weekly between Toledo, Cleveland and Put-in-Bay.

A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

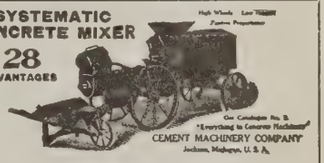
Send 2 cent stamp for Illustrated Pamphlet and Great Lakes Map.

Address: L. G. Lewis, G. P. A., Detroit, Mich.
Philip H. McMillan, Pres. A. A. Schantz, Gen'l Mgr.
Detroit & Cleveland Navigation Co.

CONCRETE MACHINERY

The greatest mixer made All kinds of styles of the latest cement block and brick machines and molders from $5 and up; in fact WE MAKE EVERYTHING IN CONCRETE MACHINERY (low prices but high grade) GET CATALOG N. FREE.

SYSTEMATIC CONCRETE MIXER
28 ADVANTAGES



$54 Concrete Block Machine



CEMENT IS CHEAP—BIG PROFITS

making concrete products and building sidewalks. Get a mixer. Get started. Prospects brighter than ever; things are going to boom in the cement industry. Get free Catalog "N."

CEMENT MACHINERY CO., Jackson, Michigan

CUSTOM MADE FLY SCREENS



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS

Our screens are made from kiln dried lumber and have waterproof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced

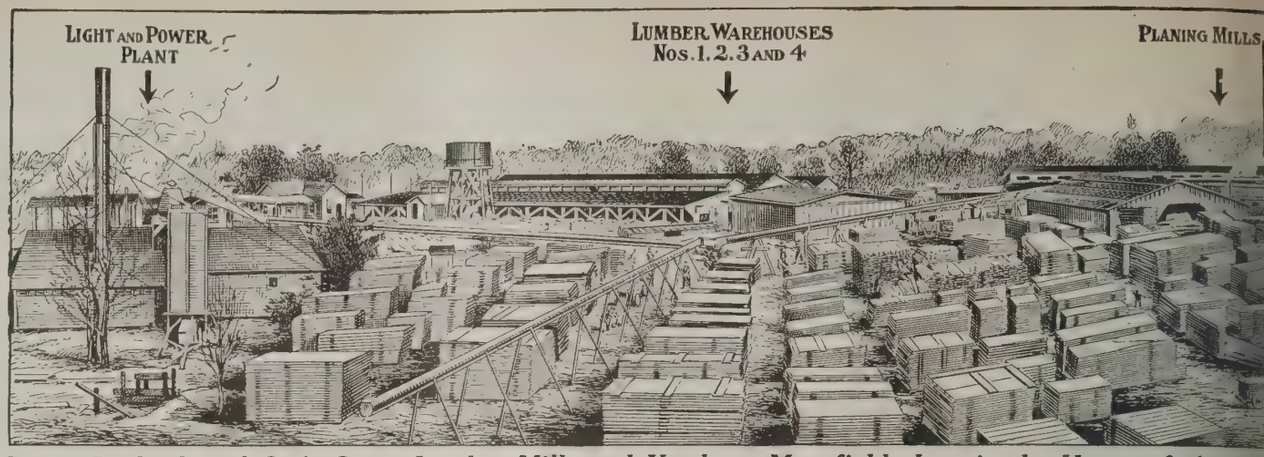
Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

A. J. PHILLIPS & CO., Le Roy Street, Fenton, Mich.
28 Years Experience. 3½ Acres of Floors

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Finest Timber in the World Converted Into Lumber and Shipped Direct to You From Our Own Mills.



Sears, Roebuck and Co.'s Great Lumber Mills and Yards at Mansfield, La., in the Heart of Americ

SUPPLY YOUR LUMBER NEEDS FROM TH

Why buy your lumber in dribs at high retail prices when you can buy from us in carload lots for the same prices or less than your retail dealer pays? A barn or building of ordinary size requires at least a carload of lumber

You Are Paying Too Much for Mill Work and Building Material



A Price Manual That Should Be on Every Builder's Desk.

"I would not take $5.00 for my Mill Work Book."

G. W. VAN-HOOSER, Dansville, N. Y.

IN THIS SPLENDID BOOK, the latest edition of which has just come from the press, we quote bed rock prices on more than 5,000 items. Our prices are not only the lowest, but our stock is also the largest and the best. You can buy the very latest designs in Craftsman doors and trim for about the same price which you pay for the ordinary doors in the local market. We can save you fully 50 per cent on magnificent massive buffets and china closets. Whether you are in need of $5.00 or $500.00 worth of mill work, you should have our new catalog in order to get the biggest possible value for your money.

JUST GLANCE OVER THE FOLLOWING PRICES on a few items selected at random from our new Building Material and Mill Work Catalog:

$ 1.50 Doors	$ 0.95
2.00 Windows	1.10
1.00 Moldings, per 100 feet	.25
75.00 Stairs	22.80

WHY WE CAN QUOTE YOU THESE EXTREMELY LOW PRICES: The big mill work factory from which we ship your order carries a stock on hand at all times upward of **half a million dollars.** Manufacturing our material in such huge quantities enables us to control the raw material, and our big sales make it possible for us to operate with the smallest margin of profit. **You reap the benefit.**

DO YOU KNOW THAT THERE IS NOT A SINGLE STATE IN THE UNION INTO WHICH WE HAVE NOT SHIPPED OUR MILL WORK? Right in your own state are hundreds of people regularly doing business with us, and we will be glad to send you copies of unsolicited letters which they have written us telling of the good quality of our material, the big saving which we enable them to make, and the prompt and careful manner in which we ship the material.

Clip the coupon today, fill it in and mail it to us, or mention this magazine, and we will send you by return mail, postage prepaid, our great Building Material and Mill Work Catalog, which may be the means of saving you more than $1,000.00 during the present year.

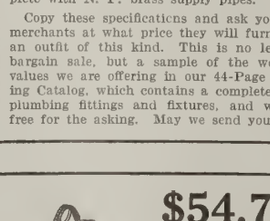
Low Down Closet Combination, $12.25



Think of a low down combination, the tank of which is made of kiln dried oak with a beautiful golden gloss finish, capacity 6½ gallons, lined with 10-ounce copper, fitted with a combined lever ball cock, which is guaranteed to stand a pressure of 150 pounds, with a rubber ball valve, the most simple and serviceable valve on the market, and with china push button in front of the tank to operate it. The seat is made of the same grade oak and is furnished with cover, with heavy N. P. brass offset hinges. The bowl is made of the highest grade English vitreous ware, is a siphon wash down pattern, absolutely perfect in every way. Furnished complete with N. P. brass supply pipes.

Copy these specifications and ask your local merchants at what price they will furnish you an outfit of this kind. This is no leader or bargain sale, but a sample of the wonderful values we are offering in our 44-Page Plumbing Catalog, which contains a complete line of plumbing fittings and fixtures, and which is free for the asking. May we send you one?

$54.75



Ball Bearing Combination Rip, Crosscut and Band Saw Machine for Foot, Hand or Belt Power.

Other Machines $20.50 and up.

This machine has five ball bearing journals, one rip guide, one angle adjustable crosscut guide, one 10-inch rip saw, one 8-inch cut-off saw and one ⅝-inch band saw. Length, 15 feet. Ask for our Special Machinery Catalog.

We are independent lumber manufacturers. We control the raw material from which it is produced. Our price represents the actual cost of manufacture plus one small reasonable profit. We employ no middlemen.

How Can You Compete with another contractor builder or carpenter who buys his lumber from us at a saving of 25 per cent of the prices you have to pay a local dealer, unless you follow his example?

Your Success Must Depend (very soon if it does not already) upon your knowing where you can buy your lumber and building material and supplies at the lowest prices and to the best advantage. Such knowledge is worth as much to you as an understanding of any new method or feature of construction work.



A few items picked at random from o Lumber Price List, showing OUR PRICES our mill. Let us send you our DELIVERE WHOLESALE PRICE LIST, showing wh these and other items of lumber cost deliver in YOUR town.

1x4 Boards, 10 to 20-foot lengths. Pric per 1,000 feet board measure.

No. 1 grade	$13.
No. 2 grade	9.
No. 3 grade	$7.

Take Another Look at the illustration of ou great lumber yard. It is reproduced from an actua photograph, taken recently, and tells its own story Here we keep on hand constantly a stock of nearl 15,000,000 feet of dimension timber, ceiling, siding flooring, finishing and other lumber, soft pine, fl flooring, cedar shingles, cypress shingles, cypres lumber, pickets, lath, etc. We can fill your ever order, whether large or small, without delay an without substituting.

Remember that your purchase is loaded on th cars in this yard (and in the near future from ou Illinois yard) and unloaded at your freight depot You save all the expense of several unnecessar handlings, as well as two substantial profits—the jobber's and the retai dealer's.

Our Lumber Is Not Regraded. We guarantee all stock to run in eve width and thickness, and all tongue and groove material to be absolutel uniform. If you can use poor regraded stock on some of your work, wh not increase your profits by buying Southern mill grades from us and regrad ing the lumber yourself?

GET OUR PRICES ON ROOFING

We Can Save You $50.00 on the Average Size Roof.

A few of the remarkable values shown in our latest Roofing Catalog:

Tarred Felt Roofing.	Best quality, 108 square feet, 85-cent value. Price, per roll	$0.50
Rubber Asphalt Roofing.	The ordinary kind, 108 square feet, $1.25 value. Weight, 34 pounds. Price, per roll	.79
Flint Coated Rubber Roofing.	108 square feet, $1.65 value. Weight, 50 pounds. Price, per roll	.95
Corrugated Steel Roofing.	28-gauge, heavy, painted red, 100 square feet. $2.50 value	1.85
Best-of-all Roofing.	3½-ply, 108 square feet, $3.50 value. Weight, 60 pounds. Price, per roll	1.80

Send us your business card or write on your printed letterhead and we will send you a complete layout of roofing samples, as well as our latest Roofing Catalog. Every price in this Roofing Catalog shows a saving of 25 to 50 per cent over retail prices.

Your Money, Including Any Freight Charges You Have Pa

SEARS, ROEBUCK AND

WATCH FOR OU

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



st Timber District. (We Also Have Another Big Lumber Plant in Course of Construction in Illinois.)

We Save You $100.00 to $150.00 on a Small Carload of Lumber.

NORMOUS STOCK AT WHOLESALE PRICES

We save you the profit you have been paying the retailer and the cost of handling the lumber through two or ee middlemen, which you have also been paying. Read the facts; they are of vital importance to you.

The control of coal and lumber prices has long been out of the hands of the public. We have restored lumber prices to a fair basis. Wideawake contractors and builders are alive to the great bene- fits our plan provides.

We Can Save You $100.00 to $150.00 on an rage carload of lumber. Think what this means ou in the extension of your field of operations the growth of your business!

Our Plan Is Not an Experiment. We have been ping lumber and mill work to every state in the on for the past three years. Letters from thou- ls of pleased customers show that we are able to them from $6.00 to $10.00 a thousand feet, ther they live in New Jersey, Colorado, Montana lorida.

ER PRICE LIST

Prices" to Every City in the United States.

ou cannot wait for our delivered Lumber Price List, US YOUR LIST, we will gladly mail you our bid quoting r prices on your entire bill of lumber or mill work. rices, however, will be exactly the same as the printed in our wholesale price list.

4 Bevel Siding, clear grade. Price, 000 feet board measure.....**$16.00**

Dimension Lumber, 12, 14 or 16- engths. Price, per 1,000 feet board re.

1 grade.....**$11.50**

2 grade..... **9.85**

r our complete assortment and wholesale send for our Delivered Wholesale Lum- st.

We Guarantee Every Foot of Lumber in our stock e strictly Southern mill grades. Our great saw situated at the edge of the timber tract in the t of America's finest timber district, is sur- ed by none in the character of its equipment. ry operation in the manufacture of our lumber, the selection of the standing timber to the ling and loading of the finished product, is in hands of experts.

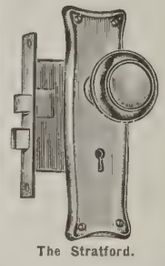
We Can Make Shipment Within 48 Hours After eipt of Order and guarantee every shipment reach you in perfect condition. So perfectly nized is our service that we are able to make plete shipment of any ordinary order within a hours following its receipt. All orders are handled and loaded by men xperience, so that we can guarantee its safe delivery to you.

Begin Now to Make More Money. Make up an order for a carload of lum- send it to us and let us open your eyes to the possibilities of our for increasing your profits. Any kind of an order will serve to demon- te our ability to save you money.

Be Cheerfully Returned If You Are Not Perfectly Satisfied

., CHICAGO, ILLINOIS

AD NEXT MONTH



98c

Stratford Design Genuine Bronze Lock Set

For Inside Doors. Full size. Unsurpassed finish in sanded or polished antique copper or lemon brass. Regular value, $1.50.

The Stratford.

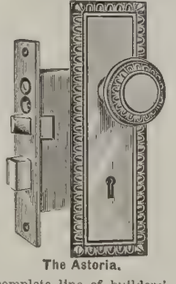
$1.77

Astoria Design

One of Our Handsome Front Door Lock Sets.

A $2.50 value.

Genuine bronze three-tumbler lock. Strictly high grade. Sanded or polished antique copper or lemon brass finish.



The Astoria.

Every item in our complete line of builders' hardware offers similar savings. Write for our Special Hardware Catalog.

From Our Factory to You

Seroco Ready Mixed House Paint



Guaranteed Like No Other

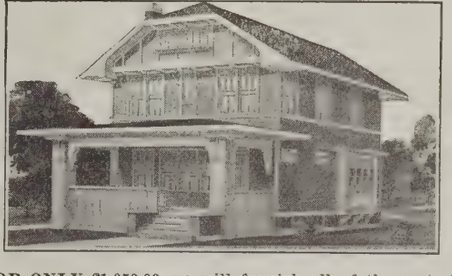
We Grind and Mix It Ourselves.

$1.10 to $1.23

a Gallon According to Quantity

Send for Color Samples and Catalog of Our Complete Line of Paints and Varnishes.

$1,050.00

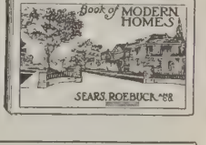


FOR ONLY $1,050.00 we will furnish all of the material to build this large six-room frame house, brick, cement and plaster excepted. To give you an idea of the high grade material we specify, we direct your attention to just a few items as follows: Clear narrow bevel cypress siding, *A* cedar shingles, fir edge grain porch floors, clear oak and maple flooring and pure white tile flooring in the bathroom, Craftsman design oak doors, stairway and trim for the first floor, clear birch doors and trim for the second floor, a beautiful rustic fireplace with two colored glass windows on each side in the living room, and a massive oak buffet of the latest Craftsman design, with seats on each side, covering the entire end of the dining room.

$2,000.00 WILL NOT BUY YOU A BETTER AND MORE HIGH CLASS BILL OF MATERIALS IN YOUR LOCAL SOURCE OF SUPPLY. The difference between $1,050.00 and $2,000.00 represents your saving when you place an order with us for a complete house bill of the size and design illustrated above. We are enabled to make you this big saving because we are producers of lumber and sell the best mill work made at wholesale factory prices. We offer to sell you, Mr. Contractor, on the very same basis the local lumber dealer pays when dealing with his source of supply. You save the retailer's profit.

OUR BOOK OF MODERN HOMES illustrates, describes and prices nearly 100 houses for which we furnish all of the material at amounts ranging from $153.00 to $1,521.00. For each one of these houses we give complete building plans, typewritten specifications and an **itemized bill of materials** (our bid), placing at your command the best architectural service that can be procured.

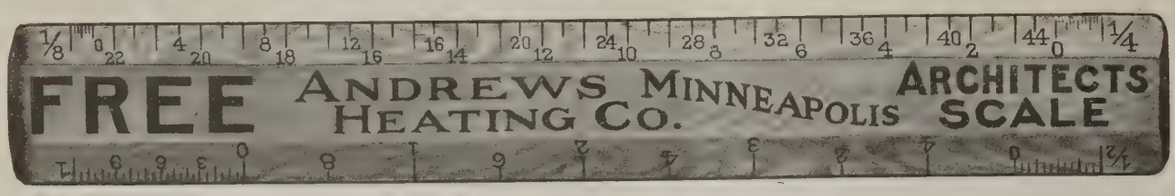
TO PROVE TO YOU THAT OUR HOUSES ARE MASTERPIECES in design, substantial in construction, and can be built at an immense saving, we print in our Book of Modern Homes twenty-two photos of houses built according to our plans and with our material, together with letters from the builders telling of their experience. Thousands of dollars have been expended by us to make our Book of Modern Homes a really helpful building guide for contractors, carpenters and everybody interested in that line. You can't afford to be without it. Use the coupon today and ask us to send you a copy.



☐ Wholesale Delivered Lumber Price List.	**Sears, Roebuck and Co., Chicago, Ill.**
☐ Book of Modern Homes.	Gentlemen:—As per your offer in The National Builder please send me, without charge, postage prepaid, the booklets and printed matter opposite which I have placed a check mark.
☐ Building Material and Mill Work Catalog.	
☐ Catalog of Home Heating Systems.	Name _____
☐ Plumbing Catalog.	
☐ Paints and Varnishes Catalog.	Postoffice _____
☐ Woodworking Machinery Catalog.	
☐ Hardware and Carpenters' Tool Catalog.	R. F. D. No. _____ State _____
☐ Roofing Catalog.	P. O. Box No. _____ Street and No. _____

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Send us Two or More Names of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.



ANDREWS HEATING CO.
1166 Heating Building
MINNEAPOLIS, MINN.

$1.00 Good For $1.00

TO INTRODUCE
The SELF-SETTING PLANE
(As long as this Ad appears.)

Any dome in this paper is good for one dollar, in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our Planes are not sold.

If you want more than one Plane and they are not sold in your town we will allow you dealer's discount.

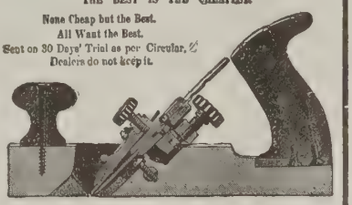
List price of **Beech Wood Planes:** Smother $3.25, Jack $3.50, Fore $3.75 and Jointer $4.50.

Do not say the price is too high until you try it, then if the Plane is not worth to you, twice its cost, return it at our expense and the trial won't cost you a nickel.

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

If you don't want a **Self-Setting Plane** now, send us a dome and the addresses of ten carpenter friends, no matter where they live, and we will send you a hard, tough, carpenter's pencil and circulars.

THE BEST IS THE CHEAPEST.
None Cheap but the Best.
All Want the Best.
Sent on 30 Days' Trial as per Circular. If Dealers do not keep it.



Gage Tool Co. VINELAND, NEW JERSEY

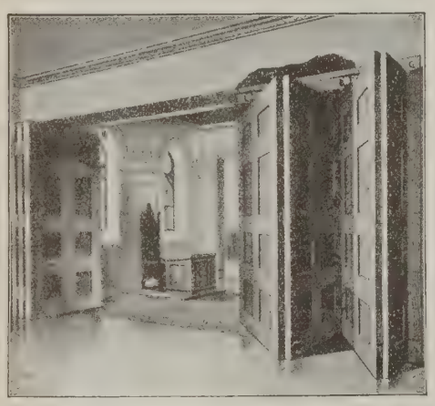
The Excelsior Dumb Waiter



Sent complete to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. Send for Descriptive Pamphlet.

R. M. RODGERS & CO.
175 Washington Ave., Brooklyn, N. Y.



ORDER RICHARDS No. 135
BALL BEARING SWIVEL HANGERS

AUDITORIUM BALL BEARING FOLDING DOOR HANGERS

For Your Church Job

Made by
Richards-Wilcox Mfg. Co.
Aurora, Ill.

Cement Books

How to use Portland Cement	$0.50
Cement Sidewalk Construction	.50
Monier (Cement and Steel) Construction	.50
Reinforced Concrete Construction. 172 Illustrations. Paper cover	2.00
Cloth	2.50
Constitution of Hydraulic Cement	.25

Sent to any address on receipt of price

Hodgson Book Company
PUBLISHERS
358 DEARBORN STREET
Chicago



Wood's Key to the Steel Square

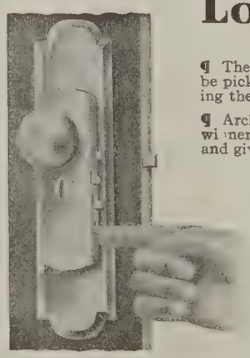
Has been tried by thousands of Builders and not found wanting. It is a wonderful instructor as to the uses of the square in obtaining cuts and bevels for all kinds of work.

Made of celluloid and put up in neat leather case of pocket size, so that it can readily be carried on the job. It is a snap at our low price of $1.50.

Send your order at once and it will be shipped prepaid to your address

HODGSON BOOK CO.
358 Dearborn St., Chicago

Dayton Keyless Locks are the Safest and Most Convenient Locks for the Home



¶ They are handsomely made in different finishes—cannot be picked—are easily and instantly opened by simply touching the right sentinel as shown here.

¶ Architects, contractors and carpenters will find them money winners—meeting every want in locking and opening doors, and giving absolute protection.

SALESMEN WANTED

¶ Let us tell you about them—also about our padlock having 38,005 combinations. Write today.

THE
Dayton Keyless Lock Co.
804 U. B. Bldg. Dayton, Ohio

THE "EUREKA" SPIRAL SCREWDRIVER

PUSH ON THE **HANDLE and THE SCREW GOES IN**



Will Drive a Screw in Hard or Soft Wood
QUICKER AND EASIER THAN ANY OTHER
THE "EUREKA" SPIRAL SCREWDRIVER
is made in two sizes from the highest class materials—No. 1, 14 in. long opened, 9 in. closed; and No. 2, 19 in. long opened, 12 in. closed. Can be used as an ordinary screwdriver.

GET ONE TODAY FROM YOUR DEALER

DECATUR COFFIN CO., E. North St., DECATUR, ILL., Manufacturers

OLDEST AND BEST

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PRICE-WRECKING BARGAINS

Our enormous purchases of Bankrupt Stocks, Sheriffs' and Receivers' Sales make it possible for us to quote prices that mean a positive saving to you of from 30 to 75%.

LUMBER
ROOFING
HARDWARE

OUR STOCK includes practically everything under the sun. Millions of dollars worth of brand new high grade merchandise bought by us at various sales is offered to the public at prices usually less than the original cost of production. We offer an exceptional opportunity to those who buy now, so send us a trial order. This will convince you.

SAVE 30 TO 50% Get our prices on Lumber, Roofing, Tanks, Pipes, Plumbing and Heating Goods. Our catalog shows over 50,000 bargains, in almost everything you use or buy daily. You need this catalog.

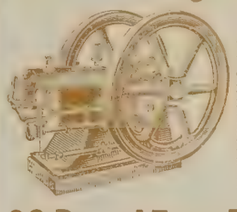
PLUMBING
HEATING
WATER SYSTEM

GASOLINE ENGINES

Equip Your Carpenter Shop with the Most Economical Power Known to Modern Science

The latest and most modern types ever placed before the buying public. Economical both in *price* and *consumption* of fuel. Will produce more *horse power* for *every gallon of gasoline used* than any other Engines in the market today. Brand new direct from factory.

Price Wrecking Bargain 8 and 12 H. P. ENGINE only **$200** AND UP



We are willing to have our Superior Heavy Duty Gasoline Engines compared with any on the market no matter what the price. Built with the greatest care and every mechanical detail is carefully provided for. Best Engine for all around work on the farm and in the factory. Most popular Engine we handle, powerful and reliable, made for heavy work and continuous service. The 8 horse power is large enough for the ordinary work on the farm, also for elevators, factories, etc. The 12 horse power we recommend for small threshers, silo fodder cutters, etc.

30 Days' Free Trial AT OUR EXPENSE | **OUR GUARANTEE PROTECTS YOU**

Our two horse power "Superior" Engine is designed to meet the demand for a low priced Engine to take the place of Wind Mills, Hand, Foot or small Tread Power. The four horse power is designed for general farm or machine shop work.

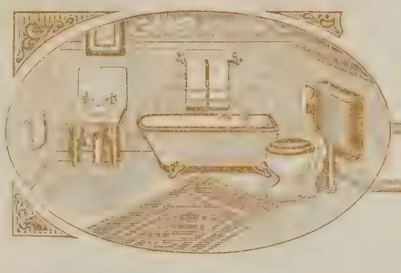
The simplicity of construction makes them the most serviceable, easy to operate and Practical Gasoline Engine ever produced. We can recommend them with the utmost confidence to our patrons to give entire satisfaction.

They are just as convenient as any Electric Motor or Windmill would be for pumping water, running cream separator, washing machine or other labor saving devices in the house. It does not require any more practice or experience to run or keep these engines in order than the Motor or Windmill.



2 H. P. $36.00 **4 H. P. $64.00**

PLUMBING AND HEATING



Complete Bathroom Outfit
As Illustrated Only **$37.50**

GUARANTEED

Price Wrecking Opportunities

To obtain high grade, brand new Plumbing Material at prices that mean a Positive Saving of at least One-half. We can equip the Home, Factory or any Public Building throughout with a Plumbing and Water System that we will guarantee to be as good as you can purchase anywhere in the land. Send for our "Plumbing Catalog," filled with valuable information, and authority on perfect sanitation, FREE UPON REQUEST.

MODERN HEATING SYSTEMS

In offering to the public our **"PERFECTION BOILER AND HEATING SYSTEM"** We are confident that we have reached the ACME OF PERFECTION and have solved the question of Heating your Home or Factory for all time to come. Our Heating Systems are the result of tests, experiments and scientific research conducted by expert Heating Engineers and we guarantee them to



HEAT YOUR BUILDING

That is what you want and are paying for.

We operate our own factory and are thus able to save you the retailer's profit and quote prices that mean an enormous saving to you.

Send us a plan or diagram of your building and let us make you an estimate.

Fill out the Coupon below and send for our Heating book; it will give you valuable information and SAVE YOU MONEY.



GOLD MEDAL ROOFING



Rawhide Stone Faced "Gold Medal" Roofing, put up in rolls of 108 sq. ft. sufficient to lay 100 sq. ft. or (one square) complete, with large head nails and liquid cement for laps. Approximate weight, 58 pounds to the roll. **Price per roll complete $2.13**

FREIGHT PREPAID at above price to States of Illinois, Indiana, Iowa, Ohio, Wisconsin and Michigan.

This Roofing will outwear and outlast any other Ready Roofing on the market. Finished Stone Faced Surface requiring no painting when laid. Unexcelled for homes, barns, warehouses, stores and in fact buildings of every kind **where long service and economy** is desired.

HOW MADE. Only the best long fibre woolen felt is used. **Of extra heavy weight and strength.** Thoroughly saturated with absolutely pure asphalt. Over this is given an additional mechanical treatment, making it more wearproof and durable. **Covered on both sides** with fine powdered marble, giving it a beautiful appearance, also adding to its **fireproof** qualities.

STEEL ROOFING
PER 100 FEET, $1.60



100,000 Squares of New Steel Roofing which we are selling at a price that is made possible by the fact that we purchased the entire product of a large mill at a forced sale. Flat, $1.60 Corrugated, V Crimped or Standing Seam $1.85

At these prices we prepay freight to all points east of Colorado except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at prices ranging from $3.00 per square up. Write today for Free samples and Great Book on roofing.

SAVE 30 PER CENT IN NEW HARDWARE



Wilmette Design Inside Door Lock Sets; Lot No. 4-A-1608, 2000 sets as illustrated. Wrought steel, antique copper finish, plated front mortise locks 3¾x3¼, one plated key, one pair knobs two escutcheons, packed complete with screws. **Per set** $0.47
Per dozen $5.20

Lot No. 4-A-1604. Wilmette Wrought Steel, Copper Finish Front Door Sets.
Complete, per set $1.40

Lot No. 4-A-699. Upright Rim Knob Locks, japanned, complete as illustrated and shown, **Each** . . . . . $0.10 **Per dozen** $1.10



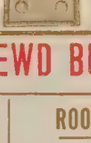
Lot No. 4-A-706. Mortise Door Locks. Japanned, complete as shown. Each $0.25
Per dozen 2.75



Lot No. 4-A-719. Wrought Steel, ball tipped, loose pin butts, copper finish, complete with screws, 3x3, 16c, 3½x3½, 17c, 4x4, 21c per pair.



Lot No. 4-A-753. Sash Locks, copper finish. **Each** $0.05
Per dozen 48



STRUCTURAL STEEL BARGAINS

Over 10,000 tons of plain and fabricated steel and Builders' Iron Work in stock for immediate delivery. We save you 20 to 40 per cent on Structural steel work of every description, also Builders' Iron Work. Write for copy of our Great Book, "Structural Steel News." Send us a list of your wants for prices.

STRUCTURAL STEEL SHAPES

STEEL "I" BEAMS



Illustration shows "I" Beams which are made in standard sizes ranging from 3 to 24 inches high.

STEEL ANGLES

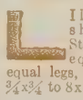


Illustration shows Angle Steel, made with equal and unequal legs, ranging from ¾x¾ to 8x8 inches.

STEEL CHANNELS



Cut shows Steel Channels which are made in standard sizes, ranging 3 to 15 in. high.

STEEL TEES



Cut shows Steel Tees made with equal and unequal legs, ranging from 1x1 to 1x4 inches.

NOTE—When writing for prices on Structural Steel Shapes, please state quantity, pattern, sizes and lengths. We can furnish all shapes cut to any length desired.

FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:
I saw your advertisement in June, 1911, National Builder. I am interested in the following items: 833

Do You Want? Gasoline Engine ——— Do You Want? Free "Book of Plans" ———
Do You Want? Free Roofing Book ——— Do You Want? Free Plumb. and Heating Book ———

My Name _____
Town _____
R. F. D. _____ P. O. Box _____
County _____ State _____

FREE VALUABLE BOOKS FOR SHREWD BUYERS

MAIL COUPON AND MARK BOOKS YOU NEED

"GASOLINE ENGINES"



Illustrates, describes and quotes the "Superior" Gasoline Engines. They are, without question, the best engine made, and offered to you at bargain prices. By reading this book you can become familiar with the method of operating Gasoline Engines successfully. **Write for free copy today.**

OUR BOOK OF PLANS



This is the handsomest **illustrated book of designs of over 100 Bungalows, Houses and Barns** ever produced. It contains the productions of Photos and is true to life in every way. Also a very **valuable book for carpenters, contractors or builders.** Sent to you absolutely free. Fill out coupon shown at the left.

ROOFING BOOK

The greatest book on roofing ever printed. Tells you how to lay all styles of roofing, quotes you money saving prices so that you can buy roofing and save 30 to 70 per cent. Write for copy today.



COLD WEATHER COMFORT

A practical treatise on Plumbing and Heating. Explains in detail how you can buy a complete Plumbing or Heating plant from us and easily save 50 per cent. Also quotes Greenhouse Heating plants at extremely low prices. Do not fail to send for copy at once.



CHICAGO HOUSE WRECKING COMPANY 35TH & IRON STS. CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Two Famous Silver Steel Saws

We want to call particular attention to the two Saws shown in the pictures below. Both blades are of SILVER STEEL—both are Taper Ground—both are genuine ATKINS SILVER STEEL SAWS—BUT the handles are constructed on entirely different principles.



No. 53. Genuine Perfection Handle



No. 51. Old Style Handle

"Pay Your Money and Take Your Choice"

ATKINS No. 53

The picture to the left shows ATKINS No. 53 SILVER STEEL SAW equipped with ATKINS Genuine Perfection Handle and illustrates plainly why this type of handle is easiest on the saw arm. While it may feel strange to the beginner—a few days use will demonstrate that the Perfection Handle is the most *scientifically* constructed and much easier on the saw arm than any other style.

Note the line running through the saw arm straight through the blade to the cutting edge. See how every ounce of power is directed to the point of contact. Observe the wrist and saw arm, how easily and naturally the blade drops into its work without pressure.

ATKINS No. 51

If you are under the impression that all ATKINS SAWS are made with the Perfection Handle, we wish to particularly call your attention to the saw shown to the right. This handle is similar to the old straight across handle that you may have been using heretofore. Note the saw arm in this case and see that the pressure back of the saw arm is *not* directed on the cutting teeth, but rather to the back of the saw. Notice this wrist and see how it is necessary to push downward in order to secure proper contact. But even with this old style handle, the No. 51 is superior to any other, because the blade is made of genuine SILVER STEEL (our own exclusive formula) and is Taper Ground, which enables it to run free and easy, even in wet lumber, with but little set.

If you do not wish to try the Perfection Handle, then try the No. 51. Either of these saws or any of our other popular numbers may be purchased through your regular dealer, who should order for you from his wholesale house in case he does not carry them in stock. If he will not order for you, let us know and we will see that you are taken care of. Be sure to see that our name, E. C. ATKINS & COMPANY, and the words, "SILVER STEEL," are on the blade. None other are genuine.

OUR FREE OFFER

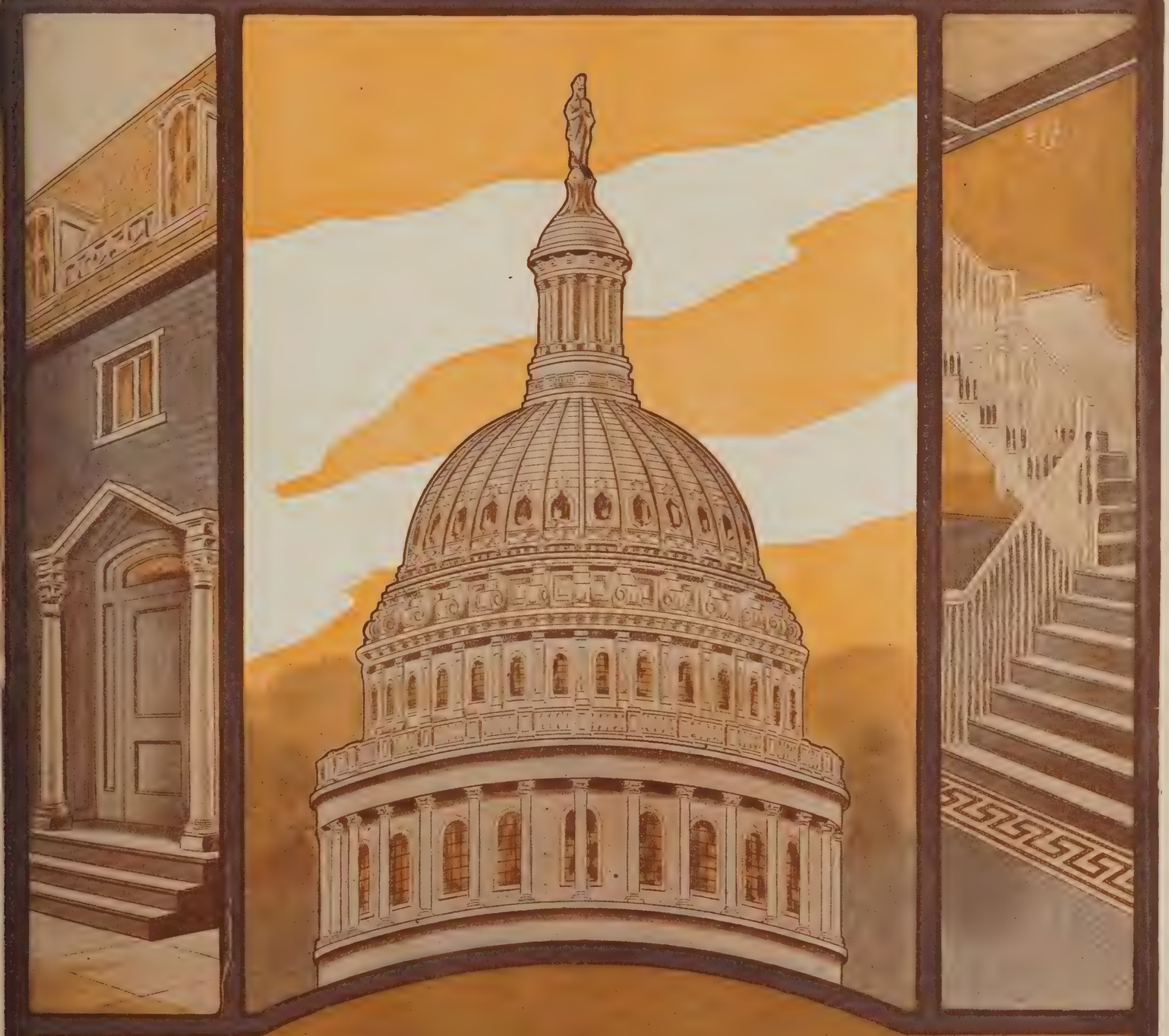
We are securing the names of high class mechanics who appreciate fine tools and if you will send us ten cents in stamps to pay postage, we will mail you one of our fine carpenter's nail aprons, Saw Sense Book, Time Book, and a great deal of useful information on the purchase and care of saws. Write today and learn "Who's Who" in the saw world.

E. C. ATKINS & CO., *Inc.*

INDIANAPOLIS, IND.

MORE COPIES
PRINTED AND CIRCULATED THAN ANY OTHER BUILDING PAPER IN AMERICA.

THE NATIONAL BUILDER



PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

JULY, 1911

Disston

SAWS
TOOLS
FILES

Economy goes hand in hand with increased efficiency when a Disston implement is introduced into factory, shop or structural work.

This is the day of close calculations in shop costs, and for this reason it is the day of the Disston Line just as in 1840.

Disston Saws, Tools and Files provide a trustworthy "helping-hand" to the experienced worker; lend confidence to the unskilled workman.

They reduce time and maintenance expense; they minimize errors in shop workmanship; they assure accuracy.

Before any implement is branded with a Disston trade mark it not only passes through many exclusively Disston processes, but after each operation a careful examination and thorough test is made—and then the final inspection.

A "Disston" overcomes the obstacles that defeat an ordinary tool.

Henry Disston & Sons

Incorporated

Keystone Saw, Tool, Steel and File Works

Philadelphia, Pa.

BRANCHES: Chicago Boston Cincinnati New Orleans Memphis San Francisco Seattle Portland Spokane Toronto Vancouver

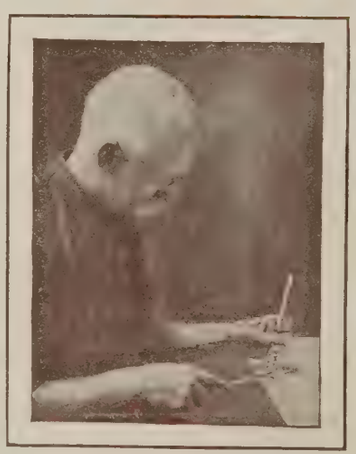
THE PERSONAL ELEMENT

must not be lost sight of

RUSSELL JENNINGS AUGER BITS

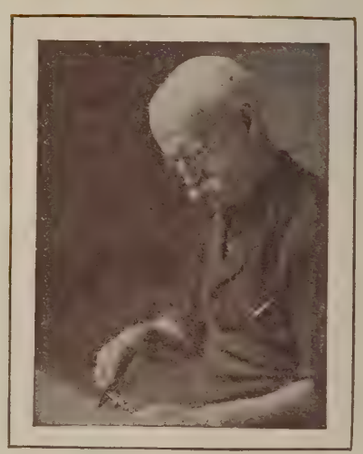
ARE

HAND MADE



Except for the few operations that can be performed better and more accurately by machines. This is why these auger bits, the original extension lip bits, are preferred by carpenters.

Our booklet tells just how to sharpen auger bits. Better have one—it's free.



RUSSELL JENNINGS MFG. CO.

CHESTER, CONN., U. S. A.

21-37

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

FOR WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut at the factory into 4x4 ft. sheets, which are easily and quickly nailed to studding, ready for immediate application of wall paper, paint, burlap, or other decoration.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary, and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



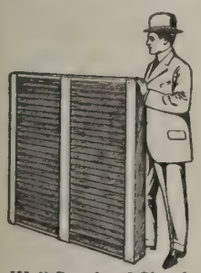
Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space

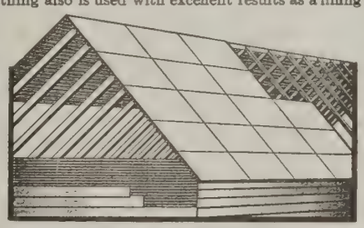
In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

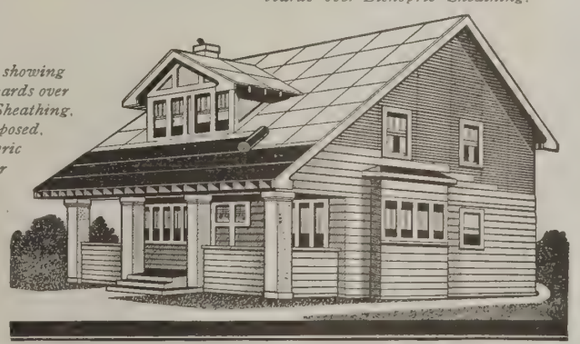
ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.

Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)



PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Utility Wall Board

Is Used on Walls and Ceilings of These Artistic Rooms

The first illustration shows how easily Utility Wall Board can be applied. The other two illustrations show how nicely wall paper can be applied on walls and ceilings lined with Utility Wall Board.

Does it not look good to you?

Wouldn't you like to have us send you a sample of it—and tell you how economical it is—How easily it is applied—How artistically it can be decorated?

Our *beautiful illustrated booklet* tells the whole story—and shows pictures of artistic interiors. It is free for the asking, together with a sample of Utility Wall Board.

UTILITY WALL BOARD

is unlike any other Wall Board you have ever seen—It is made of exceedingly tough, durable fibre, thoroughly waterproofed—No moisture can penetrate it—It is applied directly to the studding, taking the place of both lath and plaster—Any carpenter can put it on—It will last as long as the house stands—You'll be amazed at the convenience of it—the economy of it—the beauty of it.

Mr. Contractor: This is your chance to make more money and finish your jobs quicker. UTILITY WALL BOARD is right in quality and price. It has come to stay and is rapidly taking the place of lath and plaster.

Every up-to-date contractor and builder should get samples of UTILITY WALL BOARD at once. There are hundreds of places it can be used with a profit to you and satisfaction to the owner.

Remember that all delays of the plasterer are a thing of the past for those who use this modern wall lining.

Don't fail to send for the sample and booklet at once—ask for our special proposition to contractors and builders

UTILITY WALL BOARD is Sold Through Dealers in Building Material Everywhere

THE HEPPES COMPANY

4502 Fillmore St., Chicago, Ill.



CompoBoard

THE MODERN WALL LINING

Better than Lath and Plaster in Every Way

Compo-Board will outlast lath and plaster several times over—in fact it will outlast the building itself.

Makes absolutely dry, warm, moisture proof walls and ceiling. Cannot crack, crumble or chip off like plaster. Keeps the rooms warm in winter and cool in summer.

Compo-Board can be used in any climate. It is quickly and cheaply put on in any kind of weather—no muss or dirt or waste of time waiting for plaster to dry.

Not only is Compo-Board a superior wall lining, but it has a multitude of uses in the home, around the yard, and in the office and factory.

Made of thoroughly seasoned kiln dried strips of lumber covered with a thick coat of cement and heavy durable paper put on under intense heat and pressure.

You can buy it in strips four feet wide and one to 18 feet long, any length you want in even feet.

SEND FOR BOOKLET AND SAMPLE

And you can see just what Compo-Board is, and read all about its many advantages and numerous uses.

NORTHWESTERN COMPO-BOARD CO.
5776 Lyndale Ave. No., Minneapolis, Minn.

The border of this advertisement is a cross sectional view of Compo-Board.

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SAP GUM

Three years ago the architect or builder would have had a hard time to find any building of importance in which the owner had been courageous enough to use ***RED or SAP GUM.***

Today there are literally hundreds of apartment houses and fine residences in every section of the United States in which ***RED GUM*** has been deliberately chosen for the trim solely because of its actual beauty and entire practicability; and ***SAP GUM*** has also come into general favor for many builders' uses.

In places where White Enamel trim is required ***SAP GUM*** is the ideal material. Not only does it take and hold the white enamel better than any other wood, but it is possible to get good ***SAP GUM*** cheaper than any other wood hitherto used for White Enamel Woodwork. ***SAP GUM*** presents remarkable qualities where moderate priced trim of good appearance is desired. Another field in which ***SAP GUM*** has reached supremacy is in the manufacture of porch columns. ***SAP GUM*** takes stains and wood dyes beautifully, and the popular Flemish, Mission and Weathered Oak finishes are easily reproduced in ***SAP GUM.***

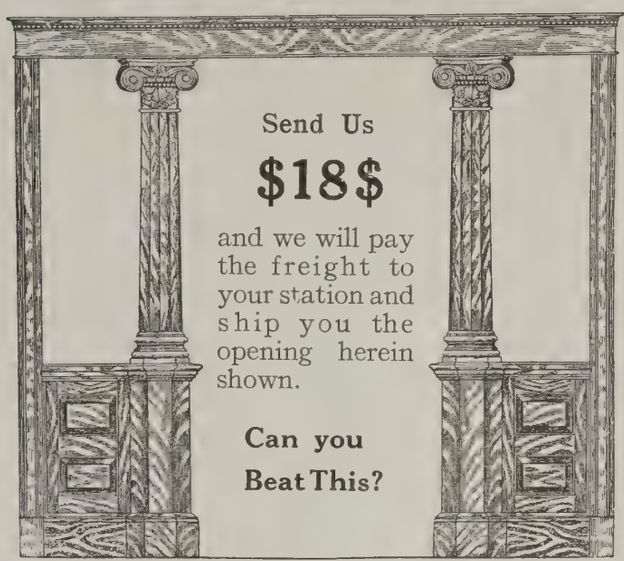
Anyone planning to build apartment houses, office buildings, hotels, residences or specially designed furniture, should defer final arrangements and correspond at once with any of the following firms regarding samples, prices and lists of important buildings of all types wherein RED and SAP GUM have been used with eminent practical success and signal artistic satisfaction.

CARRIER LUMBER & MANUFACTURING COMPANY . Sardis, Mississippi
BAKER LUMBER COMPANY . . . . . Turrell, Arkansas
ANDERSON-TULLY COMPANY. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., . . St. Louis, Mo.
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri

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CHICAGO GRILLE WORKS

1892 1911



Send Us

18

and we will pay the freight to your station and ship you the opening herein shown.

Can you Beat This?

828-838 Wells Street, Chicago, Ill.



Oak Flooring

Every **builder, owner** and **investor** should insist on OAK FLOORING, because its natural, artistic beauty combined with its economical and durable qualities, makes it **King** of **Flooring.** Any truthful landlord will tell you that OAK FLOORING **increases** the **renting** and **selling values** of any building.

OAK FLOORING is **rich** and **cheerful** in color. It imparts an air of **refinement** and **elegance** to a home. OAK FLOORING ⅜" thickness can be laid over old floors at a very low cost. It is **cheaper** than carpets. OAK FLOORING is made in **four grades** and is adapted to the humblest of homes or a palace.

Write us for further information

The Oak Flooring Bureau

834 Hammond Building - Detroit, Michigan



"ATLAS" OAK FLOORING

is the best oak flooring at any price. The workmanship is guaranteed and it is easiest to lay.

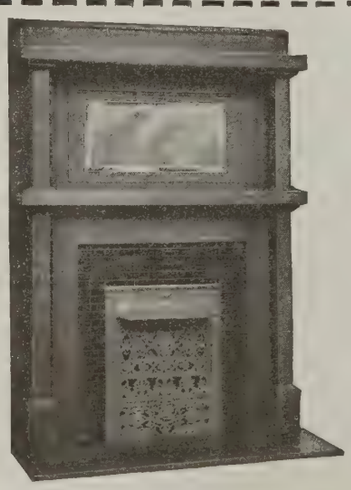
All "Atlas" $\frac{13}{16}$ flooring is thoroughly kiln dried, dressed and matched, hollow back, bored, and matched, steel polished and wire bundled. All ⅜ flooring is thoroughly kiln dried, dressed and matched, end matched, steel polished and wire bundled.

In addition to wire bundling "Atlas" ⅜ flooring we also pack it in crates when desired at a small additional cost.

If your Dealer fails you on "Atlas" write us direct.

THE WILDBERG LUMBER CO.

Ninth and Eggleston Avenue, :: CINCINNATI, OHIO



$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

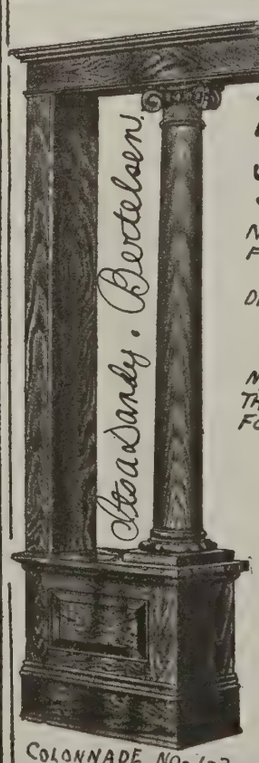
are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

$8.50 FOR THIS COLONNADE



COLONNADE NO. 1-2

A VERY LOW PRICE FOR THIS STRIKING NEW COLONNADE

MATERIALS AND WORKMANSHIP FIRST CLASS THROUGHOUT.

DESCRIPTION OF COLONNADE.
SIDE CASINGS AND CAP TRIM NOT INCLUDED
MADE FOR 5¾-INCH JAMBS
MADE IN OAK OR YELLOW PINE, IN THE WHITE, HAND SMOOTHED, READY FOR FINISHING.

PRICES
ANY HEIGHT NOT OVER 9 FEET.

Style No. 1-2 EACH...$ 8.50 PER PAIR 17.00

Columns are 6 inches in diameter, tapering to receive 5-inch compo. cap, pedestals are 20 inches high over all and the width is 24 inches over all, and when set in to receive casings extension from jamb is 18 inches. Top shelf is 10 in. wide.

Style No. 2-2 EACH...$ 9.00 PER PAIR 18.00

Same measurements as above, only pedestals are 30 inches wide over all and when set in to receive casings extension from jamb is 24 inches.

SEND YOUR ORDER NOW, DONT LET IT GET AWAY FROM YOU.

BERTELSEN ADJUSTABLE GRILLE CO. 619. S. CLINTON ST. CHICAGO.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BOOST YOUR OWN REPUTATION, MR. CONTRACTOR, BY TELLING YOUR CUSTOMERS—"PUT A STOP TO DEPRECIATION—BUILD WITH CYPRESS *AT FIRST*"



IS THE "LIFE-SAVER" of an HONEST CONTRACTOR'S REPUTATION

Here is a letter just received from a builder who **knows** by experience. Probably you feel the same way. Why not **CUT OUT TROUBLE?**

——— — ——— **Contractor and Builder,** — ——— **Street,**

PITTSBURG, PA., Mar. 22, 1911.

Southern Cypress Manufacturers' Association, New Orleans, La.

Gentlemen: Please send me information about Cypress lumber. Have about a dozen frame houses, from two to 16 years old, which I never get through repairing. Window frames, sash, siding, sills, etc., become rotten in a few years, and *the contractor gets a bad name* (as if it was his fault!)

Yours respectfully, ——— ———

This is a bona fide letter—"hot off the bat." The facts are all too true. HE WILL BE A CYPRESS MAN FOREVER. HOW ABOUT **YOU?**

We say it again—that by honest and intelligent advice on **woods** we are not only saving losses to people who are going to **build anyhow**—but we are also

CAUSING MORE PEOPLE TO BUILD

This is going to be of more and more benefit to **you** month by month. It is **up to you** to intelligently take advantage of this by **learning for yourself** that **CYPRESS** is not only the ONE BEST OUT-DOOR WOOD for the owner—but also the ONE BEST WOOD FOR **YOU.** Cypress **"makes good."** That helps your reputation. Cypress is easy to work—that's **good for your tools.**









We are giving away complete working plans and specifications for THIS SHINGLE HOUSE. Many thousands of people ALL OVER THE U. S. are writing for them. THEY WILL HAVE TO GET **YOU** TO DO THE WORK.

THEY WILL INSIST on CYPRESS.

It will be MONEY IN YOUR POCKET TO HELP THEM GET JUST WHAT THEY WANT.

CYPRESS

is the "comer" in YOUR territory.

LISTEN FOR IT

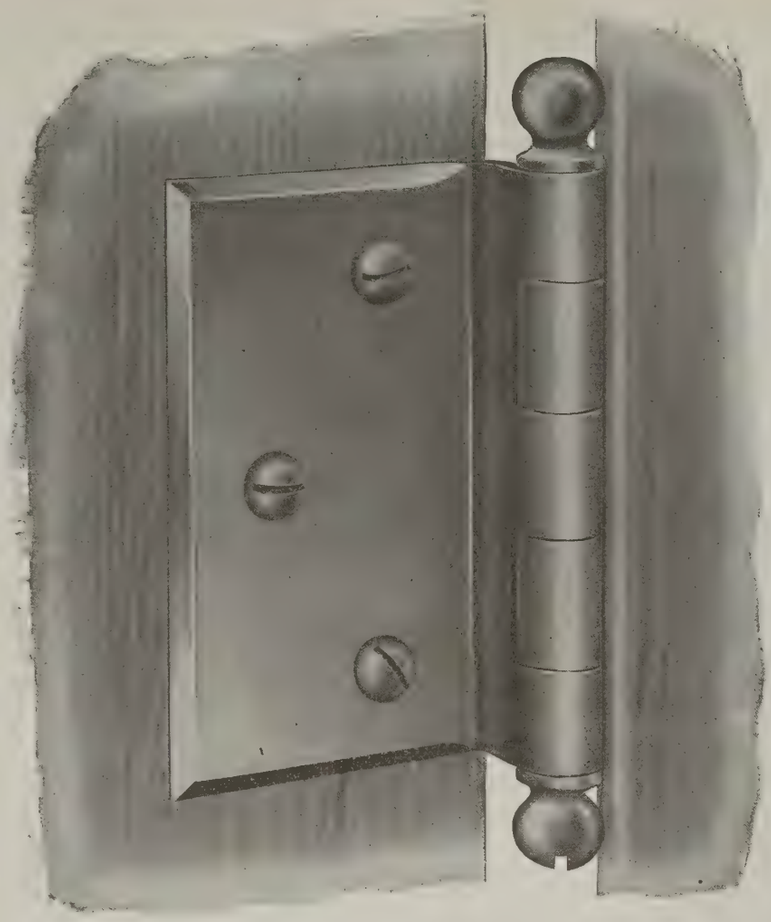
Why not FIND OUT what CYPRESS can do for YOU, NOW? WRITE US—ASK YOUR OWN QUESTIONS—about your own needs, big or little. You can rely on detailed and reliable **CYPRESS** information if you address our "BUILDERS' HELPS DEPT." We will recommend **CYPRESS ONLY FOR USES WHERE IT IS THE BEST WOOD TO USE.**

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

We are *producing* CYPRESS—*and talking it—but not retailing it.* BUY IT NEAR HOME. *ASK your lumber man if he sells CYPRESS; if he does not, ask him WHY. Then WRITE US. We will tell you where you CAN get CYPRESS.*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

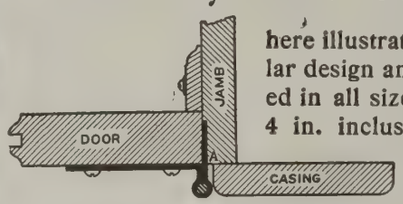
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

These are exclusive "NATIONAL" features.

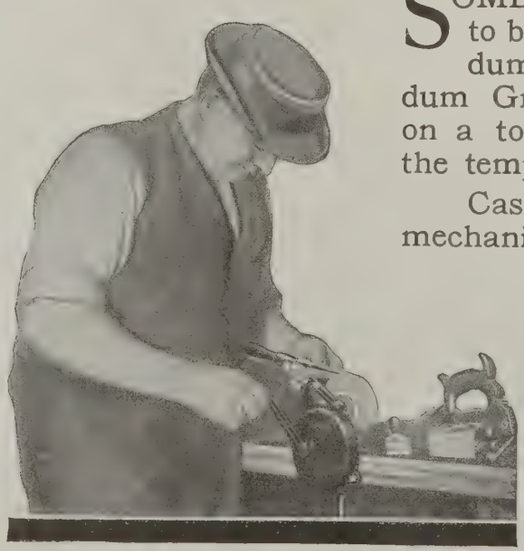
Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.

Carborundum Niagara Grinders



SOMETIMES tools get tired on the job—it takes a grinder to bring them back to a keen working edge—Carborundum Niagara Grinders are all equipped with Carborundum Grinding Wheels—the wheels that cut an edge on a tool quickly and easily without heating or drawing the temper.

Castings strong and durable—bearings and alignment mechanically perfect—equipped with tool rests and chisel guides—made in 14 styles and sizes for hand and foot power.

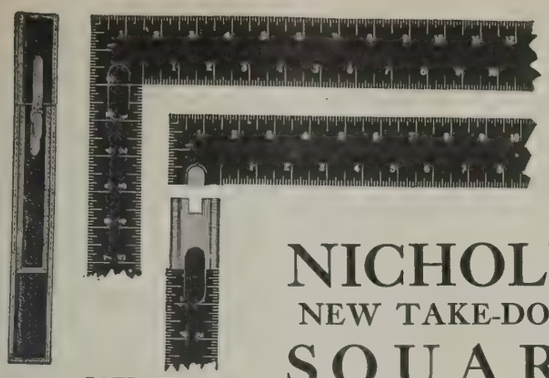
The Niagara Grinder No. 2 is a handy little machine—can be carried to the job in your tool chest—The Carborundum Carpenter's Round Combination Bench Stone and a bottle of Carborundum Temperoil will just complete your outfit for keeping all tools in perfect condition.

Carborundum Niagara Grinder No. 2, complete....	$4.00
Carborundum Round Combination Stone, No. 107..	1.00
Carborundum Temperoil, 1½ ounce bottle.....	.10

FROM YOUR HARDWARE DEALER OR DIRECT—SEND FOR THE CATALOGS

THE CARBORUNDUM COMPANY, Niagara Falls, New York

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



PATENTED

NICHOLLS NEW TAKE-DOWN SQUARE

Guaranteed Accurate and to Remain So

The main feature of our new Take-Down Square is that it will always stay true, it is so constructed that the tongue is held down into beveled bearings by a spring, and these bearings are made so as to take up the constant wear which comes in taking square apart and putting it together, thereby producing constant accuracy.

No screws used; locks automatically.

The only Take-Down Square which leaves no part of the Tongue attached to body, when separated.

Occupies smaller space than any other Take-Down Square manufactured. 2 in. by 24 in.

Instantly taken apart and put together.

Rust-proof canvas case with each square.

IF YOUR DEALER WILL NOT SUPPLY YOU ORDER DIRECT AND WE WILL PREPAY EXPRESS.

Manufactured in Nos. 3 and 100 Standard; also 100 Rafter Framing

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	2.50	2.75	3.00
No. 100 Standard	2.75	3.00	3.25
No. 100-R Framing	3.00	3.25	3.50

NICHOLLS MFG. CO., OTTUMWA, IOWA

Go to the bottom of the roofing question—if you want to save money on your roof.

Don't be caught by mere looks and mysterious terms. Find out what the roofing is made of.

And the time to find out is before you buy—it is often costly to find out afterward.

Genasco

the Trinidad-Lake-Asphalt Roofing

is made of *natural* asphalt.

The difference between natural asphalt and manufactured or artificial "asphalts" is great. Natural Trinidad Lake asphalt contains natural oils which give it lasting life. They are sealed in Genasco and stay there to defend it permanently against rain, sun, wind, heat, and cold.

Artificial asphalts are residual products. Same way with coal tar. They are mixed with oils which make them pliable for a while, but the oils evaporate quickly when exposed to sun and air; they leave the roofing lifeless, and it cracks and leaks.

When you get Genasco you can be sure of roofing that lasts. And roofing that lasts is the only kind worth having.

The Kant-leak Kleet is the lasting waterproof fastening for seams—prevents nail-leaks, and does away with unsightly cement.

Ask your dealer for either Genasco mineral or smooth surface roofings with Kant-leak Kleets packed in the roll. Fully guaranteed. Write for The Good Roof Guide Book and samples.

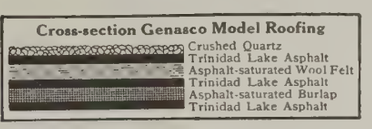
GENASCO · THE STANDARD OF EXCELLENCE · TRADE MARK REG. U.S. PAT. OFF.

THE BARBER ASPHALT PAVING COMPANY

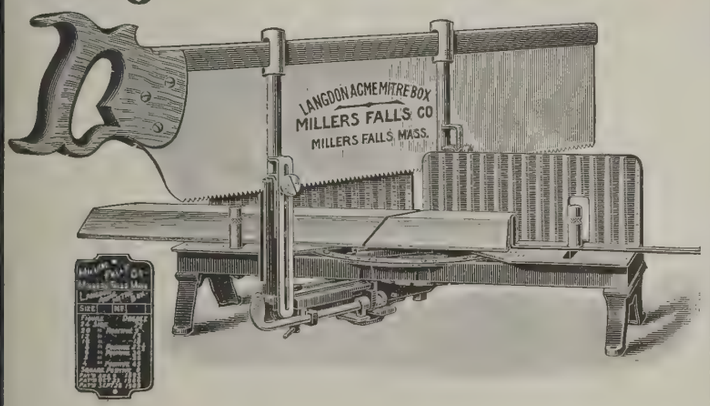
Largest producers of asphalt, and largest manufacturers of ready roofing in the world.

PHILADELPHIA

New York San Francisco Chicago



Langdon Acme Mitre Box



These Mitre Boxes, when supplied with back saws fitted by ourselves, are warranted to give better service than any similar tool on the market.

There are a dozen improvements over the ordinary mitre box in the **LANGDON ACME** that insure quicker and more perfect work than any tool of its kind.

Some of the advantages over other models are: In longer guides, which hold the saw steadier, and these guides are provided with elevators to hold the saw stationary, when desired, above the work;

In a graduated arc showing the various angles commonly used;

In supporting guides, to hold the work in place;

In an appliance for quicker adjustment of extension lever;

In a length gauge for duplicate lengths.

There are other improvements—impossible to describe because of lack of space—which are explained in our catalog.

These boxes are made in three sizes and put up with varying sizes of saws, ranging from 22″x 4″ to 30″x 5″.

Send for the ***Free*** Book, "Tool Practice."

MILLERS FALLS CO., 28 Warren St., New York

$38.95 BUYS COMPLETE BATHROOM OUTFIT



MODERN PLUMBING AT ½ ORDINARY COST

¶ WATER PRESSURE SYSTEMS, from $42.00 up. ¶ HOT WATER AND STEAM PLANTS. Save $100 to $250 on a Heating System. Plans free with every plant. ¶ PIPE, VALVES, FITTINGS at Lowest Prices. All high grade, strictly guaranteed goods. Catalogue N free.

JOHN HARDIN & CO.

Established 1876

4541-4549 Cottage Grove Avenue

CHICAGO

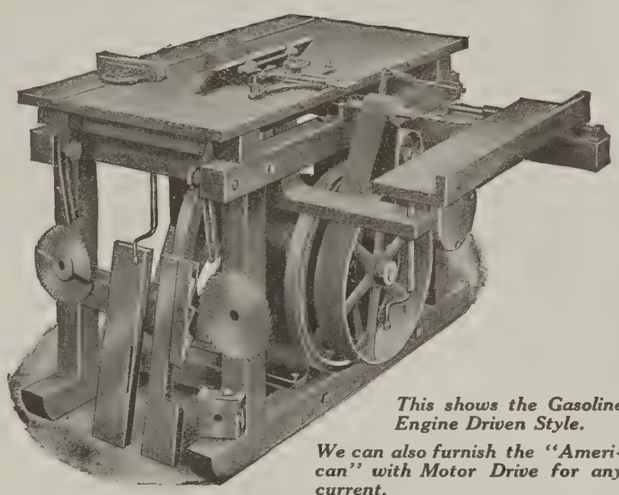
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE

"AMERICAN"

PORTABLE **SAW BENCH**

IS A CONTINUOUS MONEY-MAKER



This shows the Gasoline Engine Driven Style.

We can also furnish the "American" with Motor Drive for any current.

Some machine tools do good work—make money—at the outset. But they haven't the staying power which means permanent profit-paying capacity.

The "American" Portable Saw Bench isn't in this class at all. It is an "always-on-the-job" machine, ready for work at any time and doing good work all the time, year in and year out.

This peculiar distinction of the "American" Bench is the natural result of the care applied to its design and construction.

The best materials and plenty of them; strong, rigid frames; ample bearings; sturdy adjustments; ready manipulation; quick changes for various duties:—these are exclusive "American" features giving exclusively "American" results.

When you have finished one job with an "American" Bench, your machine is ready for another job. It asks no "lay-offs" after a spell of hard work.

An "American" Bench is a continuous money-maker. Send for the descriptive Bulletin and be convinced.

AMERICAN SAW MILL MACHINERY CO.

Woodworking Machinery of All Kinds

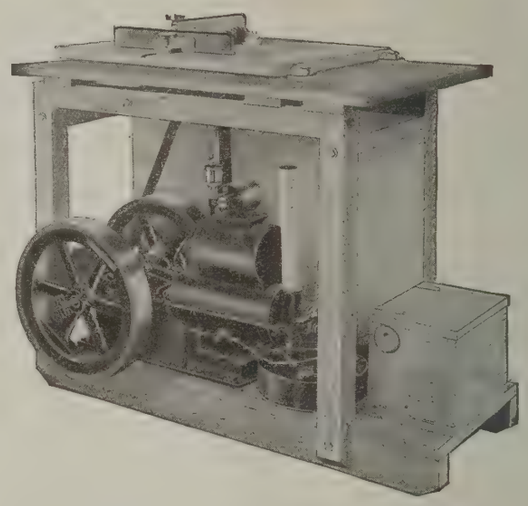
Solid and Inserted Tooth Circular Saws

80 Laight Street
HACKETTSTOWN,
NEW JERSEY

1650 Hudson Terminal
NEW YORK CITY
NEW YORK

$165.00

For this Portable Saw Rig Complete
9 Machines in One



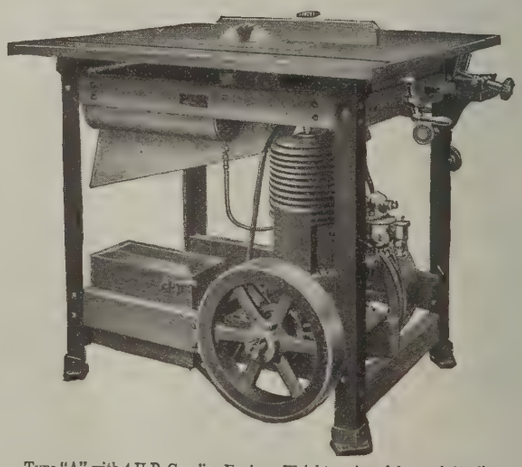
Will rip 2″ and cross cut 3″ lumber
Write for descriptive folder

C. H. & E. Manufacturing Co., Inc.

319 Mineral St. Milwaukee, Wis.

Have You Investigated

The Grimm Woodworker



Type "A" with 4 H.P. Gasoline Engine. Weight equipped for work 350 lbs.

Nine Machines in One

8-inch Rip Saw	Boring Machine (3 bits)	4-inch Jointer
8-inch Cross Cut Saw	Moulder (8 prs. knives)	Jig Saw (3 blades)
6-inch Dado Head	10-inch Sander	Two Emery Wheels

Progressive building contractors are fast coming to realize the importance of substituting practical machines for hand labor. The **Grimm Woodworker,** furnished either with gasoline engine or electric motor and combining so many important attachments in one machine, is undoubtedly one of the greatest time, labor and material savers yet brought out.

Write for descriptive booklet and our attractive selling plans.

Grimm Manufacturing Company

42 Erie Street, Buffalo, N. Y.

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MATERIAL HOISTS



FOR DOUBLE PLATFORM ELEVATORS

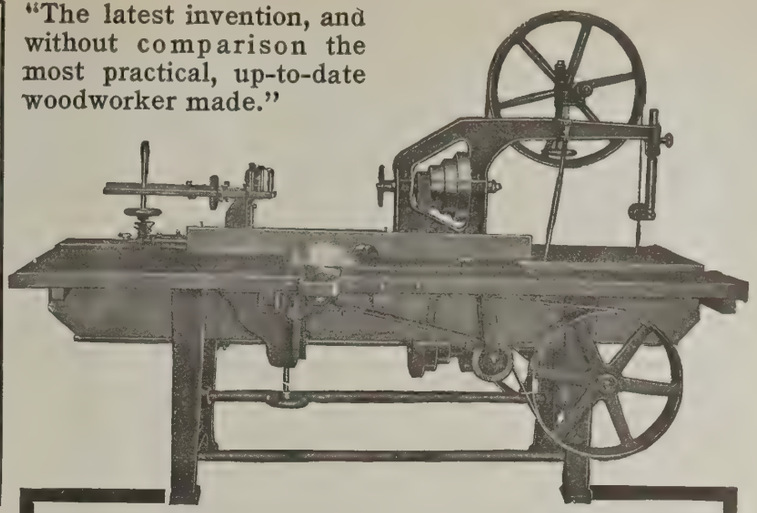
SIMPLE • STRONG DURABLE

The most economical method for elevating building material. Two sizes, 4 and 6 horse power. Contractors, send for Bulletin No. 5 and get our proposition.

Also a full line of engines from 1 to 35 horse power.

Bates & Edmonds Motor Co.
1146 MILL ST., LANSING, MICH.

"The latest invention, and without comparison the most practical, up-to-date woodworker made."



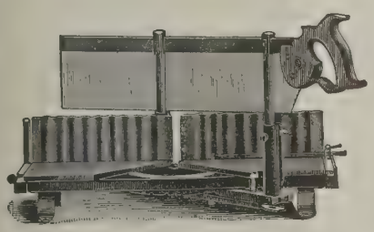
Buffalo Crain Combination Woodworker

Note the ample size and capacity of the parts which perform the four vital operations in your shop: **1. Lathe**—40″ between centers; **2. Band Saw**—taking 12″ under the guide; **3. Saw Mandrel**—taking saw sup to 12″ dia.; **4. Planer Head**—taking 5″ or 10″ bits. The convenient location, strength, simplicity and easy adjustment of these vital parts, are of the greatest advantage. Drilling, boring, sizing, jointing, moulding work, tenoning and, in short, practically every operation of daily occurrence in a woodworking shop, can be performed on it **without extra attachments.** As an investment, it is a true gold mine. **Three men can work at it at one time.** Lowest power cost. Ask for Booklet 1785.

Buffalo Forge Co., Buffalo, N. Y.

GOODELL MITRE BOX

Made of STEEL - Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw

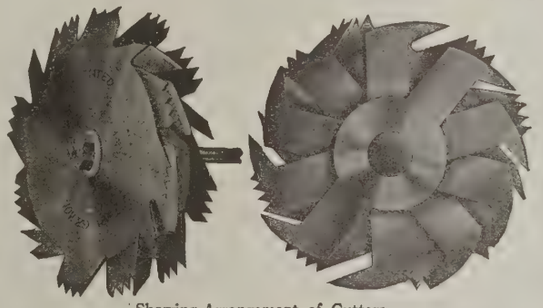
Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

HUTHER BROS. PATENT GROOVER OR DADO HEAD
WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛″ to 2″ or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N. Y.**

FOX UNIVERSAL WOOD TRIMMERS

TRADE MARK



4-A STYLE

$22.50 BUYS THIS TRIMMER COMPLETE with triangular gauge blocks which make it possible to do a large amount of special work on this machine.

F. O. B. Grand Rapids Michigan

Send for Complete Catalog

FOX Machine Co.
26 N. Front St., Grand Rapids, Mich.

J. B. Stone & Co., 135 Finsbury Pavement, London, E. C.
New York Address, 30 Church St., - Telephone 6115 Cortlandt

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

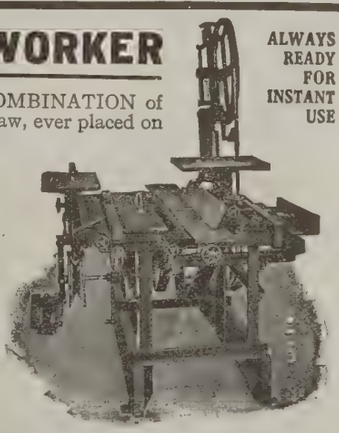
Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*



PARKS' BALL BEARING MACHINE COMPANY
KNOWLTON AND FERGUS STREETS **CINCINNATI, O.** Canadian Agts., Bournival & Co. St. Barnabe North, P. Q.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Reduce Accidents

You may be held for damages in case of serious accidents. Men's lives are at risk on your scaffold. For your own protection you should use the safest and best scaffold you can buy.



Wheeler Safety Scaffold Brackets

Lock automatically. Are rigid and firm when in place. Scaffold cannot swing. Men **are** safer than on other scaffolds. They **feel** safer and work faster on them.

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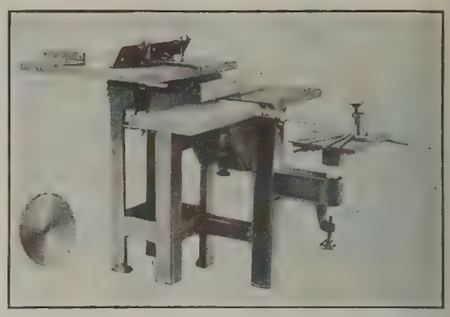
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This combination machine is the best value ever offered. It is made of solid cast iron and is furnished complete with necessary tools, belt, etc. Each machine is distinct from the others, and can be operated without interference with them.

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Taylor Portable Steel Derrick, 2000 pounds capacity. Adjustable capacity and speed to three ways. One man operates both cranks and can hoist with ease 700 pounds. Weight 160 lbs. Made in two sections. A man can climb a ladder with either section. Beam section connects to post by tipping in a vertrcal position. Consider the durability of a derrick constructed of malleable iron and steel and that of wood, *more compact, more powerful.* Roller bearing circle swing. Clears side wall of building three feet. With special platform attachable to side of railroad gondola car for unloading water-pipe, etc. Price of derrick with three way block, brackets, and bolts for attaching to building, $40.00 f. o. b. Chicago.



Manufacturer

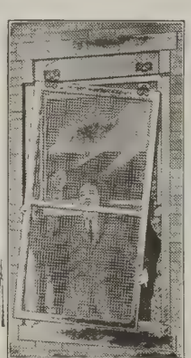
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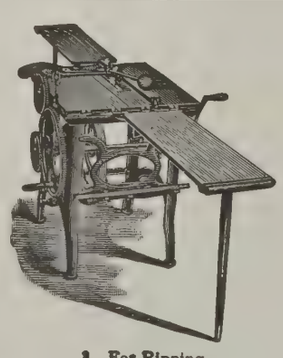
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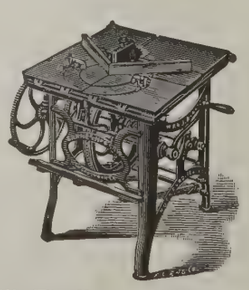
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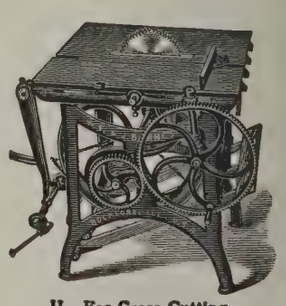
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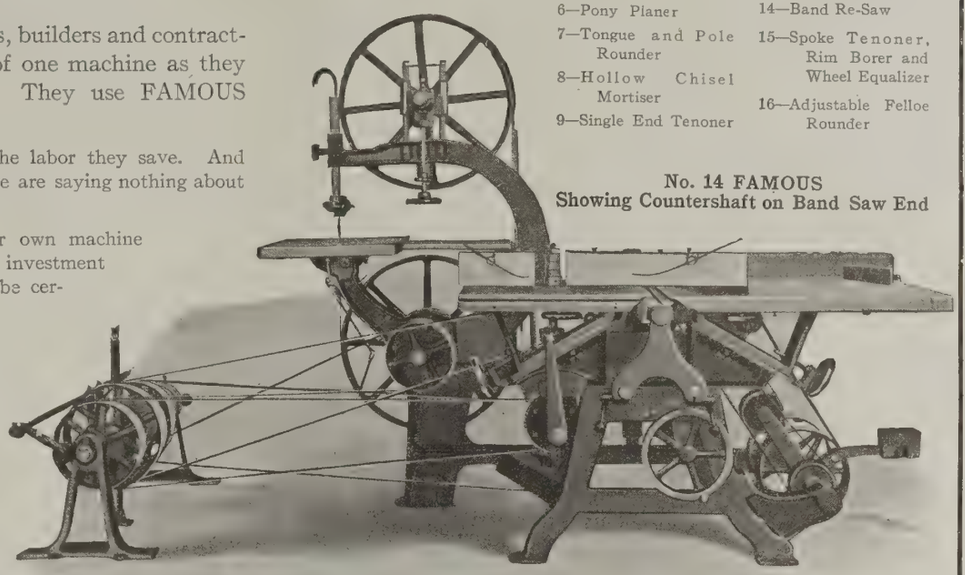
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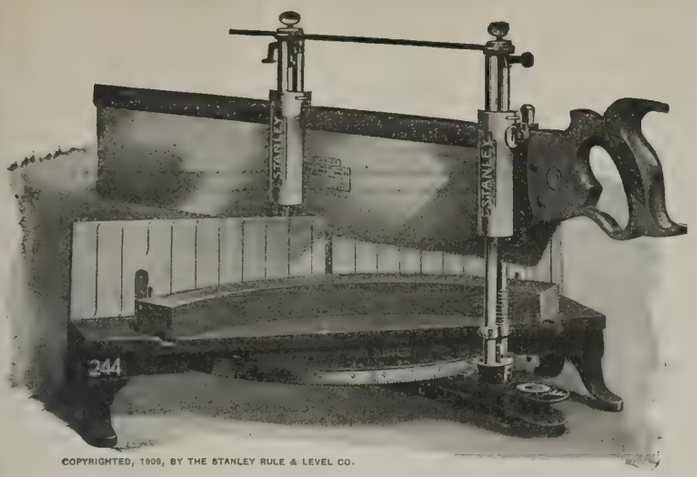
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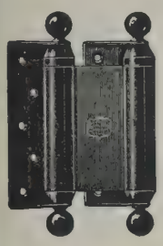
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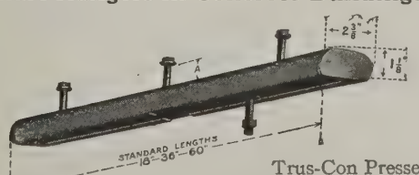
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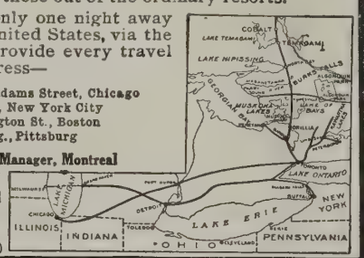


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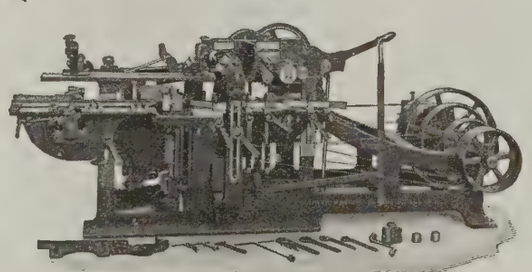
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(8)

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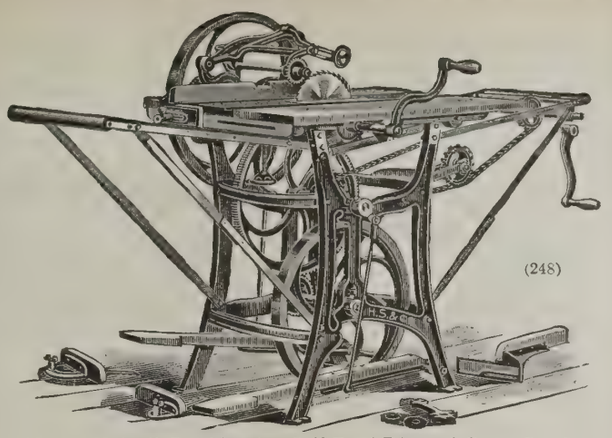
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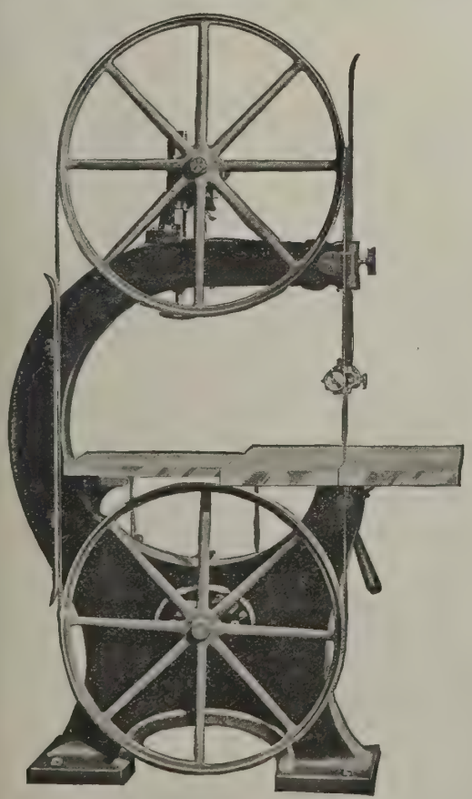
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Band Saws satisfy those practical, experienced mechanics who need strong, substantial tools.

The reason CRESCENT Band Saws are so popular is because they have earned a well-deserved reputation for durability and accuracy where hard service is demanded of them. Each day they are pleasing some of the most exacting band-saw operators in every civilized country, and as you appreciate what it means to have a thoroughly dependable, well-built, practical band saw, you should certainly look into the merits of the CRESCENT line before you order.

Send for a catalog telling all about these splendid machines, and our line of Saw Tables, Jointers, Borers, Swing Saws, Planers, Planers and Matchers, Wood-Workers, Disk Grinders.

The Crescent Machine Co.

No. 10 Main Street

LEETONIA :: :: OHIO

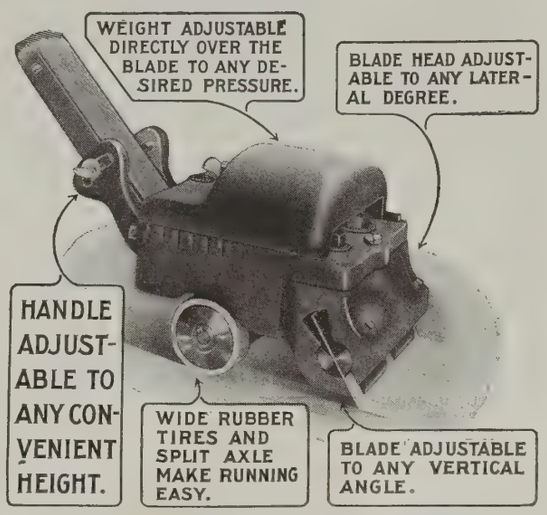
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YOU KNOW

from the picture that the

ADJUSTABLE

Is a Practical FLOOR SCRAPER



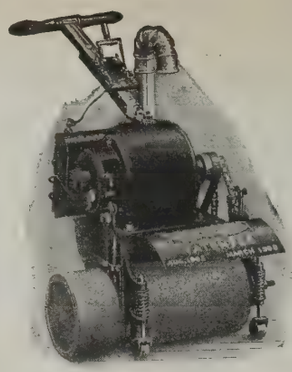
I will send you one **on approval** and let you give the machine a chance to speak for itself in your own hands.

If not more than pleased with its work, ship it back at my expense. If perfectly satisfied, remit **$40,00,** the price to everyone, payment in full.

I will make one profit the day the sale is made, but you will make a profit every day you use it.

H. P. DIDRICKSEN

941 Park Avenue **SOUTH BEND, IND.**



Made in three sizes: 8x18, 8x15, and 8x12 in. Roller Edge Roller easily adjusted to either side

Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

The Schlueter will remove all joints or warped edges, and oil, wax, lime stains, or the "muck" from skate wheels, in a most satisfactory manner.

Earning Capacity, $20.00 to $35.00 per Day

Send for prices and Free Trial Proposition

M. L. SCHLUETER

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1001 Flatiron Bldg. NEW YORK.

Acme Floor Surfacing, Laying & Finishing Co. Not Inc.

IT'S A SCRAPER BUT IT WORKS LIKE A PLANE

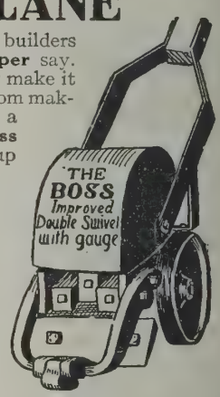
That is what the many satisfied contractors and builders who are using the **Boss Improved Floor Scraper** say.

The **gauge** on the front and wheels at the rear make it like a plane. This gauge, which keeps the knife from making a depression in the floor, gives the knife a double support. It can be set for **any thickness of shaving,** or **instantly removed** for working up into corners.

Deep Cutting is prevented by the pear shaped wheel in front, which lets the knife down gradually to make the cut.

Poor work is **impossible** as with the simple but positive adjustment of this gauge and wheel attachment the knife leaves no mark. The standing attachment cleans the wheel and takes off the rosin when working hard pine.

Price very low. Write for descriptive Circular "N"



GEORGE J. KEPPLINGER, - Dwight, Illinois

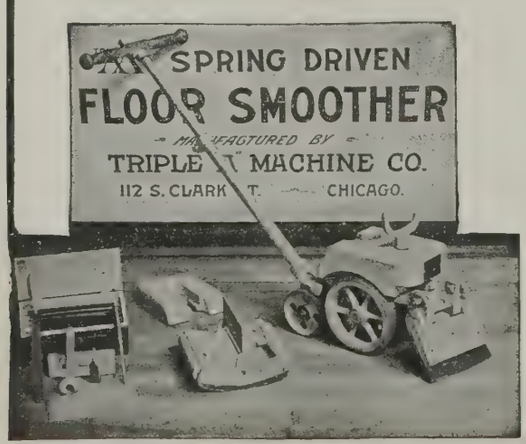
When You Buy a Floor Surfacing Machine
BUY A GOOD ONE—IT PAYS!

The Triple "A" Spring-Driven Floor Smoother combines the advantages of the hand machine and the power machine. No more expense than the former, yet has the capacity and ease of operation of the latter.

No wasted energy pulling a dead weight.

About half of all the Triple "A"s sold have been bought by owners of dead weight machines. What's the answer?

"Get the best first and save extra expense."



The Triple "A" to be appreciated needs only to be seen in operation.

For advertising purposes we will give a special discount on the first machine sold in each town.

SENT ON FREE TRIAL

WRITE FOR FULL INFORMATION

TRIPLE "A" MACHINE COMPANY

34 North Clark Street **CHICAGO**

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The WEBER DOUBLE ACTING Floor Scraper

The WEBER knives adjust to any desired slant for perfect work on all conditions of flooring. The WEBER is guaranteed not to chatter nor leave waves. The knife is held to its work—not by a dead weight—but by a flexible joint—similarly to action of human hand. The WEBER scrapes forward and backward. It has two knives, either of which can be brought into instant action. This rests you—saves your time—and enables you to scrape the centers of very small rooms. I guarantee perfect work in either direction. The saving in time and money in a year is a big item. The WEBER scrapes right up to the wall. By adjusting the handle to the right or left (see dotted lines), the extreme edge of the knife comes into direct draft with it. You can scrape right into the very angle of the floor without side draft, or marring the baseboard.

Try It Five Days FREE

Send for this scraper. Take it right out onto the job. Put it up against any other scraper made—on any kind of flooring. If its work isn't better in every way, return it.



Write Me Now

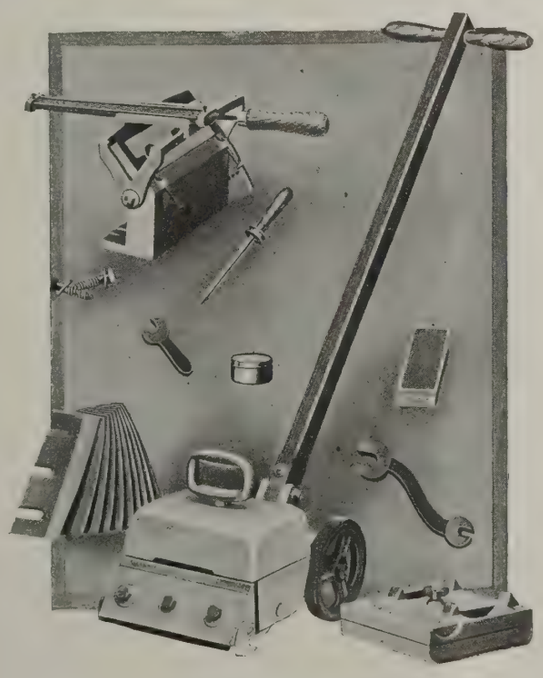
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Weber No. 1

This is my latest model. Note the handle adjustment, two knives, excellent balance, and workmanlike finish thruout. Made to save time and it *does* it.

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661 71st Avenue - - - - WEST ALLIS, WIS.

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The Acme Floor Scraping Outfit.

By that I Mean

Absolutely Nothing

Sounds Strange—But It's a Fact

For many years I have been shipping the Acme Floor Scraping Outfit to interested parties on one week's free trial and if you have never taken advantage of this offer, you have been passing up a big money and labor saving proposition.

You don't have to take my word as to the "goodness" of my outfit. I give you the opportunity to prove it to yourself—more I cannot do. If you do floor scraping by hand you are wasting your money. I guarantee that the Acme Floor Scraping Outfit will do your floor scraping perfectly and to your entire satisfaction. Thousands of daily users are ready to testify as to its value to them.

Do you want full particulars of my absolutely free trial offer? Drop me a line and I will send them, as well as descriptive booklet by return mail.

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Antifriction Ball Tip Butts

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Strongest, Best and Cheapest Antifriction Butts Made

GUARANTEE OF QUALITY STAMPED ON EVERY BUTT

FURNISHED IN ALL STANDARD FINISHES

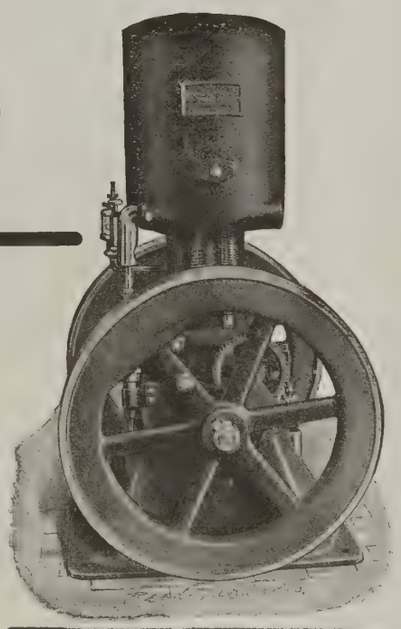
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The NOVO gasoline engine in four sizes from 1¼ to 6 H. P. is especially adapted for use on portable and stationary machinery of every kind. It is **very light in weight, absolutely self-contained,** gasoline being in the base and the water contained in tank around the cylinder, which is guaranteed not to burst from freezing. The **upright form** and **low height** for vertical engine, and **small size of base,** adapts it for use on any machine requiring a self-contained power.

We should be pleased to furnish manufacturers or users of portable machines of any kind with full information, weights, and sizes of our different engines.

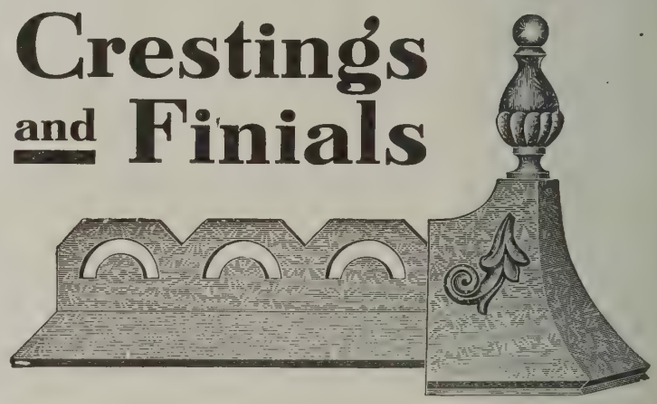
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THE WINTHROP **Solid Tapered Asphalt Shingles**

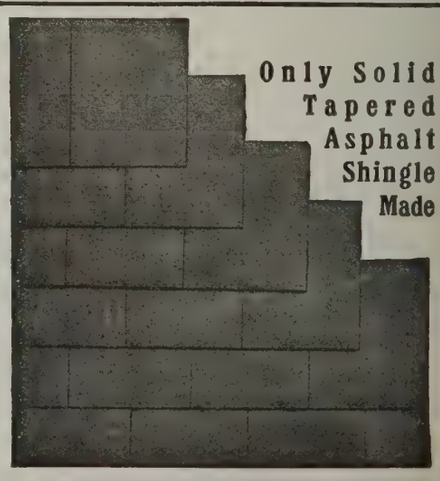
ARE OF A COOL, GRAY SLATE COLOR

And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

SPECIAL INDUCEMENTS TO THOSE WHO APPLY FIRST ROOF IN EACH TOWN

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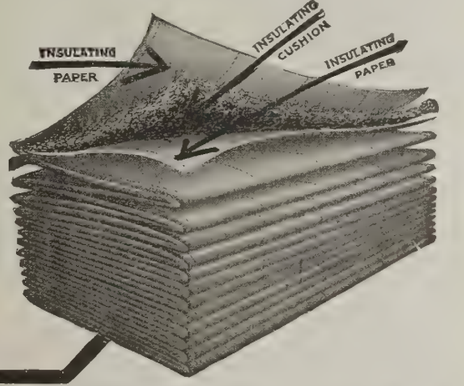


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An important question to the prospective builder or buyer of a dwelling is—"what will it cost to keep it comfortable?" The use of a sheathing material which actually prevents loss of heat through radiation and convection reduces coal bills and keeps a house warm in winter and cool in summer. Keystone Hair Insulator does this because it is made of cleansed and sterilized cattle hair, which, when felted together, offers greater resistance to the passage of heat and cold than any vegetable or mineral substance ever discovered.

Keystone Hair Insulator

is as much warmer in comparison with building paper as a woolen blanket is in comparison with a cotton (vegetable) sheet, **and for exactly the same reason.** Consisting of a sheet of hair felt between two sheets of strong, non-porous building paper, it is cushion-like in character and absorbs sound waves instead of conveying them. This makes it an effective sound deadener when placed between floors and walls. Get our booklet which shows how actual tests by big builders have proved Keystone's superiority.



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To Prove to You the high, standardized construction and composition of Carey's Roofing, we want to send you

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Results far better than from costly cumbersome affairs formerly used. Retails at $1.25 each.

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M ASHLAND M

Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers

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The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry. A high-grade mixer at minimum cost. Our business has been built up on repeat orders. Correspondence invited.

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R ASHLAND R



The Original

BAY STATE Brick and Cement Coating

Protects concrete or stucco walls, floors and ceiling against damage from moisture and does not destroy the pleasing texture of concrete or stucco. It has been endorsed by the National Board of Fire Underwriters as a fire retarder, has been applied with great success to the exteriors and interiors of residences, hotels, factories and mills; when applied on ceilings it does not drop off, thus preventing damage to delicate machinery. It is not affected by acids or smoke.

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It prevents floors from dusting and sanding and is admirable for hospitals and similar institutions, will stand wear and washing. Write us for particulars about its application. We can give you the names of some of the best residences and best textile and other mills where it has been used successfully under most adverse conditions.

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R. I. W. PAINT

"REMEMBER IT'S WATERPROOF"

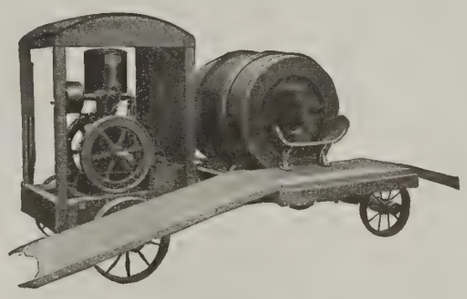
Sold in barrels, $1.25 per gallon; 5-gallon cans at $1.35 per gallon; 2-gallon can, $1.50 per gallon, all F. O. B., Chicago

Proof Against Water, Acid, Fumes or Alkali

Special Elastic Compound for Each Specific Purpose

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You Can Pay for the Mixer on a Single Job by the Greater Economy of Operation

It is not alone the saving of one-third in first cost, one-half in power, one man to operate the hoist and two-thirds the delays and repairs, but the greater portability enabling it to always be kept at the most convenient position on the job for rapid work, that are the distinguishing features of the

Eclipse Concrete Mixer

And we offer our patrons not only greater economy of operation, but unequalled service in shipment. We carry 100 Eclipse Mixers in stock at our factory, stores, warehouses and branch houses for immediate shipment.

It is pre-eminently the mixer for the contractor because it saves money in nearly every possible use.

Our new 1911 catalog No. 32 is just off the press and gives full information how to handle the Eclipse to obtain best results. Write for it. Our testimonial booklet explains how other contractors are making money by using the Eclipse Mixer.

You can buy the small size Eclipse Batch Mixer Complete with Power at a lower price than a Continuous Mixer.

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Read Mr. Bradley's Interesting Letter

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South Bend, Ind.

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A man in Wyanet tried to make blocks with a ——— machine, but he had to quit—could not sell his blocks.

I am a farmer and cannot do justice to the business. Everyone that sees my blocks say they are the very best they ever saw, and I say so, too.

Yours truly,

(Signed) L. R. BRADLEY

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Mail Coupon for Catalogue Today—Get all the facts about **Ideal Machines.** Learn about their simplicity and durability, why Ideal Blocks have an ever ready sale, and why there are more Ideal Block Machines in use than all other machines put together.

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421 Emerick Street, South Bend, Ind.

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Architects are referred to Sweet's Index, pages 28 and 29.

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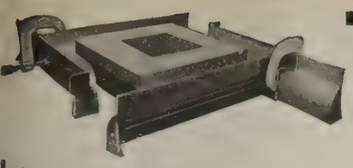
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Block Machines	Step and Sill Molds	Silo Blocks	Batch Mixers
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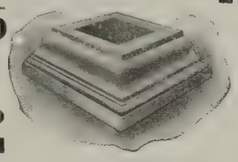
If You Don't Say This Mold

is the best value you ever bought after you have used it for six months, send it back and we'll return your money.

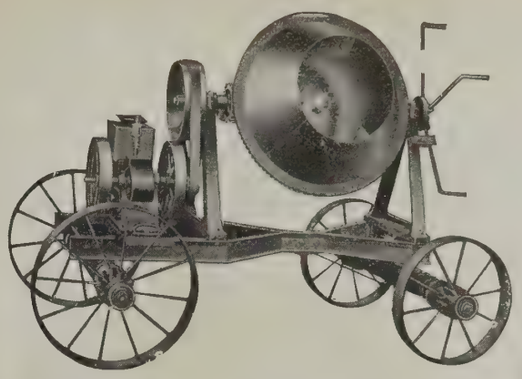
You'll be surprised to see how many different places you can use it; makes 476 different sizes of blocks.

We wouldn't make any such statement if we didn't know what the utility of this mold is; and we know that if you realize the value of this mold like we do you would never sell it if you couldn't get another one.

Adjustable from 2 to 24 inches in width and from 2 to 24 inches in length. Send for a catalogue. Dont overlook sending because you ought to know what a mold like this will do for you. Send today—don't put it off. **$10.00**



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Specially designed for cement contractors whose requirements are met in a batch mixer of small size and low cost, that will turn out a perfectly mixed mass as rapidly and as economically as the larger machines.

Drum holds 6 cubic feet of loose material—turns out a perfectly mixed batch of 4 cubic feet. Mounted on steel skids or substantial trucks—with or without gasoline engine power. The Polygon "Junior" is one of

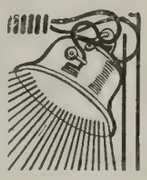
"THE GREAT POLYGON LINE"

including everything for the cement contractor—mixers of all sizes, power loaders, hoists, gasoline and steam engines, hand and power pumps, block and brick machines, trucks, sand and stone screens, culvert forms, dump carts and cement workers' tools. The Polygon line stands for satisfaction and economy.

Our Catalog illustrates and describes entire line.
Send for it today. Mailed free.

WATERLOO CEMENT MACHINERY CORP., 111 Vinton St., Waterloo, Ia.

Say, Mr. Contractor



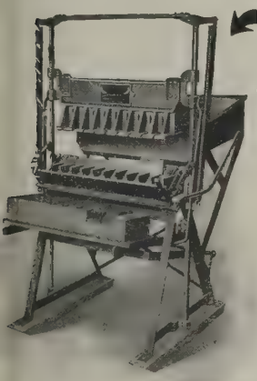
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Our "Crescent" Vertical Tamping Brick Machine will establish a big and profitable business for you. Cement bricks are rapidly replacing clay bricks, also cement blocks, owing to their beauty, durability and low cost of production. You get a handsome price for artistic brick.

Get our Illustrated Catalog and lowest prices. It will be an "eye opener" to you.

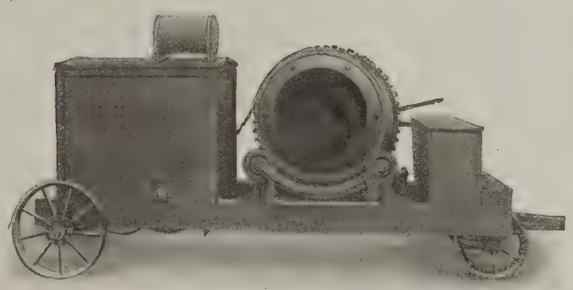
It will pay you to act at once.

We also manufacture Continuous Mixers, Sewer Pipe and Tile Molds, Power Tile Machines, etc., etc. : : : : : : : :

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"The Largest Line of Concrete Machinery in the World"



Northwestern Contractors' Power Batch Mixer

This machine combines all of the features which every contractor or concrete worker desires in a mixer. It has such a low intake that the material can be shoveled in from the ground or a small platform built and the material dumped right into the mixer with wheelbarrows. It has a high discharge and will empty into a wheelbarrow or into the forms. It is light and portable and can be readily moved from place to place. It has automatic watering tank and can be adjusted to discharge any given amount of water each batch. It will hold a full sack of cement with practically any mixture. It can be equipped with a power, stationary loader or low platform. We guarantee that this mixer will cost you $100 to $200 less than any standard mixing machine of equal capacity on the market.

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952 Spring St. - EAU CLAIRE, WIS.

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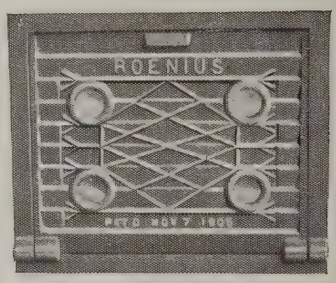
HESS Sent on Approval FURNACE

You can buy our furnace direct from our factory AT THE FACTORY PRICE, and test it 60 days in winter weather. If not pleased, return it at our expense for freight both ways, and pay us nothing.

This offer, and lots of good furnace information, will be found in our free 48-page booklet. Ask us for one. A postal card will do.

Hess, 907 Tacoma Building, Chicago

Roenius Wood and Coal CHUTES

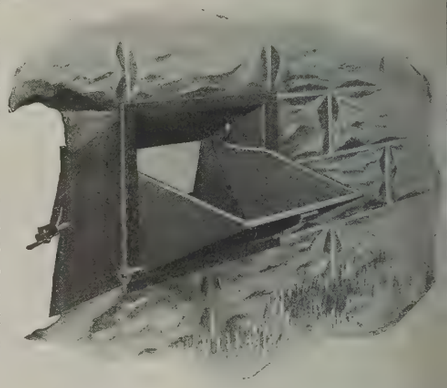


ROENIUS CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.

Write for Circulars and Prices.

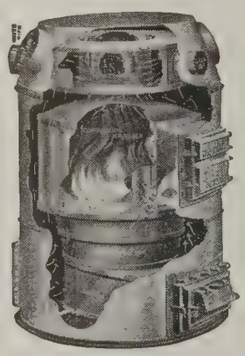
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MANUFACTURERS

Grand Rapids, Wisconsin

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SAVES 50 PER CENT OF COST; 40 PER CENT OF FUEL



Most Durable, Most Economical Furnace Sold

Has a Perfect Ventilating System for Every Part of the Building

RESIDENCE HEATING PLANT

Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 20-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

Special Price, $65

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54-in. Furnace, 32-in. Fire Pot, 40-in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

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Sheet Metal Statuary of Rare Artistic Worth



WITHIN the last quarter of a century there have been reproduced at the Mullins Factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.

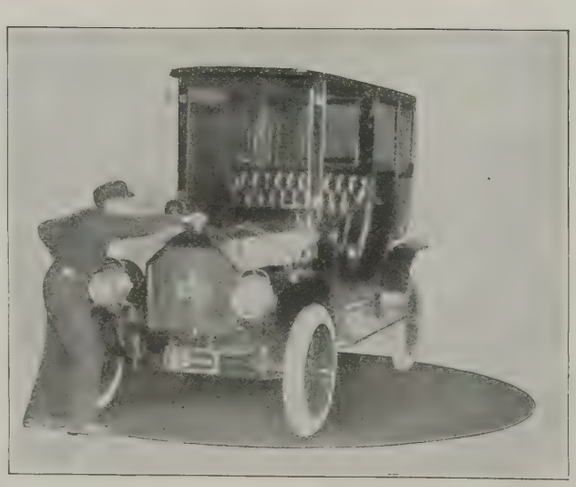
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We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description

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The W. H. Mullins Co.

210 Franklin St., :: :: SALEM, O.



You Need A Turntable

Wherever automobiles are handled in crowded quarters a turntable is indispensable. Don't get a poor one—get a good one at the same price

When the Lansing Wheelbarrow Company, with its large organization and large equipment, determined to make turntables, it undertook the task with the express intent of producing the very best **turntable** in the largest quantity, giving the user the favorable advantage of price. There are no other equally good **turntables** at any price, and if they approach it they certainly cost you more. Let us send you our elaborately and beautifully illustrated booklet on TURNTABLES.

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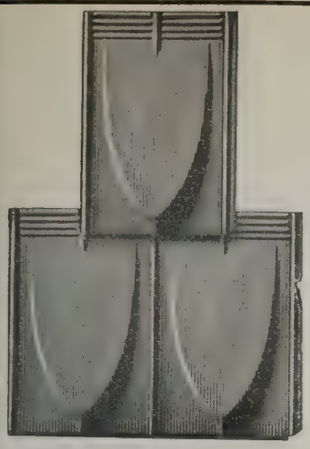
LANSING WHEELBARROW CO.

14 Grand Street, LANSING, MICH.

Branch Warehouses:

102 N. Moore Street, New York
330-4 N. 1st Street, Minneapolis,
American and Willow Streets, Philadelphia
169 W. Lake Street, Chicago
789 Folsom Street San Francisco
923 Mulberry Street, Kansas City

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STYLE B.
Showing Method of Laying

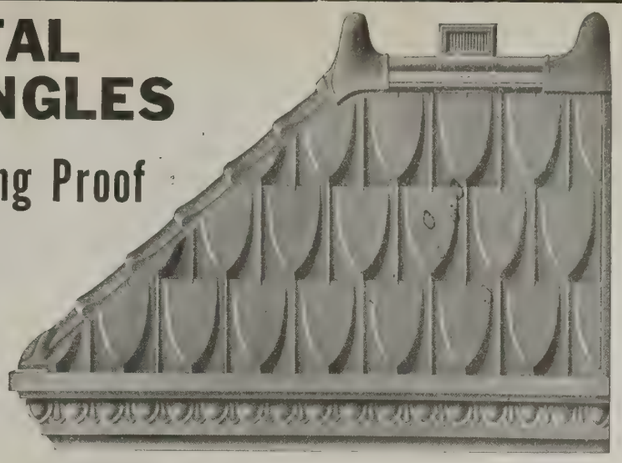
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Fire, Water and Lightning Proof

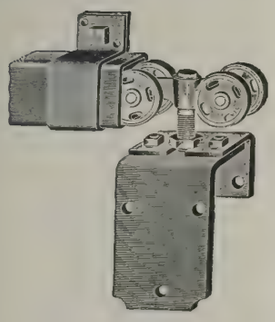
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MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.



No. 20½ Ball Bearing

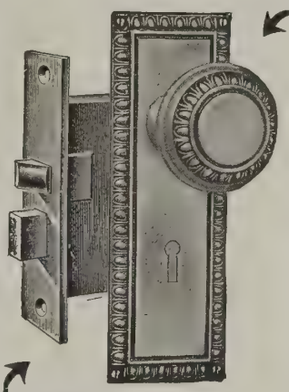
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You can adjust it both ways; to prevent dragging from timber settling and chafing of door on jambs.

Send for our Architects' catalog to-day.

Richards-Wilcox Mfg. Co.
AURORA, ILL.



No. 5311. Inside Lock Set Steel, Old Copper Finish. PRICE PER SET 37c.

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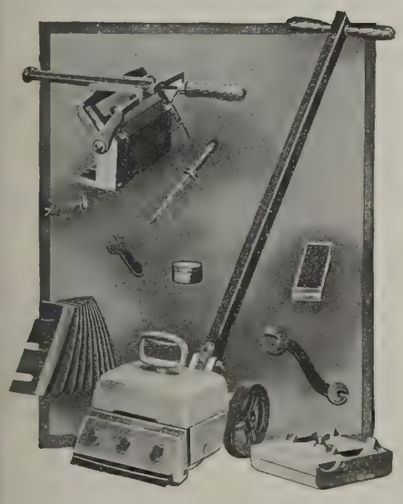
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FREE Our illustrated Catalog and net price list to Contractors and Material Men. Please state whether you are a Contractor or Carpenter.

We do not sell to Contractors or Carpenters in COOK COUNTY

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Is an equipment that has revolutionized the work of floor scraping.

It is a time and money saver and is guaranteed to do perfect work.

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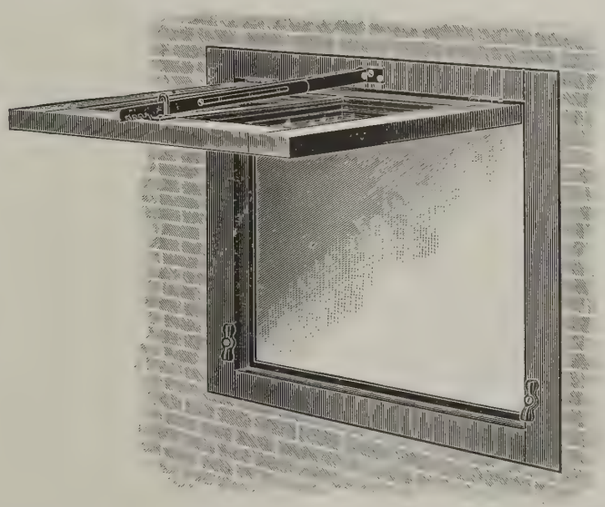
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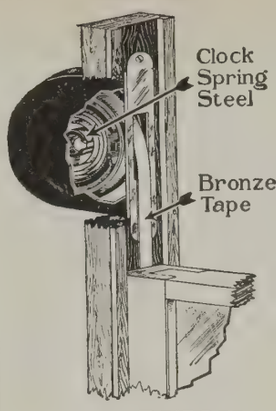
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This lift is so coustructed that it can easily be adjusted by simply loosening a bolt and pushing it together or slipping it apart to fit any size of window frame from a 14 to a 20 inch sash. It works automatically and will hold the window open at three different angles. This lift is easily applied by engaging the first notch in the catch at bottom of window and screwing it fast on the casing at top.

Manufactured by

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5,000,000 Pullman Sash Balances

In daily use and less than 100 repairs on all of them in a year. Do you know of anything that is used at all that wears as well? No more expensive than cords and weights, far more modern, neat and smooth working. Can be installed anywhere. Carry any weight window.

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And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.

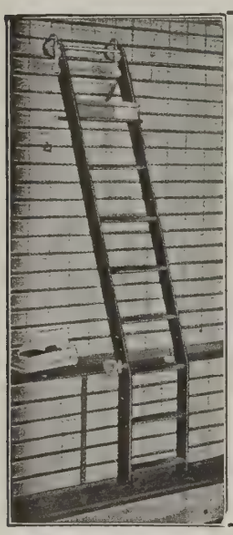


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Established 1869



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by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

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Makes any angle, allows for settling of building—keeps windows from frosting. The most beautiful, practical and durable bar in the world. Made in metal.

"Holds with a grip of iron, yet with a touch of velvet." Glass set from the outside. **More good features explained in our catalog—it's fine—send for a copy before you build or repair.** Write today.

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Universally Recognized

As the leaders in Architectural Beauty and Quality.

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We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, **that's why** we are selling more columns today than ever before.

Ask for Catalogue "T"—it's worth having for any **Home Builde** Send for catalogue T 27 of pergolas, sun dials and garden furniture or T 40 of wood columns

We manufacture a full line of porch material and Interior Hardwood Columns.

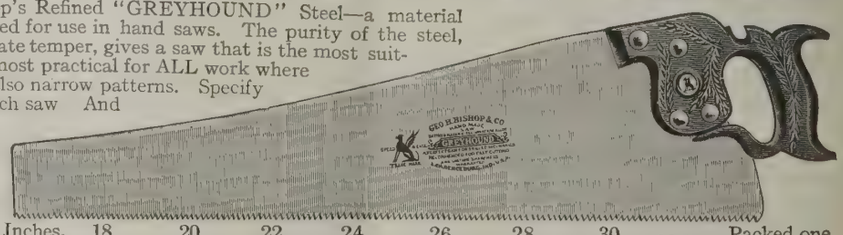
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GREYHOUND HAND SAWS



The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us.

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Brick Mantels AND Face Brick

"Bradford Reds"



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Brick Mantels Made of Really Red Red Pressed Brick from

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BUILDERS AND CONTRACTORS

are invited to correspond with us. Get the facts and keep the round profits that are legitimately yours.

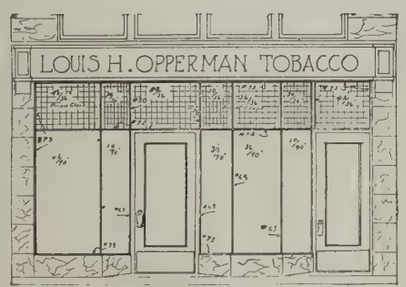
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Use the Petz Bar—the one that has shown its reliability and staunchness in thousands of modern buildings and remodelled store fronts. It is known and used by the leading architects and contractors and is endorsed by insurance companies, for the fact that it will give strength of construction without breaking glass.

To gain an idea of the various styles of this staunch bar, its beauty and strength, send today for our new book: "Modern Store Front Construction." We will gladly assist you in selecting if you will give us details of the work you contemplate.



FRONT ELEVATION

DETROIT SHOW CASE COMPANY

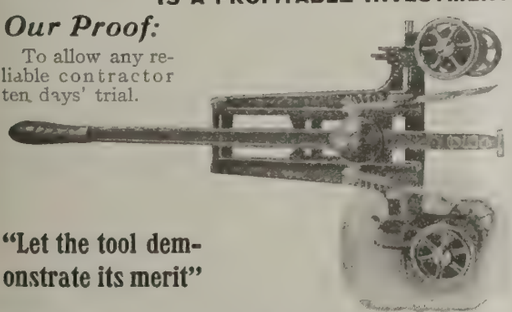
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Our Door Lock Mortiser

IS A PROFITABLE INVESTMENT

Our Proof:

To allow any reliable contractor ten days' trial.



Our Claim:

It will cut an opening for a mortise lock in three minutes in any kind of wood, plain or veneer.

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What can you do that any one of a million others could not do just as well? How much result-increasing or expense-decreasing knowledge can you bring to bear in your work? Have you any special ability? Is there any reason why an employer should single you out for more than average pay? Or are you just an average workman?

Look the facts in the face. "What can you do?" "How well can you do it?" "How much are you worth from your neck up?"—that's the line of talk Old Industry hands out to the candidate for prosperity. Are you ready with the answers?

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The business of the I. C. S. is to raise salaries. And the more than 400 voluntary letters sent to Scranton every month to tell of positions bettered and salaries increased through study of I. C. S. Courses prove how well the big institution is doing its work. No matter where you live, how insufficient your education, nor how small your means, the I. C. S. offer you a sure way to a better job. They have been increasing salaries for 20 years. They are doing it now. They are not going to stop.

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Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

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Building Foreman	Surveying & Mapping	Textile Manufacturing
Building Inspector	Mechanical Engineer	Chemist
Structural Engineer	Mechanical Draftsman	Commercial Illustrat'g
Structural Draftsman	Stationary Engineer	Bookkeeper
Concrete Construction	Electrical Engineer	Stenographer
Plumb. & Steam Fitting	Electric Wireman	Advertising Man
Heating & Ventilation	Electric Lighting	Window Trimming
Plumbing Inspector	Electric Railways	U. S. Civ. Serv. Exams.
Estimating Clerk	Heavy Elec. Traction	Automobile Running

Name _____

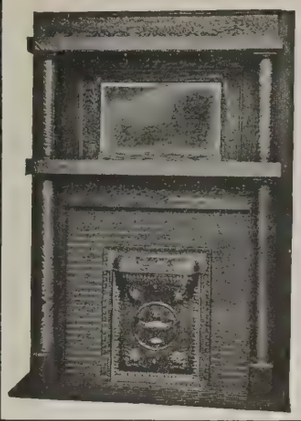
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City _____ *State* _____

Present Occupation _____

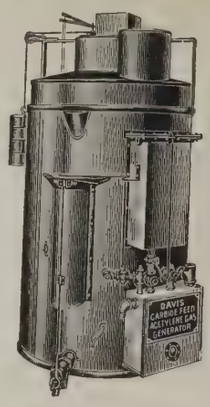
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Try it at Our Expense

Until your dealer becomes stocked with this new combination India Oilstone we will send one on trial, express paid, for $1.00. Try it ten days. If not satisfactory return and receive your dollar back,
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Try it at Our Expense

COMBINATION INDIA

We want every carpenter to try this oilstone which was designed solely for carpenter's use. In addition to above offer we will include an attractive glass top souvenir sharpening stone with every order on condition you mention your dealer's name in your reply.

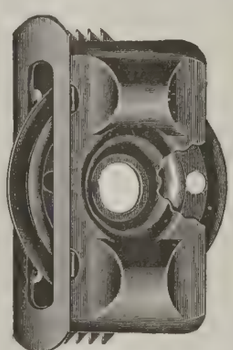
SHARPEN YOUR SAW

THE "SPECIAL" SAW SET

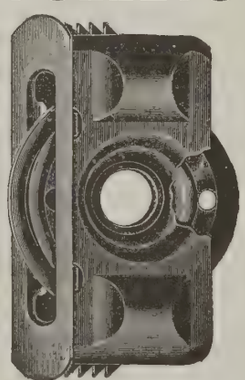


When your saw begins to run hard, set it with a "Special" saw set and note the difference. Easy to use, sets the saw just right, and will not break or strain the saw teeth.
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OTTUMWA SASH PULLEYS



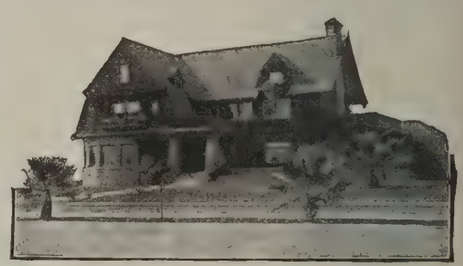
Are the best for you to use and specify.
NOTE THE LARGE BEARING
Insures Smooth Action and no Noise.
SAMPLES FREE



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JOHNSTON & SHARP MFG. CO., - - OTTUMWA, IOWA

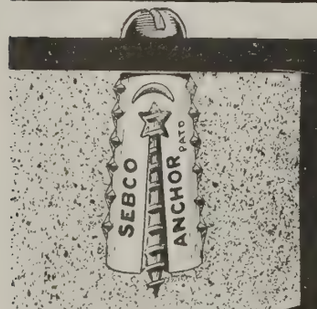
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not only beautify the shingles, but thoroughly preserve them. They are made of Creosote, "the best wood Preservative known," and the finest and strongest colors, ground in linseed oil. They cost half as much as paint, can be applied at half the labor cost, and are suitable for shingles, siding, and other exterior woodwork. *You can get Cabot's Stains all over the country. Send for samples and name of nearest agent.*



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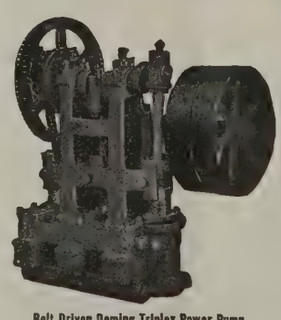
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REAR ELEVATION.



SOUTH ELEVATION.



NORTH ELEVATION.

SUPPLEMENT TO

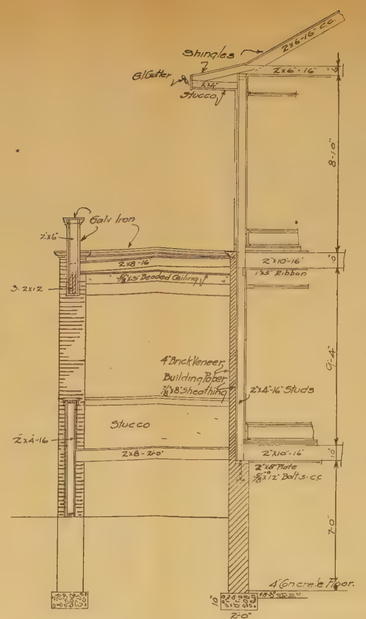
THE NATIONAL BUILDER

JULY, 1911

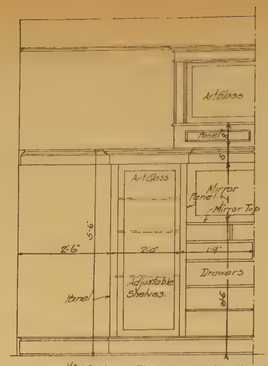
NATIONAL BUILDER DESIGN No. 343

Scale for Floor Plans, 1 inch Equals 4 Feet. Scale for Elevations, Front—1 inch equals 4 feet; North, South and Rear—1 inch equals 8 feet.

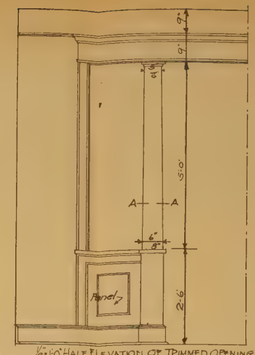
FOR ESTIMATE SEE PAGE 29



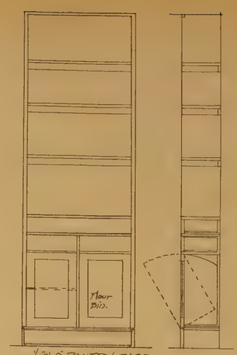
¼"=1'0" SECTION.



½"=1'0" HALF ELEVATION of SIDE BOARD.

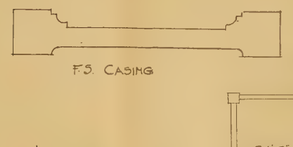


½"=1'0" HALF ELEVATION OF TRIMMED OPENINGS.

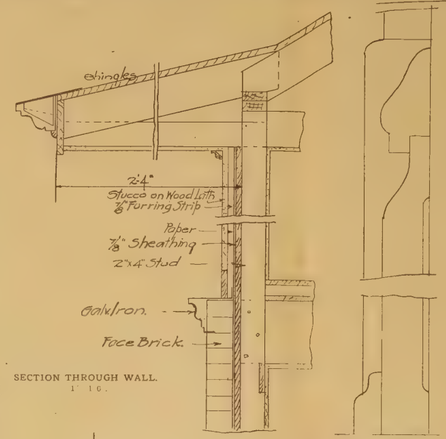


½"=1'0" PANTRY CASE.

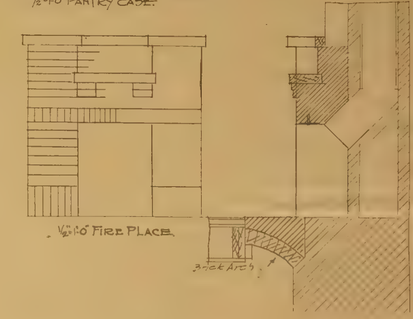




F.S. CASING

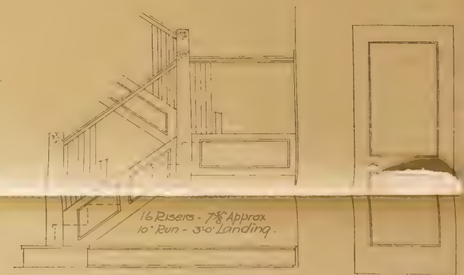


SECTION THROUGH WALL.

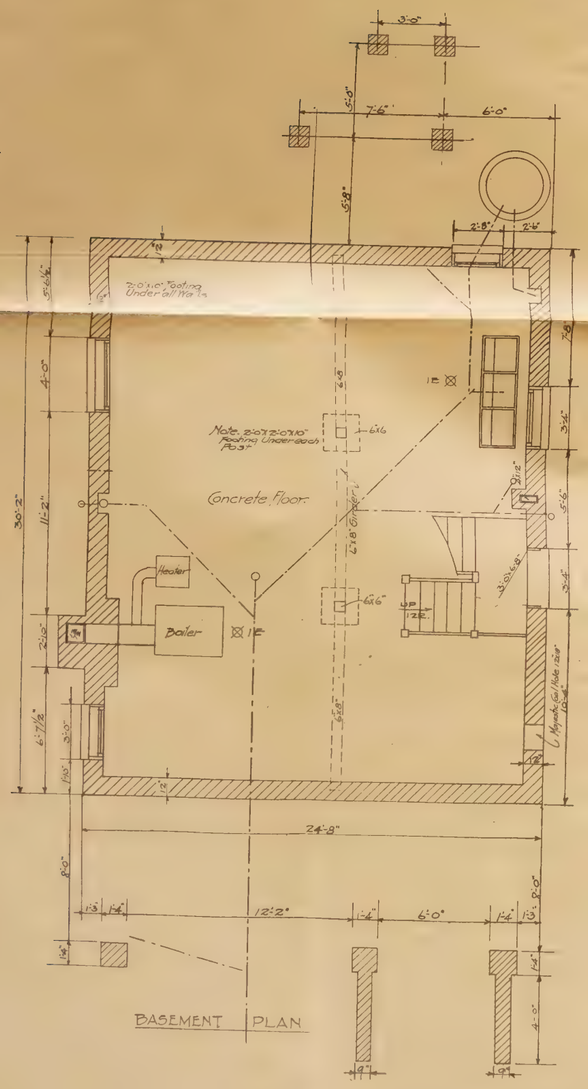


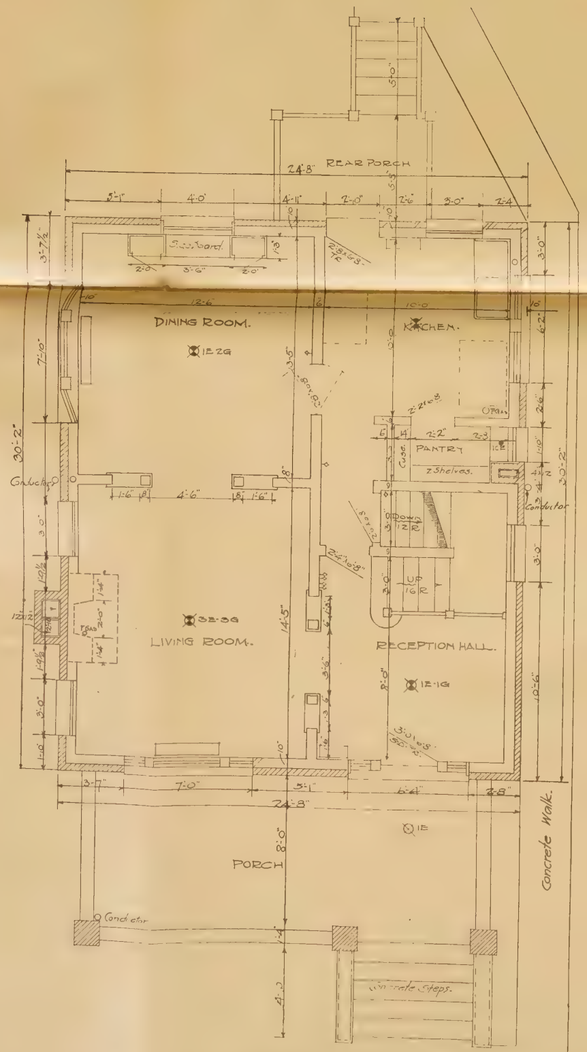
½"=1'0" FIRE PLACE.

¼"=1'0" Elev. Linen Closet.

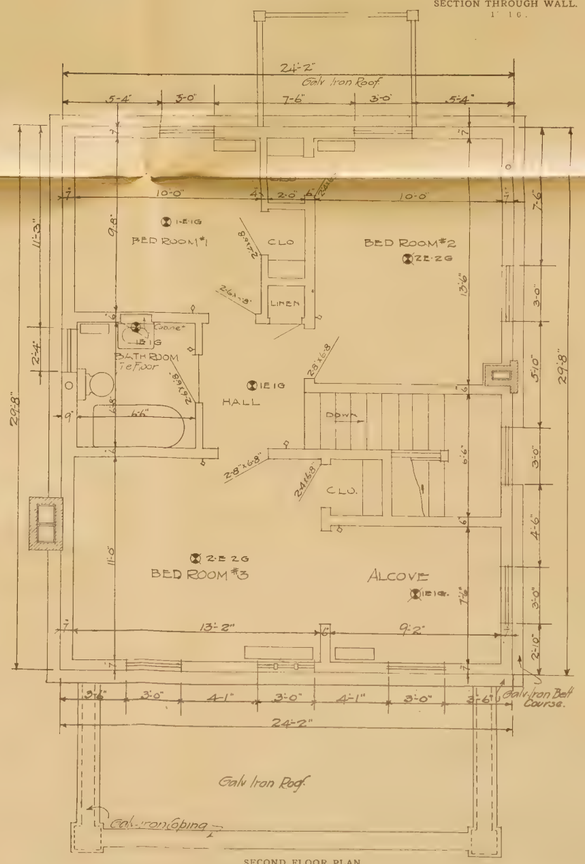


½"=1'0" TYPICAL DOOR.

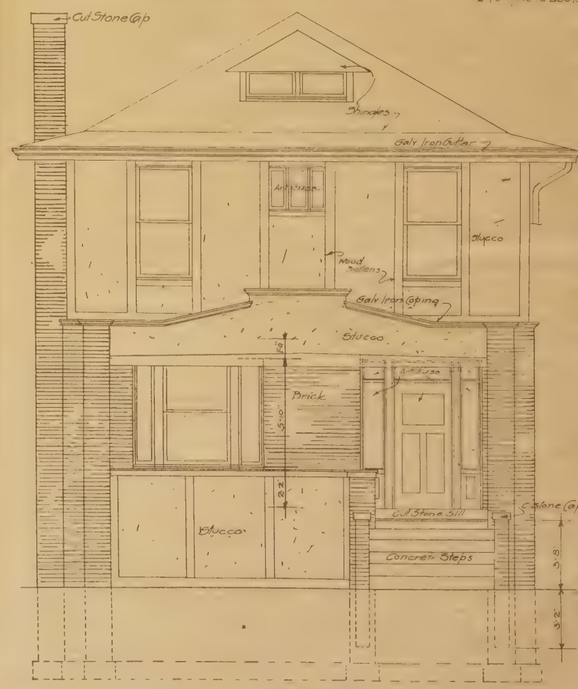




FIRST FLOOR PLAN.



SECOND FLOOR PLAN.



FRONT ELEVATION.

THE NATIONAL BUILDER

ol. 52 CHICAGO, JULY, 1911 No. 7



RAVENSWOOD MANOR, built at Chicago, Ill.

NATIONAL BUILDER DESIGN No. 343

L. E. Russell, Architect, Chicago

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $3,601.30

STIMATE OF RAVENSWOOD MANOR

y I. P. HICKS

EXCAVATING AND MASONRY.

130	yards excavating, 35c	$ 45.50
72	yards cement cellar floor, $50	36.00
17	lineal ft. chimneybreast, $2.50	42.50
15	lineal ft. chimney above breast, $2	30.00
300	cubic ft. concrete footing, 25c	75.00
9,000	brick laid in basement wall, $13	247.00
9,000	face brick in veneered wall, $25	225.00
120	yards stucco plastering, 80c	96.00
	Concrete front steps	15.00
	Stone caps	3.00
	Bolts for masonry	3.50
	Kitchen chimney	34.00
	Total excavating and masonry	$844.50
	lastering, 660 yards, 27c	$178.20

LUMBER BILL.

		Feet.
1,	6x8x20 ft. girder	80
1,	6x8x10 ft. girder	40
1,	6x6x14 ft. post	42
48,	2x10x24 ft. floor joists	1,920
10,	2x8x16 ft. wall plate	213
110,	2x4x20 ft. outside studs	1,467
24,	2x6x24 ft. ceiling joists	576
7,	2x8x16 ft. front porch	149
14,	2x8x12 ft. front porch	224
14,	2x8x10 ft. front porch	187
5,	2x8x16 ft. rear porch	107
2,	6x6x18 ft. rear porch	108
3,	2x12x22 ft. front porch	132
3,	2x12x18 ft. front porch	108
52,	2x6x16 ft. rafters	832
4,	2x6x20 ft. hip rafters	80
50,	2x6x18 ft. partitions	900

40, 2x4x18 ft. partitions	480
50, 2x4x16 ft. plates	533
20, 2x4x14 ft. dormer, etc	187
20, 1x4x12 ft. bridging	80
30, 1x6x12 ft. braces	180
20, 2x2x18 ft. furring	120
Total feet framing lumber	8,745
8,745 framing lumber at $27	$236.11
1,680 ft. 1x8, No. 2 boards, rough floor, $27	45.36
2,600 ft. 1x10, No. 2 boards, outside walls, $27	68.20
1,400 ft. 1x8, No. 2 boards, for roofs, $27	37.80
14 m. clear R. C. shingles, $4	60.00
8 rolls Neponset building paper	10.00
4 rolls red rosin building paper	3.00
200 lineal ft. 1x6, fir finish, $45	4.50
50 lineal ft. 1x4, fir finish, $45	.77
40 lineal ft. 1¼x12x16 ft., fir finish, $45	2.25
80 lineal ft. 1x8x16 ft., fir finish, $45	2.38
100 lineal ft. 1x12x16 ft., fir finish, $45	4.50
100 lineal ft. 1x12x16 ft., cypress finish, $45	4.50
240 ft. 1⅛x3x8 ft. clear cypress flooring for porch, $40	9.60
40 ft. 1⅛x3x6 ft., clear cypress flooring for porch at rear, $40	1.60
240 ft. ⅝x4 inch x 8 ft., beaded cypress ceiling, $30	7.20
40 ft. ⅝x4x6 ft., cypress ceiling, $30	1.20
64 2x2x16 ft., furring strips	9.50
1,720 ft. ⅞x2¼ face oak flooring, $80	137.60
140 ft. ⅞x2¼ face maple flooring, $60	8.40
600 ft. grounds, ½c	3.00
4 1¼x12x12 ft., fir finish	2.70
Total lumber bill	$660.17

MILL WORK.

1 cellar window frame, 16x20, 2 lt	$ 1.75
1 cellar window frame, 18x20, 2 lt	1.75
1 cellar window frame, 12x20, 2 lt	1.60
1 cellar window frame, 24x20, 1 lt	1.75
1 cellar sash, 16x20, 2 lt	1.50
1 cellar sash, 18x20, 2 lt	1.60
1 cellar sash, 12x20, 2 lt	1.40
1 cellar sash, 24x20, 1 lt	1.60
1 cellar door frame, 3 ft. 0 in. x 6 ft. 8 in	2.25
1 cellar door, 3 ft. 0 in. x 6 ft. 8 in. x 1¾ in	4.50
1 front door frame, 3 ft. 0 in. x 6 ft. 8 in., with side lights and transoms	10.00
1 O. S. door frame, 2 ft. 8 in. x 6 ft. 8 in., with transom	3.00
1 triple window frame, front	7.00
1 twin window frame, 26x16	4.50
1 twin dormer frame, 29x12	3.50
5 window frames, 28x30, $2.25	11.25
1 window frame, 28x18	2.00
1 sash frame, 38x18	2.00
1 sash frame, 28x16	2.00
1 sash frame, 28x16	1.80
1 sash frame, 24x16	1.80
3 window frames, 30x30, 2 lt., $2.25	6.75
2 windows, 19x30, 2 lt., $2.00	4.00
1 window, 12x16, 2 lt	1.75
2 windows, 26x16, 2 lt., $1.80	3.60
1 window, 30x36, 2 lt	2.60
2 side sash, 10x60, 1 lt., $2.00	4.00
5 windows, 28x30, 2 lt., $2.40	12.00
2 dormer sash, 24x12, 1 lt., 75c	1.75
1 window, 28x18, 2 lt	1.80
1 sash window, 38x18, 1 lt	1.60
1 window, 30x16, 2 lt	1.80
1 sash, 28x16	1.40
1 sash, 24x16	1.30
3 windows, 30x30, 2 lt., $2.50	7.50
2 windows, 14x30, 2 lt., $1.50	3.00
1 window, 12x16, 2 lt	1.25
2 windows, 26x16, 2 lt., $1.50	3.00
2 cased openings, col. and pedestals, $35	70.00
2 side lights for door, 12x52, $2	4.00
1 transom, 3 ft. 0 in. x 12 in. over all	2.00
2 transoms, 14x12 over all, 60c	1.20
1 rear transom, 2 ft. 8 in. x 12 over all	1.75
3 sets door jambs, 2 ft. 8 in. x 6 ft. 8 in., 90c	2.70
3 sets door jambs, 2 ft. 6 in. x 6 ft. 8 in., 90c	2.70
4 sets door jambs, 2 ft. 4 in. x 6 ft. 8 in., 80c	3.20
1 set door jambs, 2 ft. 2 in. x 6 ft. 8 in	.80
530 ft. base, cypress, 3c	15.90
530 ft. base mold, cypress, 1c	5.30
530 ft. floor mold, cypress, ½c	2.65
320 ft. cypress picture mold, 1½c	4.80
600 ft. 12 ft. cypress casing, 2c	12.00
240 ft. head casing, cypress, 2c	4.80
240 ft. cap mold, cypress, 2c	4.80
240 ft. fillet, cypress, ½c	1.20
100 ft. window stool, cypress 2c	2.00
100 ft. apron, cypress, 2c	2.00
320 ft. window stops, cypress, 1c	3.20
260 ft. door stops, cypress, 1½c	3.90
Front stairs	50.00
Sideboard	40.00
Medicine cabinet	6.00
Linen closet case	10.00
Mantel	30.00
140 ft. water table, 1½c	2.10
140 ft. bed mold, 1½c	2.10
100 ft. quarter round, ½c	.50
100 ft. cove, ½c	.50
3 porch newels, 50c	1.50
44 ft. bottom porch rail, 5c	2.20
44 ft. top porch rail, 5c	2.20
120 porch balusters, 4c	4.80
Total mill work	$430.20

CARPENTER LABOR.

8,745 ft. framing lumber, $9	$ 78.70
5,680 ft. sheathing, $8	45.44
14 M. red cedar shingles, $2.25	31.50
560 ft. porch floors and ceiling, $2	11.20
1,860 ft. finish floor, $2	37.20
1,600 ft. smoothing floors, $1.50	24.00
140 ft. cornice, 6c	8.40
50 ft. porch cornice, 15c	7.50
44 ft. porch rail and balusters, 30c	13.20
3 porch newels, 35c	1.05
2 porch columns, 60c	1.20
Rear porch steps	5.00
120 ft. belt course, 6c	7.20
Cellar stairs	8.00
Main stairs	24.00
Sideboard	16.00
Pantry work	15.00
Linen closet	6.00
3 closets, $1.50	4.50
2 cased openings, $6	12.00
4 cellar iron frames	6.00
1 cellar door	4.00
1 rear O. S. door	3.50
1 double-acting door	4.00
1 front door with side light	7.50
11 inside doors, $3	33.00
23 windows, $2	46.00
530 ft. base, 5c	461.09
320 ft. picture mold 1¼c	4.00
Work on dormer	10.00
Setting frames	10.00
Incidentals, 10 per cent	51.15
Total	$562.74

RECAPITULATION.

Excavating and masonry	$ 844.50
Lumber bill	660.17
Mill work	430.20
Carpenter labor	562.74
Hardware and nails	58.00
Tin work	56.00
Plastering	178.20
Plumbing	300.00
Heating	290.00
Electric wiring	50.00
Incidentals, 5 per cent.	171.49
Total estimate	$3,601.30

EDITORIAL NOTES AND COMMENTS

PERHAPS the biggest and most gorgeous function that ever took place in the world was the late coronation of King George V of Great Britain.

* * *

Eight tons of gold plate valued at $15,000,000, $100,000,000 worth of precious stones, and other tons of gold were carried about by kings, queens, noble lords and hereditary functionaries on their persons. This is foolery gone mad.

* * *

Displays of this kind, in these democratic days, in so democratic a country as England, seem very much out of place, out of tune, and out of time. Notwithstanding these "misfits" there must be something in their presence that tends to gratify, amuse and strengthen the patriotism of a great freedom loving people. Why?

* * *

A thousand years since the great Alfred cut the shackles of barbarism from off the fettered limbs of the early English, progress, enterprise, invention and the general advancement of mankind have grown, and thriven, in the motherland, and in the homes of her children, and it may be these great pageants, happening from time to time, have done much toward making the great events that gave us and perpetuated these blessings we now enjoy and appreciate so much. It does seem like a waste, the spending of so much money for these functions, but is it all a waste? A large portion of this money will find its way into the hands of the poor, both at home and abroad, and large sums will be distributed and set in circulation that likely would have been hoarded up for years had not the coronation and similar events forced it from the strong boxes of the rich. There are two sides to every question, and the shooting off of firecrackers and waving of bunting on each of our glorious Fourths, and a grand display of ceremonial trumpery, once in the lifetime of a crowned president, have much relationship, and have their uses for the public good. In England the king reigns, but the people rule; in these United States the people reign, but the politicians and trusts do most of the ruling.

* * *

Something worth while calling attention to in connection with the coronation, is the fact that it passed over successfully and was not marred by any serious accident. This is remarkable when we consider the number of miles of seating accommodation made and provided for the millions of people who witnessed the performances. For some days previous to coronation day alarmist reports as to the safety of the stands erected, the ability of the police to handle the crowds, and the condition of Westminster Abbey itself, were circulated, but few who knew how systematically and thoroughly such things are looked after by the London authorities were disturbed by such rumors. Not a stand gave way, not a limb broken, not a skull cracked, not a child injured, and everything went off in accordance with the prepared program, without a hitch; millions of people were handled as easily as though they had been trained soldiers. The credit of all this is not altogether due to the authorities; much is due to the good nature of the crowd, which, like all English speaking crowds, generally keep "heads level" and obey the law or rule that has been made in their interests.

* * *

Some of the wooden stands made and erected for the occasion were marvels in constructive art, and each one was built on the latest scientific principles, every piece of timber having been calculated to carry the load it was expected to sustain, and in which a large factor of safety was provided. Few nails were used, the most of the joints being held together by wrought iron bolts and rods or well proportioned mortise and tenon. Girders, trusses and braces were placed wherever such were required to give the frame stability and hold the structures from swaying laterally or across sectionally. Some 250 draftsmen and engineers were employed for several months previous to coronation day, designing and perfecting the plans for these stands, and not a timber or a plank was allowed to form part of the work that was not shown on the plans or was not examined and passed by an authorized inspector and marked with his official stamp. It is said that over 5,000 carpenters and other workmen were employed for weeks during the erection of these stands and that more people were hurt during the process of building than were injured during the entire coronation services; but during the whole period of construction and time of festivities, not a fatal accident occurred to any individual person taking part in them. If THE NATIONAL BUILDER can secure copies of the plans and details of some of the more noted of these stands, along with specifications, we will reproduce them for the benefit of such readers as may be interested in structural timber work.

* * *

Something less than a century ago there used to be a tax on building bricks in England, and in order to evade it the bricks were made of larger and larger sizes. These were used for cellars and other concealed places. To stop this fraud an act was passed in the reign of George III fixing the legal size of bricks. Early in Queen Victoria's reign the tax was taken off, and bricks may now be legally made of any size whatever. But any change from the standard would bring about great inconvenience. All calculations are made for building on this standard size, and the London building acts have practically fixed it at 9 by 4½ by 3 for all time.

* * *

It is said that the European notion of wall paper was imported from China. There its ornamental use for screens, partitions and the like was known as early as the fourth century. Authorities on this subject assert that it was Holland during her naval supremacy of the sixteenth century which first began to adopt and hand around the wall paper idea.

The early Chinese wall papers were printed from blocks, hand painted or stamped with infinite labor and exquisite art. They were made to order, produced in sheets of varying dimensions according to the uses to which they were put. The modern rolls of wall paper with a continuous duplicate design were unknown. It was not until the invention of the modern printing and stamping machines with cylindrical rollers that a continuous conventional pattern was favored.

* * *

As neither China nor Japan were a communicative country during the beginning of the commercial history of Europe, these wall paper exportations were few and far between and considerably at a premium. Yet they soon hit the European fancy as a good substitute for the arras and tapestries of the time.

Up to the end of the seventeenth century the imported product was prohibitive in price, however, and it was not until the middle of the eighteenth century that it was really a familiar thing on the market. When the methods for printing and stamping wall paper from blocks was introduced from China each nation was jealous of its neighbor in the wall paper trade and tried to keep its own process a secret.

Towards the end of the seventeenth century the English were the largest importers of the hand decorated Chinese wall papers, but only for a short time. As the demand increased they began to perfect a process of paper stamping and paper decoration to imitate tapestries, and with improved machinery soon cheapened their product and popularized it all over Europe. By the time of the Stuarts the arras of Shakespeare's era was beginning to disappear.

THE EMPLOYER AND HIS HELP

Much has been said in the various trade papers recently with reference to the proper methods to handle help. The writer has always assumed the position that employers and others in charge of help gain nothing by treating men like slaves and keeping them in constant fear.

The following article recently appeared in the Woodworker, as it voices the writer's views precisely, it is reproduced:

To substantiate this theory, the writer is able to cite a shop employing a good-sized force which is working under such an understanding at the present time. It is a fact that the lay workmen are not the only ones who would like to shirk the responsibility of mistakes in figures and management, for the foreman and superintendent may be in fear of the boss, as well as the others. But every owner and manager should know that the "super" is liable to more mistakes than any other one man engaged in the actual work of getting out the goods, especially if he is crowded with work and has to be his own foreman.

TIN ROOFS

By H. M. SANDERS

TIN PLATE in sheet form is not the same as in its pure state as an ore. As a metal pure and simple, it is of a brittle crystalline nature. It belongs to a class of soft metals, but not like lead or copper, sufficiently soft and malleable to be of practical value in sheet form without being alloyed with some other metal. To be of practical value as a sheet metal, it must be united to a harder and tougher metal; this harder and tougher metal, to be the body of the plate, and of a texture not too fine a grain, but sufficiently porous, so that the applied coating or plating of tin will penetrate beneath the surface and form a covering for the same, that will be lasting and not wash off by rains or weather exposure.

SIZE OF SHEETS.

There are some forty or more sizes of what is termed tin plate, varying in dimensions from 10x14 inches up to 42x96 and 120 inches in size. Of these forty sizes of tin plate while all of them are more or less useful and applied in the industry, those sizes that range from 10x14 up to 20x28 inches, are of the greatest commercial value, as they are the sizes most generally used.

The demand for the larger sizes above 20x28 inches in size has grown out of the necessities of the times, under the wonderful growth and development of the sheet metal industry during the past fifty years.

Tin plate is placed on the market packed in boxes. A box of 10x14-inch tin holds 224 sheets; 14x20 and 20x28-inch tin is packed in boxes holding 112 sheets each. As the sizes of sheets increase the number of sheets in a box become proportionately less. The idea is to have, as nearly as possible, a uniform weight in the handling of the tin in the boxes, upon each box thus packed is marked the size, thickness, and brand of the tin plate, usually at one end, where it can be seen when the boxes are stacked up.

In these later years, since there has been so much agitation, unfavorably and otherwise, over the subject of the quality of the tin now in use for roofing, manufacturers have been led to stamp on each sheet the brand and quality of the tin. The thickness of tin plate is designated thus: IC for the lightest grade, IX, one cross, the next heavier; IXX, two crosses, still heavier, and so on up until the highest grade, IXXXXXXX, seven crosses, is reached. The heavier grade above IXXXX are not in general use.

This latter plate, IXXXX, is placed on the market in sizes ranging in width from 36 to 42 inches and in length from 72 to 120 inches.

This idea of stamping each sheet with its quality and brand is comparatively a new thought, and not generally adopted until some twelve years ago, soon after the manufacture of tin plate in this country was started. Today this country has out-stripped England and become the largest manufacturers of tin plate in the world.

There are two classes of tin plate, termed bright tin and terne plate. The former is used mostly for all work except for roofing purposes. The latter, terne plate, is used almost wholly for roofing purposes and in most if not in all cases where the metal is subjected to outside weather exposure and climatic conditions. Before the introduction of terne plate, bright tin was used for roofing, as well as in all departments of the sheet metal industry, but for roofing purposes terne plate is considered better, as it is presumed to stand all kinds of atmospheric action upon it better than the bright tin. This is owing to the fact that the alloy with which it is coated or plated is composed of lead and tin, in the proportion of two-thirds lead to one-third pure tin.

QUALITY OF TIN PLATE.

The difference between a good and a poor quality of tin plate lies in the nature and character of its plated surface and in the fibral texture of the body plate which forms its base. But more largely in the latter, the fibral texture of its base, than in the composition of its outer surface, when considering its durability. The best quality of tin plate, both the bright tin and the terne or roofing plate, shows a bright surface on each side of the plate, free from specks or streaks. The bright tin plated wholly with pure tin has a bright polish of silvery hue. The terne plate coating, being two-thirds lead and one-third tin, presents more of a leaden hue, both sides of the sheet being covered with a smooth mottled surface. The body of the plate of the metal is soft and pliable, and of the best grade, free from pinholes or blemish of any kind, and sufficiently tough in its fibral texture to be worked into locked seams without cracking the body plate or its outside coating.

A skilled mechanic in sheet metal work can usually tell at a glance the quality of tin plate, whether it is a good or a poor quality, or rather, perhaps, it would be better to say, this was the case under the old conditions of the past, when the base of the tin plate was charcoal iron instead of sheet steel, so largely used today. This change in the base metal in tin plate, from charcoal iron to steel, has taken place within the past fifty years or since the introduction of Bessemer steel. For 300 years prior to that time no other metal but charcoal iron was used as the body plate of sheet tin.

Now the question arises, what has been the effect of this change in the base of this metal upon its value as a roofing material? It is true that some of our American manufacturers claim that it is better, others that it is equally as good. Hence we have the new old style brands. If this were all true as to fact, of what significance the tin plate conference, held in Baltimore a few years ago? This conference was called for by the National Association of Master Sheet Metal Workers of this country, and was held under its auspices in conjunction with the manufacturers of tin plate. Heretofore, and not until the introduction of the steel plate, such a conference was never known in this country before, or required. Nor as to fact, would this tin plate conference have been called had it not been that tin plate was losing its foothold as a material for roofing purposes. While perhaps the outcome of this conference was not wholly satisfactory as to results, it showed the trend of such a movement toward the betterment of conditions. But under present conditions, in an age of such revolutionizing tendencies as at present, it has become a serious question, as to how far the effort to reduce cost of production, under the pressure of the times of strong and sharp competition, is to depreciate the value of material. That this condition exists and that it has a deleterious influence and depressing effect on the use of tin plate for roofing purposes, is lamentably true.

It is a well known fact that prior to 1875 there was no such thing known as a steel base for tin plate in general use.

It is also an equally known fact that tin roofs began to deteriorate in value on the introduction of Bessemer steel base since that time.

Upon the cause of this deterioration, Mr. W. S. Goddard had this to say before the tin plate conference: "That while the cause of this trouble is a question as yet unsolved we know that it does exist and no remedy has yet been found. It is known to be what is called an internal corrosion, or disintegration of the steel base between the coatings. When this occurs the coating disappears and you have a pinhole or rust spot, for it is a well-known fact that the coating will not adhere to rust or when the surface is not perfectly clean.

Rust, or the hydrated oxide of iron, once established, contains all the elements of a long and ceaseless life, and as long as it is in contact with a ferric body its activity never ceases. It is to a terne plate what a cancer is to the human body. Rust begets rust. It may be held in check for a time, but when the efficacy of the material used to check it is exhausted, then the rust again commences its inroads. There is only one cure, and that is to eliminate every trace of rust."

So we can see the senselessness of the claim put forth by many, that a tin roof should be allowed to rust before being painted. Those who advocate this, simply start the rust on the way and defeat just what the mixture of lead and tin is applied to the plate for, namely, to preserve it from rust.

It is a well known fact that all the old reliable brands of tin made their enviable reputations as a roofing material on the fact that the base of the metal was charcoal iron. Examples of which in this country and in Canada, to say nothing of its use in England and other countries, show that these roofs have stood the test of seventy-five years or more.

Now in considering the relative value of iron and steel as a body plate for sheet tin, the question arises wherein lies the difference between them. The surface covering or plating in both cases are the same, and all other things being equal, their lasting qualities are the same. So, if one is better than the other for roofing purposes, we must look for the cause of it not in the character of the surface covering, but in the character of the metal which forms its base. The test in this matter is the comparative ability of the two metals to withstand weather exposure under all kinds of climatic conditions.

Iron has successfully met this test. Now as regards the use of steel let me quote what Mr. Goddard says about the character of steel:

"In coating steel sheets with tin and lead, the coating all lies on the surface, the plate absorbs none of it. This is because the molecules of the steel are small and lie close together, producing a fine, close grain with a surface admitting of a very high polish, while the molecules of iron are larger and more irregular, giving the plate a more open grain which can absorb to a more or less extent the coating of the tin and lead. Comparing the two metals to maple and oak: Maple has a fine grain and when varnish is applied it all lies on the surface, and is easily scraped off, leaving the surface of the wood as clean as a piece of glass, while the oak has to have its grain all filled up before the varnish is applied, and even after the varnish is scraped off the filling still remains for a protection. As an example, take a sheet of terne tin on a steel base and tack it fast to a board and with a sharp scraper scrape off all the coating; then rub it with a piece of fine emery cloth. Now apply a magnifying glass and you have nothing but a smooth, bright surface with no coating in sight.

"Treat a charcoal iron plate in the same manner, and then apply the glass and you find that the surface scraping does not remove the coating that lies beneath the surface, and that it is absorbed in the grain and molecules of the iron."

Hence the decline in the value of tin plate during the last quarter century of its use, with steel as its base plate, to one-tenth of its value in its lasting qualities as a roof material, compared with that of tin plate made with charcoal iron as its base metal.

METHODS OF LAYING TIN ROOFS.

The two kinds or classes of tin roofs are what are termed "flat seam" and "standing seam" roofs. The flat seam is used upon comparatively flat roofs, generally speaking where the roof pitch is less than 3 or 4 inches to the foot.

Sometimes, not often, we believe, 10x14-inch sheets are used, but generally speaking the 14x20-inch size tin is used. All flat seamed roofs are what is termed the locked roofs, put on one sheet at a time, in courses, each course breaking joints with the preceding course. Each of the sheets is cleated down to the roof with tin cleats, in size usually 1½x2 inches, usually three cleats to the sheet. These cleats are locked into the folded edge of the sheets, and the opposite end nailed to the roof. This gives free action for the expanding and contracting of the tin roof.

No nails should ever be permitted to pass through the body of the roof surface. Use resin or some flux without acid in it, when applying the solder. No acid of any kind should be used on a tin roof. It is needless to say—to the roofer at least—that after the tin is laid the seams are to be hammered down close with a mallet, before the process of soldering is commenced. After the roof is soldered, scrape off the resin, or flux, from the seams and sweep off the roof clean before painting it. After which, the sooner the better, paint the roof.

Flat seam roofs of 10x14 sheets require 8 pounds of solder to 102 square feet, and roofs laid with 14x20 size sheets 6 pounds to 100 square feet.

Now in regard to the laying what is termed a standing seam roof. Usually this class of tin roof is put together in 50-foot lengths, or rolls.

Sometimes 14-inch wide, using the 14x20-inch sheet, but generally speaking, for roofing purposes the 20x28-inch tin is used, making the width of the roll 20 inches wide.

Steep roofs of this character require but little soldering, and only in the cross seams. In making top and bottom connections on the roof the side standing seams are double locked and require no soldering, since the tin is put together in rolls of the required length to reach from the top to the bottom of the roof.

When each roll is unrolled on the roof, the side edges are turned up with the roofing tongs used for that purpose. The edge on one side is 1 inch high, and the edge on the other side of the roll 1½ inch high. These two edges, 1 inch and 1½ inches high, respectively, come together and form the seam, being double locked together. First, the 1-inch side of the roll is cleated down to the roof with a cleat with two prongs, one of the prongs to hold this 1-inch edge, and the other prong to hold the adjoining roll with its 1½-inch edge. The cleats are placed from 8 to 10 inches apart.

After the 1½-inch side is doubled over the 1-inch side, making a single lock, the top of the seam is again doubled over, leaving a seam about ½-inch high.

THE USE OF THE STEEL SQUARE

By J. H. B.

IN too many cases where a lean-to roof is used the top ends of the rafters simply lean against the wall, thus putting an immense thrust on the wall plate and the wall on which this rests. To obviate this thrust, and make the roof as near self-supporting as possible, the scantling A (Fig. 6) is nailed to the wall, the rafters being notched on to this, thus doing away with a great deal of the outward thrust, and the roof is made safe, or practically so.

In marking off the length of the rafter it is best to work from a line parallel with the backing, that is, the extreme edge of the wall plate, which means that a line must be drawn down the length of the rafter, at 1½ in. from the upper edge, as shown in Fig. 7. In setting out the length, it is necessary to remember that, while the width of the building is in no way altered by this, the height is reduced by about 2 in.; thus, instead of 7 ft. to work to there is 6 ft. 10 in. only. This means that the length of the rafter is found by working from the 12-in. mark on the long arm of the square and the 10¼-in. mark on the short arm, moving the square along the rafter as shown in Fig. 8 until it has been moved eight times, thus giving the width of the building: 8 ft. By this method the roof is practically divided into a series of parallelograms, as in Fig. 9, and by dividing the width into a certain number, and the required height into the same number, and working the square accordingly, any pitch can readily be obtained.

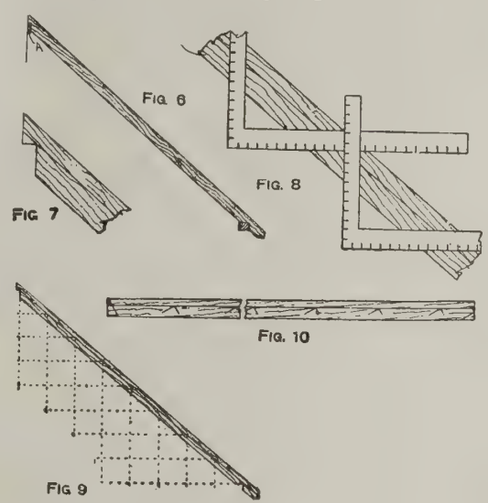


Fig. 6—Section of Lean-to Roof. Fig. 7—Top End of Rafter, Showing Backing Line. Fig. 8—Position of Square in Marking Off Rafter. Fig. 9—Principle of Marking Out Roof in Parallelogram. Fig. 10—Rafter as Marked.

As described so far, it is the marks on the square that have been used, and it will easily be understood that unless great care is taken mistakes are liable to be made. To do away with all chance of this as far as possible, it is best to use a gauge of some kind on the square, so that the latter is always kept at the desired angle. Then the only point to look after will be to keep it correct in shifting it along from mark to mark, as in Fig. 10, making all the marks intersect as the backing line.

Gauges for the above purpose can be purchased, and they are better than any home-made ones; but as expense is often an object, it may be mentioned that two strips of wood, screwed together with four screws, will do all that is required in this connection.

In setting the gauge, allowance must be made for the 1½ in. of backing, the points of the square worked to being brought to the backing line, when the gauge is resting against the back of the rafter.

In this article a roof of an even width has been chosen for the sake of simplicity; but in the next a simple span roof and odd inches will be dealt with. J. H. B.

HOW TO FIND THE LENGTH OF A BELT

The length of a belt may be found by adding the diameter of the two pulleys together and dividing the result by 2 and multiplying the quotient by 3¼. Add the product to twice the distance between the centers of the shaft and you will have the length of the belt required.

THE ART OF SILVERING MIRRORS

By A. ASHMAN KELLY

THE writer has received a great many letters from correspondents asking for information regarding the process for silvering mirrors, and some time ago there were several individuals who advertised their desire to teach the art, usually for two or three dollars. The "teaching" usually consisted of a formula or two for doing the work in some more or less undependable manner. While there is undoubtedly a large demand for information on this subject, mostly from painters who wish to add the work as a side line, yet it is far from being an art easily adapted to the inexperienced who wish to add to their income. Sometimes a mirror becomes damaged, and the owner wishes to know how he may repair it. As a rule it is cheapest to send it to a mirror factory. However, in the following article I will try to give plain directions for silvering mirrors, but must caution the novice that there are easier things to do successfully than this, and if he is disappointed in the result of his work, let him not worry nor blame anybody else.

Perfect cleanliness is the first thing to direct attention to. There are several formulas for silvering, some of which I give in this connection. One way is to lay the glass face down in the silvering solution; another is to pour the solution on the face of the glass, the law of capillary attraction keeping the fiuid from running beyond the edges of the glass, or if not, then press a little beeswax around the edges.

A second silvering, while the glass is still damp from the first coating, will make a better job than one coat.

The silvering may be protected by a coat of shellac varnish, over which apply a coat of japan black thinned with turpentine to the consistency of a paint. Or use asphaltum varnish. Some cheap mirrors are painted with red lead paint.

Silvering requires plenty of daylight and heated room.

Convex, concave, curved and chipped glass may be silvered, but such work requires more silver solution to the square foot than plain plate glass. Druggists' globes also may be silvered. There are also silvered mirror business signs.

At one time lead and mercury amalgam was used as a silvering solution, but as the materials were very poisonous they have been discarded.

To silver plate glass have a clean, warm room and a level and solid table to work on. Clean the glass with dilute nitric acid or with strong sal-soda water, and after washing this off, wipe dry and polish with tissue paper. Just any kind of plate glass will not answer for silvering, so be sure to ask for plate glass that is made for the purpose. Some of it is imported, but the best now is made in this country.

A Chicago workman gives the following formula for silvering:

No. 1 Solution: Take 80 grains of silver nitrate and dissolve in 10 ounces of distilled water; to this add 2 ounces of alcohol and 2 ounces of ammonia water. Add the ammonia drop by drop, until the precipitate first formed is dissolved. This should stand three or four hours before using it.

No. 2 Solution: Then take 6 ounces of water and dissolve in it 24 grams of silver nitrate, and add 30 grams of arsenate of copper. Now add liquid ammonia drop by drop until the first solution is dissolved. To this then add 2 ounces of alcohol.

Now make a separate solution of 48 grams of potassa in 16 ounces of water; bring this to a boiling point in a suitable vessel. While hot add solution No. 2, drop by drop, and continue boiling for about one hour; then allow it to cool, when it may be filtered and is then ready for use.

Place the glass on a perfectly level table as directed. Take some filtered water, just a little, and add to it equal part sof solutions 1 and 2; mix thoroughy; then pour it carefully over the glass, and as quickly as possible and when the glass has been covered level full, let it stand from 10 to 15 minutes. If, upon examination, the silvering is not brilliant enough, apply another coating of the silvering, while the first coating is still damp. When dry it is ready for the backing-up paint or varnish.

Seems simple, doesn't it?

Formula No. II. Make up No. 1 solution as follows: Dissolve 80 grains of nitrate of silver in 2 ounces of distilled water. Solution No. 2: Dissolve 80 grains of pure caustic potash in 2 ounces of distilled water. Add ammonia water drop by drop, with continual stirring, to solution No. 1. until the whole of the silver is deposited and redissolved. Then the solution will be quite clear. Now add the potash solution which will cause the first solution to become black. Add more ammonia water, drop by drop, stirring meanwhile. The slower the ammonia is added the finer the division of the silver. When the solution again becomes clear the action is complete. Now add a weak solution of silver nitrate, drop by drop, until a very pale brown color ensues. Errors may now be corrected by adding more silver or more ammonia, as the case may require. Silver should be slightly in excess in the first solution. THIS SOLUTION SHOULD NOT BE KEPT, AS IT IS A POWERFUL EXPLOSIVE. Filtering is not advised.

Now take 2¾ ounces of the solution and add water to make up 8 ounces. The glass in this case is to be placed in a bath, for which purpose have a suitable shallow vessel, say a tin pan of suitable size, coated on the inside with a mixture of equal parts of resin and beeswax, melted. On the bottom of the pan place two straight sticks ⅛ inch thick, on which the glass will rest, avoiding the bottom of the pan. Now pour on the solution carefully, avoiding air bubbles. Allow it to remain on a few minutes, then pour off the solution and add to it a 10 per cent reducing solution of grape sugar or sugar of milk.

This is then carefully poured back into the bath, over the glass, again avoiding air bubbles. The deposition of silver begins to take place, and the solution becomes muddy in color. The slower the action the harder the deposit. Leave until all of the silver is deposited, then pour off the solution and wash off the glass with distilled water several times. This washing with pure water is a very important part of the work, as when carelessly done brown spots will occur on the silvering in the future, spoiling the mirror. Dry the glass carefully, and be very careful not to mark the silver with the fingers, etc. Polish the face of glass with roughe. It is then done.

The room must be very warm, and hence perspiration is in evidence; if a drop of it gets onto the silvering it will spoil the job.

There are several methods or formulas, but the ones given here will answer all purposes.

RESILVERING A MIRROR. This is difficult, yet not impossible by any means. If the whole glass is to be done, then it will have to be made perfectly clean as directed for new glass, first removing the old material. But if only a portion of the old glass is to be remedied, then remove the silvering of the bad spot and a little outside and around it, and wash the spot clean with alcohol on a rag. Now from a piece of old or broken mirror take a piece of silver a little larger than the amount of the spot that is to be mended, and place on the piece a drop of mercury, and in a few minutes clear away the silvering from around the patch you are to transfer to the glass that is being repaired, and slide it carefully onto the latter. This is not easily done, yet with care and maybe more than one trial you will succeed in getting the patch onto the mirror.

The materials used in silvering will cost about a nickel for one foot of surface, and as the charge is usually about fifty cents a foot for such work it will all depend upon the time it requires to do a job as to whether there is a fortune in following such work or not.

The glass, whether old or new, must not have any scratches or other blemishes, for they will show up very plain when under or above the silvering. Precipitated chalk is better than whiting for polishing the glass with, as whiting is liable to contain grit. Dilute nitric acid is a good cleanser, with alcohol following, and a silk rag or tissue paper for cleaning up and polishing with.

GOVERNMENT WHITEWASH

Whitewash: To make the whitewash which has been used for more than thirty years in the White House at Washington and on the lighthouses maintained by the United States government along the coats, take a half-bushel of unslaked lime, slake it with boiling water, cover during the process to keep in steam; strain the liquid through a fine seive or strainer, and add to it a peck of salt, previously dissolved in warm water; three pounds of ground rice boiled to a thin paste and stirred in while hot; half a pound Spanish whiting and one pound of glue, previously dissolved by soaking in water, and then hanging over in a small pot hung in a larger one filled with water. Add five gallons of hot water to the mixture, stir well and let it stand for a few days covered. It should be applied hot, for which purpose it can be kept in a portable furnace.

LEAVES FROM A STUDENT'S NOTEBOOK—No. 2

By GEO. METSON

RIVETING RIVETED JOINTS.

IT IS first of all necessary to consider the size of the rivets to be used, in designing a riveted joint which should weaken the work the least possible, without employing an unnecessary amount of metal or time in making the joist.

The rough rules of rivets and riveting are briefly, that the diameter of the rivets used should be twice the thickness of the plates joined, if these last are less than ½ inch thick each. When the plates are half inch or over, the diameter of the rivet should be 1½ times the thickness of the plate. If the holes are drilled, the rivets may be slightly less in diameter than if they had been punched.

The shank of the rivet, i. e., the length before clenching from under the head, should be, of coarse, the total thickness of the plates to be joined, plus sufficient to clench, which may be taken as 1⅜ times the diameter of the rivet.

The usual dimensions of the heads of rivets are for the extreme diameter to be 1¾ times that of the shank, and the heighth to be 2-3 of the diameter of the shank.

"Pitch" of rivets means the distance from center to center of the rivets. The greatest pitch that should be used is 6 inches, as if placed at a greater distance there is a chance of moisture finding its way between the plates, which may cause rusting or corrosion, which may tend to force the plates apart. A rough rule is for the pitch to be twelve times the thickness of the plates in the joint, but a 4-inch pitch is a very common one in use for the compressional flanges of built up plates, girders, etc. The minimum pitch must be twice the diameter of the rivets used, but for practical purposes 2 inches may be considered the limit of closeness.

The distance from the edge of any bar or plate that a rivet can be placed is the diameter of the rivet.

The design of a riveted joint needs careful calculation. For an example, let it be required to find the size and disposition of the rivets of a bar having a lapped joint, the bar being required to withstand a pull of fifteen tons.

Without deducting for rivets, the bar would have to be

$$\frac{\text{15 tons pull}}{\text{6½ tons safe resistance to tension of steel}}$$

—say 2½ sq. in. in area, so that a bar 5x½ inch would suffice; but we must deduct 1-16 inch more than the diameter of the rivets used if the holes are drilled; or if the holes are punched, we must add 1-16 to each side of the actual diameter of the rivet. We will assume that the plates we propose to join are ½-inch thick, so that our rivets will be ¾-inch diameter.

We must next find how many rivets we require to make the joint. The calculations will be as follows:

Resistance to shear of one steel rivet is diameter² x 3.1416 x 5 = (⅜)² x 3.1416 x 5 = 2.2 tons, and therefore the number of rivets necessary to transmit the stress from one side of the joint to the other $= \frac{\text{15 tons pull}}{\text{2.2 safe resistance to shear of rivet}}$ = say 7, and these would be placed as shown in Fig. 1.

To further design the bar, we must employ the tentative method, i. e., assume a size and prove its correctness afterwards. Let us assume a bar 6½ x ½ inches. We will first see if the joint is strong enough across line XX. Here we have (6½ inches — 2x13-16 inches) x ½ inch x 6½ tons = 15.8 tons, which is sufficient.

Proceeding to test across the line YY, we have here for failure, for joint to break across this line and two rivets to shear. The calculation therefore is: (6½ inches — 3x13-16 inches) x ½ inch x 6½ tons + 2x2.2 tons = 17.6 tons. So the joint is strong enough all through.

There is, however, another stress to be taken into account, known as the "bearing stress of rivets," which should not exceed nine tons. The area of metal exposed to this stress is the diameter of each rivet in the joint multiplied by the thickness of the plate or plates against which they bear. In this case, we have ¾-inch rivets and ½-inch plate.

Area exposed to bearing given by each rivet = ¾x½ inch in our joint with a pull of 15 tons and with 7 rivets, the bearing stress per square inch $= \frac{15}{¾x½x7} = 5\ 5\text{-}7$ tons, which is well within the nine tons allowable. ¾

It may not always be possible to have a lapped joint, so we will now consider the same bar with a butt joint covered by a single cover plate as in Fig. 2. Here the load is transmitted from one bar to the cover plate and back to the other bar. The calculation will be as before, but it will be observed that the number of rivets in the joint are doubled. It is usual with single cover plates, to let them be thicker than the plates they join, and in some cases this will allow the length of the cover plate to be reduced. The cover plate here could be ⅝-inch thick.

If double cover plates are used, they need only be half the thickness of single cover plates. The rivets will be in double

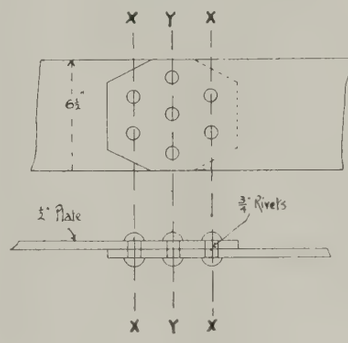


FIG. 1. LAPPED JOINT.

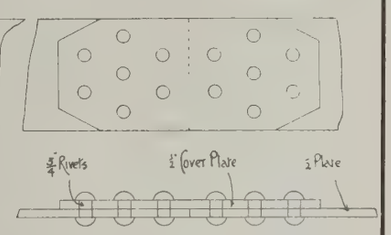


FIG. 2. SINGLE COVER PLATE JOINT.

STUDENTS NOTES ON RIVETED JOINTS IN PLATES.

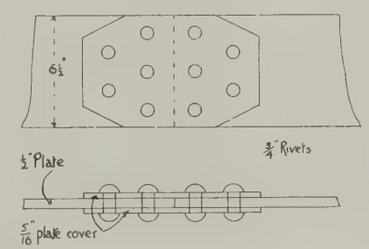


FIG. 3 DOUBLE COVER PLATE JOINT.

shear, each rivet offering resistance to shear between the bar and bottom cover plate, and also between the bar and top cover plate. But though this is so in theory, it is only usual to allow the strength of the rivets in double shear to be 1¾ times as strong as in single shear, and not twice as strong. So that with double cover plates, we can reckon on the safe resistance to shear of steel as being 8¾ tons per square inch. This will reduce the number of rivets required. These will now be $\frac{\text{15 tons pull}}{(⅜)^2 x 3.1416 x 8¾}$ (safe resistance to double shear of one rivet) = say four rivets. But before we complete the design we must look to the "bearing stress." Here it would $\frac{15}{¾x½"x4}$ = 10 tons, which is too much. We must, therefore, have 5 rivets in one joint as Fig. 3.

KINDLY MAIL CHECK

How dear to our heart is the steady subscriber
Who pays in advance at the birth of each year,
Who lays down the money and does it quite gladly,
And casts round the office a halo of cheer.
He never says, "Stop it; I cannot afford it,
I'm getting more magazines now than I read,"
But always says, "Send it; our people all like it—
In fact, we think it a help and a need."
How welcome his check when it reaches our sanctum,
How it makes our pulse throb; how it makes our hearts dance!
We outwardly thank him; we inwardly bless him—
The steady subscriber who pays in advance.—Ex.

PERFORMANCE OF BUILDING CONTRACTS

By W. J. STANTON

Where, by the terms of an entire contract, one is to build a house for another, within a given time and for a gross sum, he cannot recover anything until full performance on his part. In such cases performance is to precede payment and is the condition thereof; and the fact that the building is accidentally destroyed by fire or otherwise just before its completion, and without the fault of either party, does not change the rule. There can be no recovery before an acceptance of what has been done.

The same rule applies to a contract under which materials are to be furnished or put into a building where it is destroyed by fire, or otherwise, before the contract is fully performed. The loss falls upon the contractor and not upon the owner, for a contract to furnish materials and perform work in the construction of a building as an entirety, and no part of the work is regarded as being done, or material furnished, until the whole contract is complete.

A contract to build a house in which it is stipulated that the entire work is to be completed before any part of the compensation is demandable, is an entire contract. A workman can recover nothing under an entire contract for the building of a house which is destroyed by fire before its completion; but it is otherwise if the contract is not entire. A contract to erect a house for the cost of the labor and material, with a certain per cent of the total cost added as compensation to the contractors, payments to be made as the work progresses and the balance on completion, is entire, although there is no specific sum mentioned as the contract price. The payment of money by installments for the convenience of the contractor does not necessarily affect the entirety of his contract to build and deliver a complete house. Hence, if the building is destroyed by fire before completion, he cannot recover an installment not due him.

On the other hand if it is expressly provided in the contract that the last installment is not to be paid until the completion of the building, it cannot be recovered where the whole work is consumed by fire without apparent fault of either party, before its completion. In a California case the plaintiff agreed to repair an old house and to build a new addition thereto to be attached to it. The old house was to be turned, removed from its old foundation, and placed on a brick foundation, to be laid under both the old house and the new addition. There was nothing in the contract by which the price to be paid for any part of the work or materials could be distinguished from that to be paid for any other part. A provision in it that the third installment should be paid when the building was completed according to the agreement and specifications was construed as referring to the whole building, including the old part and the new addition, and the contract was therefore held to be an entirety.

A contract to erect a building for a certain price, payable in installments, is an entire contract and a destruction thereof by fault of the builder gives the owner a right to recover all installments paid. A latent defect in soil does not excuse a contractor from erecting a house which he has covenanted to build.

One party to a building contract cannot be compelled to accept work not performed according to the specifications, and to rely on recoupment for his indemnity. It is a good defense, in an action for work and labor done, in the building of a house on another's land, that the work was done in such negligent, unskillful and unworkmanlike manner as to be of little or no value to the owner of the premises. Upon the same principle, if the owner of a house and land agrees to sell and convey it, upon the payment of a certain price which the purchaser agrees to pay, and before full payment the house is destroyed by accidental fire, so that the vendor cannot perform the agreement on his part, he cannot recover or retain any part of the purchase money. Therefore, where the plaintiff contracted to sell and convey to defendant a farm having buildings thereon, and to deliver a deed in "fee simple of said premises" upon the payment, by defendant on a day named, of the price stipulated, and before the day named and the tender by the plaintiff of the deed, the buildings on the premises were burned, and the value of the premises greatly reduced thereby, it was held in Massachusetts that the plaintiff could not maintain an action upon the contract.

As exceptions to the rule that there can be no recovery upon a building contract until the work is done according to agreement, it may be stated that the general rule does not apply where unfinished work has been accepted, or has been used by, and is of benefit to one of the parties, and that a recovery may be had upon a divisible contract. Thus, if the owner clearly accepts the property when nearly, but not entirely completed, any loss occurring thereafter must fall upon him. Where the owner has accepted the building in its approximately completed condition, and is using it for the objects for which it was built. the law implies a promise on his part to pay what the work done is reasonably worth.

The question of acceptance, however, is a very delicate one. The mere fact of an owner's taking possession of his own land upon which buildings have been erected, or where repairs have been done or alterations made to a building thereon, does not afford an inference that he has dispensed with the conditions of a special agreement under which they were built, or of a contract to pay for the work actually done according to measure and value. A builder cannot recover unless he has complied with his contract, and it is held in New York that this is true, although the defendant has taken possession of and uses the building, as this is not necessarily a waiver of failure to comply with the conditions of the contract.

In a Massachusetts case there was a contract to repair a house and outbuildings for a certain sum, but when the repairs on the house were nearly completed the owner, by his tenant, entered and occupied it, after which the house and outbuildings were destroyed by fire. In an action for work done and materials furnished, the workman was held entitled to recover for the repairs done on the house when the owner took possession. The court recognized the rule that one cannot recover on a contract to do an entire piece of work for a specific sum unless the work is done, and therefore carefully stated that "the precise ground on which the plaintiff can recover in this case is, that when the repairs upon the house were substantially done, and before the fire, the defendant, by his tenant, entered into and occupied it, and so used and enjoyed the labor and materials of the plaintiff; and that such use and enjoyment were a severance of the contract, and an acceptance, pro tanto, by the defendant." To entitle a party to recover for part performance, or for performance in a different way from that contracted for, his contract remaining open and unperformed, it is sometimes held that the circumstances must be such that a new contract may be implied from the conduct of the parties to pay a compensation for the partial, or substituted performance, as the mere fact of partial performance being beneficial to a party is not enough from which to imply a promise to pay for it. Consequently it is held that if a builder fails to complete his contract to erect a house on another's land, or does not make the work substantially conform to the contract, the mere fact that the building remains on the land, and that the owner enjoys its benefits, he having no option to reject it, is not such an acceptance as will imply a promise to pay for it, in face of the fact that the special contract has not been performed.

As an exception to the general rule above stated, there have been cases allowing a recovery upon a building contract where it is divisible. If such a contract provides that the whole building shall be constructed for a certain sum, a specified portion of that sum to be paid upon the completion of the foundation walls, a second specified portion when the roof is on, a third specified portion when the plastering is completed, and the remainder when the house is completed, such payments are distinct and separate, and may be sued for as they mature. A building contract which is not an absolute one to do work at all hazards, but is dependent upon assumed and implied conditions which the other party is to perform but does not perform, is severable to the extent that a mechanic may recover for work done up to the time that the building is destroyed by fire.

If performance of a building contract is prevented by acts of the other party, the contractor is entitled of course to recover the reasonable value of the work performed and materials furnished.

The doctrine that there can be no recovery on an entire building contract until the work is done, is not the law of Texas. It has been held there that under a contract to furnish materials and perform labor in altering an existing structure, according to agreed specifications, with no provision as to time of payment, if the structure is destroyed by fire, without the fault of either party, when the work has been only partly performed, the builder may

recover for the work done. This case is opposed to the great weight of authority. The rule is just and founded in reason, for if he does not intend to bear the loss it is natural to presume that he will stipulate against it. The well recognized principle that, where one of two innocent persons must bear a loss, the law casts the burden upon the party who agreed to sustain it, or rather leaves it where the parties, by their agreement placed it, applies in such cases.

RECENT COURT DECISIONS

The New York Code of Civil Procedure, section 3414, makes a laborer's or materialman's lien prior to a contractor's. Section 2 of the Lien Law defines a "Contractor" as one who contracts with the owner of the land to improve it, a "Materialman" as one, other than a contractor, who furnishes material for such improvement, and an "Improvement" as including work done or property or "materials furnished for its permanent improvement." The New York Court of Appeals holds that the lien of one who installs plumbing, of one who furnishes trim for the building under contract with the owner, and one who sells brick and mason's building materials to the owner for use in the building, are all on an equality, being entitled to preference in order of time.

Where an owner employing a contractor to erect a building permitted the contractor to perform extra work under the theory that he should receive a specified sum therefor, and there was no fraud by the contractor in estimating the cost of the extra work, the Michigan Supreme Court holds that the contractor was entitled to recover the specified sum minus deductions for defective work.

Plaintiffs furnished lumber and hardware to one who has contracted to build a dam, the materials being used in the construction of a temporary cofferdam. On abandonment of the work by the contractor, the owner took possession of the work, using for it the material which the contractor had left, including that in the cofferdam. The piling material constituting nearly one-sixth of the lumber, was substantially destroyed by use in the cofferdam, and a major portion of the planking when removed was capable of use in some other similar dam, and had at time of removal a market value of from $4 to $5 per thousand, but after removing it the owner used it in tramways and planking, and at the completion of such use it had no value except for firewood. At the completion of the work there would remain about 50 per cent of the lumber furnished, a large share of which would be unfit for anything but fuel, and the balance fit for use only in other dams and worth about $5 per thousand. The planking cost $16 per thousand and constituted about three-fourths of the lumber claimed. The hardware used in the cofferdam was of no value except as scrap iron.

The Supreme Court of Wisconsin held that there was such a consumption of materials in the erection of the cofferdam as to entitle the materialman to a lien on the permanent dam, under the provisions of the Wisconsin statute, giving a lien to the materialman who furnishes any materials for, or in, or about the erection or construction of any structure. The case also holds that where a materialman, as a convenience to the contractor, advances the freight on the materials, it was proper to allow such amount, on the theory that it was in substance a part of the purchase price, though it was not agreed in advance that such charges should be any part of the price.

AN ATTRACTIVE BUNGALOW

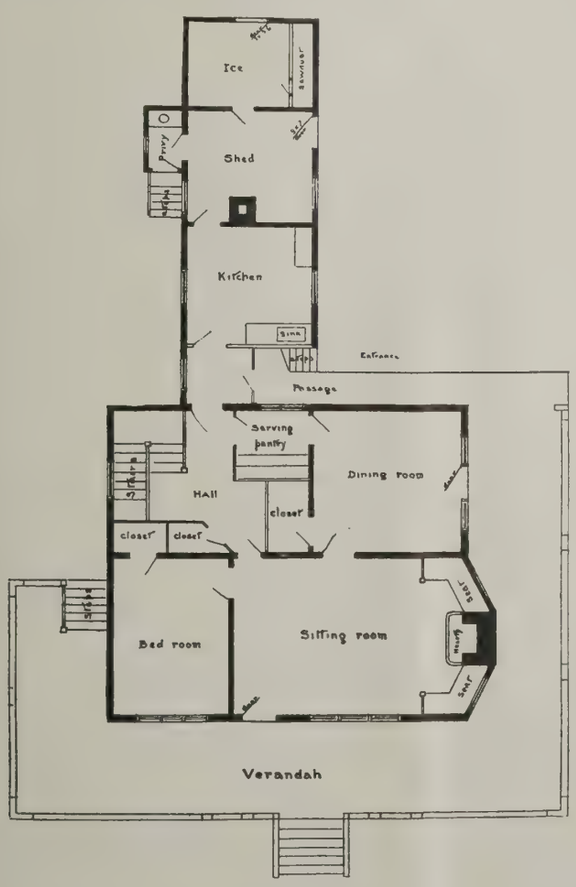
THE accompanying photograph of an attractive little bungalow designed by Mr. J. W. H. Watts, R. C. A., of Ottawa, Ont., and built by Mr. Robert McGiffin, Aylmer, Quebec, is a style of house that presents several features attractive to prospective builders. The exterior is constructed with the ordinary balloon frame and clap-boarded. The wide sweep of veranda is particularly attractive in a summer home, while the closed-in balcony affords a delightful and shady retreat. The interior is done in clear pine and spruce, natural finish, and varnished.

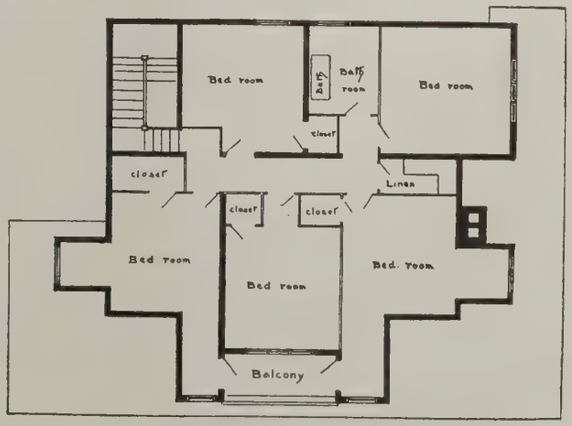


The sitting room is commodious and provided with an open fireplace and window seats. On the ground floor are also the dining room, with serving pantry adjoining, and a roomy closet. From the hall, which opens off the sitting room, a platform stair leads to the first floor, where there are five bedrooms and bath. To supply this latter, and also the kitchen, water is pumped from the lake to a tank.

The kitchen is one story only and opens from the main hall. Access can also be had to the kitchen from the end of the veranda. To the rear are also woodshed and ice-house.

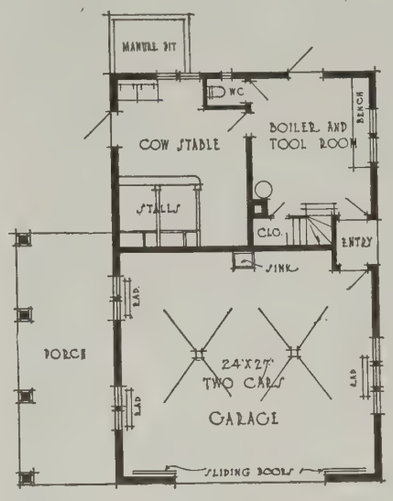
This bungalow would cost in the neighborhood of $5,000 to build.



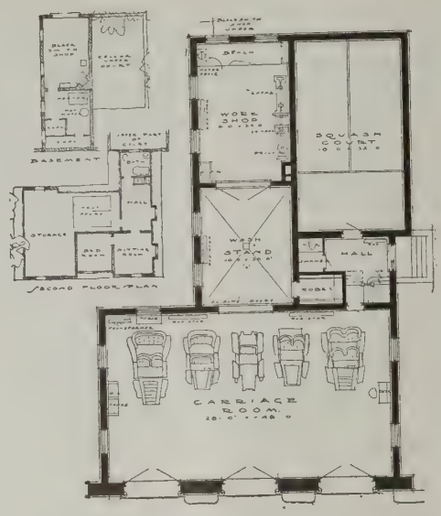


PLANNING A PRIVATE GARAGE*

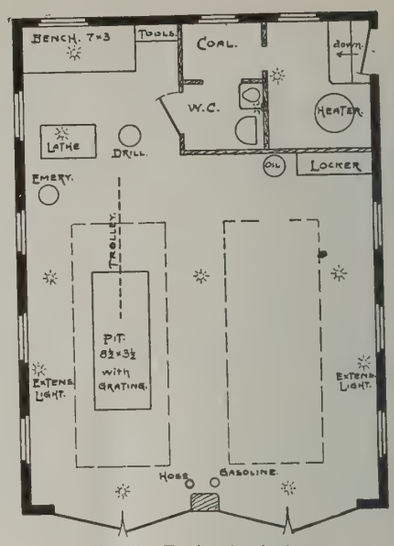
By HERBERT L. TOWLE



By Bailey & Bassett, Philadelphia.



By Andrews, Jaques & Kantoul, Boston.



By Mr. Towle, the Author.

When a garage contains more than two cars a question arises as to the entrance and inside arrangements. Where the winter climate is not severe, undoubtedly the simplest plan is that of an individual pair of doors for each car. In freezing weather, however, a garage so arranged is hard to keep warm, unless the doors open on the south side. The next choice is a single door with a turn-table inside for backing each car into its proper place, which in this case should be crosswise of the entrance, as in a public garage. Failing a turn-table, skids may be used. If the garage houses but two cars it is simplest to give an individual door to each car.

The usefulness of the turn-table has already been indicated. It occupies considerable room, since its diameter must be that of the diagonal wheel base plus an allowance of 6 inches or so for flattening of the tires, and this room cannot be used for any other purpose beyond washing the cars, for which purpose the turn-table pit is, of course, drained. For the one and two-car garage the turn-table is, therefore, a luxury, but with three or more cars it begins to justify itself.

A working pit is a luxury in much the same manner. It is a convenience where much repair work is to be done, and therefore justifies itself where several cars are kept in order.

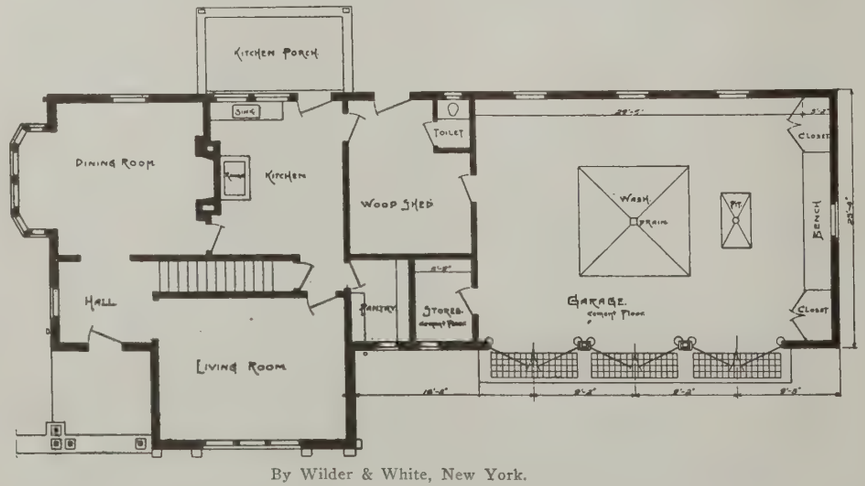
For one and two cars the trundle already mentioned answers sufficiently well. The working pit, like the turn-table, must be drained, and it is advisable not to connect it with the general garage drain, in order to avoid the possibility of an explosion of gasoline vapor in the latter communicating to the pit.

When planning a garage for three or more cars, it is essential to arrange so that the movement of any one car shall not involve disturbing the other cars. The writer has seen garage floor plans otherwise excellent, in which this requirement had been wholly overlooked, with the result that a car coming in from the washing stand might find its way blocked by one or two other cars thus necessitating shifting the latter, and possibly running them outside to do so. In the plans is shown a floor plan with separate washing stand and separate entrance and exit in which the difficulty just mentioned is avoided by use of a turn-table. Any car can be run onto the turn-table, swung around, and run out front foremost, without disturbing any other car. The arrangement shown is limited to four cars. To accommodate a larger number, it would be best to build the garage like a round-house, with a storage room forming a portion of the circle, with a turn-table at the center. The washing stand could then be combined with the turntable, or better, perhaps, could be located separately, as in Figure 3, and the machine shop and paint shop could be located one on either side of the washing stand. Another arrangement would be to extend the plan of Figure 3 by adding another turntable and two additional cars on each side, flanking the central passageway over the turntable. Of course, by using skids the cost of the turn-tables may be saved, but to handle a car easily on skids requires three men.

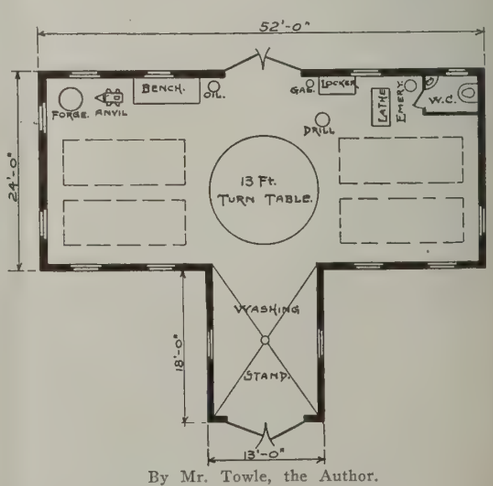
It has already been mentioned that the hot water system of heating is the best adapted to garages. This is partly for the economy of the system, and partly because the garage will not suddenly freeze up, as it might owing to lack of steam if the steam system were used. The hot water is carried through pipes around at least two, and preferably three, sides of the garage. The pipes should be placed as low as possible, and in order to insure circulation, the heater will generally have to be depressed 2 or 3 feet below the floor of the garage, assuming that there is no basement. These small heaters are very economical, and three hods of coal will last a week in average New York winter weather.

Thus far architectural details of construction have not been mentioned. The available materials are stone, solid concrete, hol-

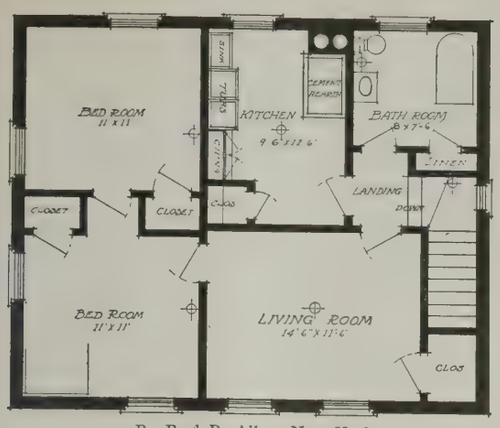
*Reprinted by permission from "Motor."



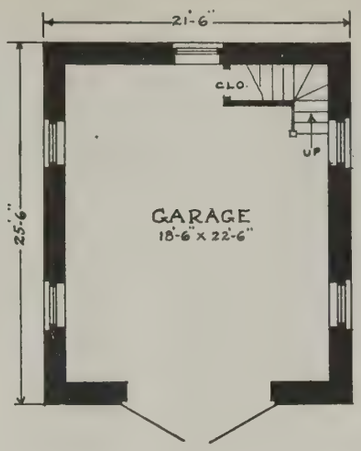
By Wilder & White, New York.

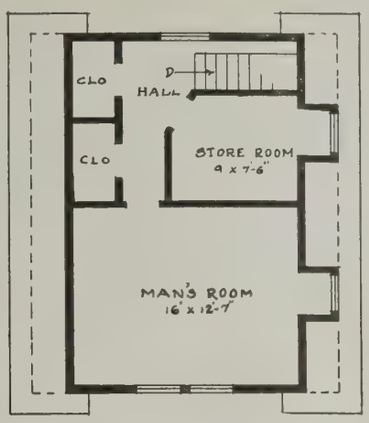


By Mr. Towle, the Author.



By Paul R. Allen, New York.





By C. E. Schermerhorn, Philadelphia.

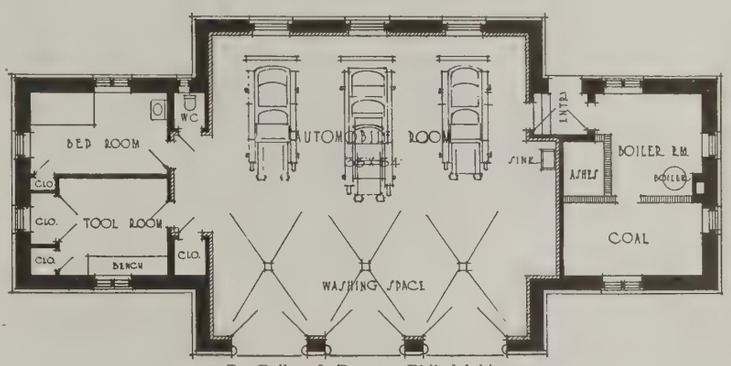
low tile, bricks, concrete blocks, stucco, wood and steel, besides, of course, portable houses of wood or wood and canvas.

A highly desirable feature, and one difficult to attain in a small garage, is ability to resist sudden changes in temperature. A small garage, if not carefully planned, may become a furnace or an icebox in a few hours, and neither extreme is good for the car. High temperatures hurt the tires and the paint, and low temperatures sometimes lead to cracked water jackets and leaking radiators. From this point of view perhaps the best material of all is hollow tile, on account of the air spaces contained. Next to this comes a double wall of solid concrete, with an air space between the inner and outer walls. Stone is nearly as good, and may be quite as good if furred and plastered over laths inside. Bricks and concrete blocks are fair. Stucco, either wood or metal, though not absolutely fireproof, is a close approach to it if lathed and plastered inside, and resists temperature changes fairly well. Frame construction the writer condemns as not being fireproof. A portable house, by the way, becomes a permanent house in the eyes of the law, if planted on a permanent foundation of stone, brick, or the like. The proper thing is to place it on wood piling, which can be taken up.

The smaller the garage, the more necessary it is to have approximately weather-proof swinging doors. The writer has devised the arrangement shown in the accompanying sketch, for excluding rain and snow. A strip of canvas nailed to the bottom of the door would approximately serve the purpose instead of the swinging metal or board flap shown in the sketch. Owing to shrinking and swelling of the doors, absolute tightness is not to be expected, but by using weather strips of various sorts it can be approximated.

Whatever the construction otherwise, the floor should be concrete. It may drain to the center, under each car, or better perhaps, it may drain to a trench molded in the concrete and running all around next to the walls. The chief objection to the center drain is the possibility of a gasoline explosion in the drain setting fire to the car. The slope should be arranged so as to lead away from the floor about the bench and tools. For instance, in the sketches accompanying this article the drain trench may follow the dotted line of the curtain. It has sometimes been suggested that the water from the washing be drained out through the main doors. This is excellent except in winter, when the doors are liable to freeze fast. The better plan is to crown the floor as suggested, drain to right and left, and have the ends of the drains lead into drain openings just inside the door.

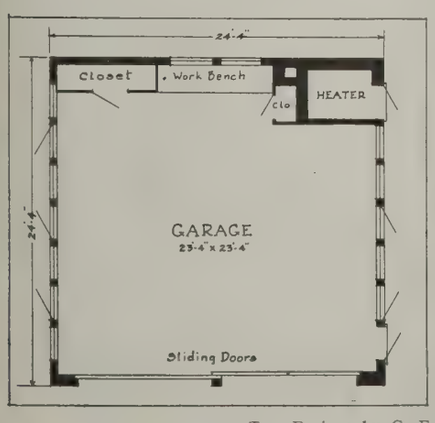
The lighting arrangements should give ample illumination both overhead and beneath, without direct sun if the latter can be avoided. Ribbed glass panes are excellent to intercept sunlight. The windows should extend fairly low, i. e., not more than two feet above the floor. If the expense is not too much, a northern

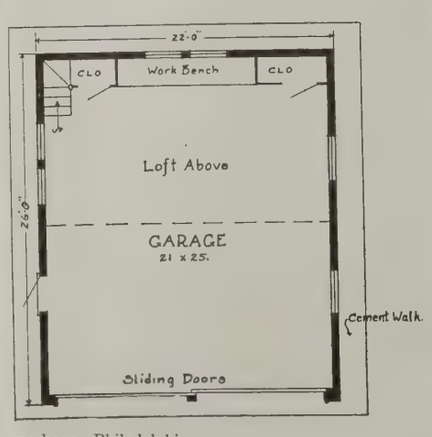


By Bailey & Bassett, Philadelphia.

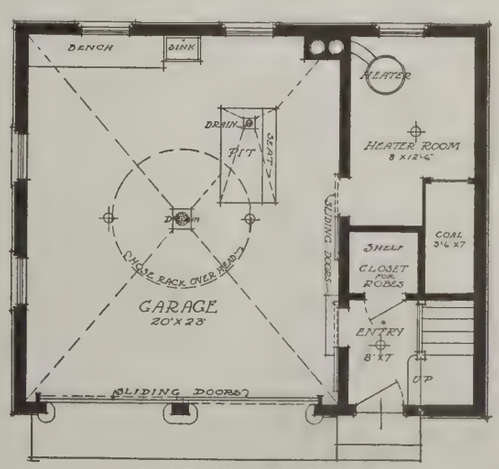
skylight is admirable. The electric drop lights should be placed as shown in the sketch plans, one on each side near the motor, another over the bench, another over the lathe, if any, and at least one at the back of the car over the door. Extension sockets for side lights should be provided, at least one for each car.

Since many stables are being remodeled for garages, the foregoing suggestions may readily be extended to these also. A cement floor is desirable in all cases, to minimize the danger of fire. It can be laid on the existing floor by reinforcing the floor beams, if necessary. Additional windows should be cut in as needed, and the interior should be lathed and plastered. If the heater is located in the basement, it should be reached by outside stairs so that there shall be no possibility of heavy gasoline vapor settling into the basement and causing explosions.





Two Designs by C. E. Schermerhorn, Philadelphia.



By Paul R. Allen, New York.

POWER MACHINES FOR THE WORKSHOP

By GEORGE E. WALSH (Continued from June.)

II.

WITH the power question settled the carpenter anxious to fit out his shop with adequate machinery must select his woodworking tools and machines with a view to the class of work he intends to take up. The average shop is a growth, and not a sudden, fully conceived and planned thing. Success brings a greater pressure of work, and then the question of handling this economically comes up for solution. At first one may aspire only to a small band saw or table saw, but as the work increases he wants a turning lathe and a planer.

The tendency is toward the combination of machines in a single equipment, and through adjusting parts it is possible thereby to do a greater variety of work. For instance, a power saw outfit may be designed to accommodate a small and big rip-saw, a cross-cut saw, jointer-header, dado-header, and emery wheel. Thus in a single machine we obtain sufficient variety to meet almost all demands for a small shop. A single engine drives such a machine, and the carpenter finds much of his work simplified and greatly improved. There is far less handwork, and much less running to the mill to order every little piece of work.

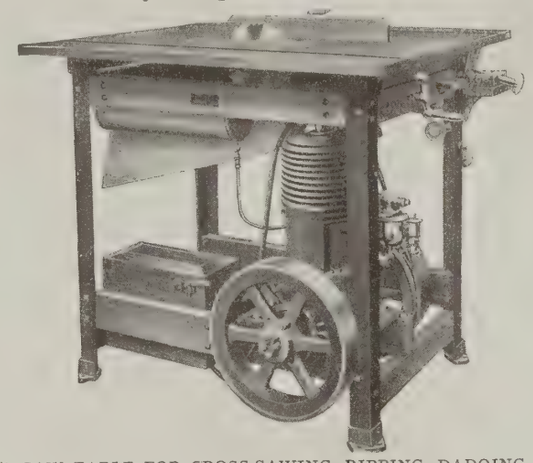


FIG. 1—A SAW TABLE FOR CROSS-SAWING, RIPPING, DADOING, BORING, ETC.

Simple and efficient table saws equipped for power connection can be purchased all the way from $50 up, and they can be used in a great variety of work. A rip-saw costs very little, and with one suitable for all ordinary work carpentry jobs can be done in much less than the usual time. Nearly every carpenter collects a considerable amount of second-hand lumber, and much of this could be cut up and utilized for odd jobs if a good power saw outfit was in the shop. Within a year's time one should save enough in this way to pay for the initial cost of the whole equipment.

Some carpenters stop at the rip and table-saw outfit. They never see the need of providing themselves with any further machines, but if the shop is equipped with power it is pretty certain that one will soon buy other tools to be run by it. Here naturally a good deal depends upon the character of the work the carpenter is doing. If he has jobs which call for a good deal of extra mill work he will in time add to his single machine.

Suppose, for instance, he has a gasoline engine of four or five horsepower coupled up to a table-saw. He has a surplus of power, and it would cost him practically nothing to operate one or two more machines. So he purchases a turning lathe and connects it by belt to the shaft. The turning lathe can be used for a great variety of odd jobs. It is almost as important as the rip and cross-cut saws. Odd pieces of lumber can be used, and instead of ordering odd pieces from the mill he can turn them out himself in the shop. It is sometimes pretty costly work to order from a mill a piece that will match something broken on a house, but it would be a simple matter to turn it out in the shop provided with a power lathe.

In the ordinary course of events the next machine that the carpenter would long for would be a planer molder or a jointer. This would prove a good investment if the class of work demanded it. With a molder of moderate size it would be possible to do odd door and sash work, and this pays in towns where mill facilities are not of the best. Of course, a complete equipment would call for a mortising machine. A good many have small foot-power mortisers already in their shops, but with gas power provided it would pay to get a heavier and bigger one. Then a class of work could be done that the ordinary carpenter with his foot mortiser could not do. A tenoning machine would add to the variety of work, and also a shaper.

By the time that these machines were installed the shop would be more of a woodworking plant than a simple carpenter shop. It would be equipped with machines costing several hundreds of dollars, and the owner would have to begin figuring interest on his investment to make good profits. It would be more in the nature of a small mill than a carpenter shop; but the line of work would be of a character to make this pay. No carpenter would purchase such equipments unless his work warranted it. There would have to be a demand for the machines before any one would purchase them. In other words the shop would be a growth, an evolution due to trade.

There is a need for such complete woodworking shops in every town. They are the connecting link between the small shop and the mill. Their operation would in time develop trade among other carpenters. Instead of going to a mill to have an odd job done, the average contractor would fall into the habit of sending the work to the carpenter shop equipped with the tools that could do it quickly and satisfactorily. With the tools and machines provided, the carpenter would naturally drift into cabinet work, and this is one of the best paying specialties of the trade. Cabinet work today depends as much upon machines and tools as upon

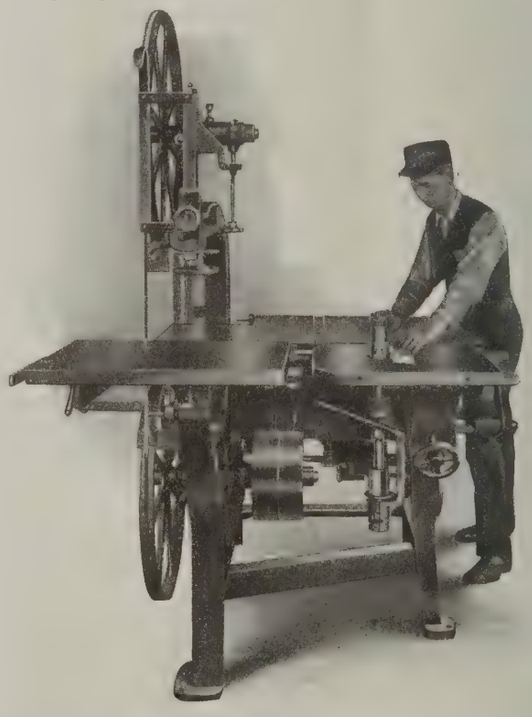


FIG. 2—COMBINATION MACHINE. PRACTICALLY A COMPLETE WOODWORKING PLANT. AS MANY AS 16 MACHINES CAN BE THUS COMBINED IN ONE.

any skill of the hand and eye. Three-fourths of the work can be done by machinery much cheaper and more satisfactorily than by hand.

There are plenty of instances of carpenters succeeding in this way and building up a flourishing business. As they saved money they purchased machines and added them to their shops. The character of work they could do advertised them and brought orders. The shop took on the character of a mill to some extent, and in time sufficient orders were obtained to pay for the employment of many helpers. One drifts into cabinet work, and another sticks to jobs and contracts of ordinary character. In either case the expansion of the business brought more work and greater possibilities.

The ambitious carpenter of today has more possibilities than ever before. He can reach out and bid for work that was never within his reach in the days when power machines were not adapted to the small shop. His shop may easily develop into broad lines and eventually become a woodworking mill on a small scale.

THE FOOLISH CONTRACTOR

By H.

There are so many contractors who are dilatory in finishing their jobs, with the result that they have much money due them and many dissatisfied owners, who are sure to do all they can to prevent other work coming their way.

We know of a Chicago contractor who seems to have no trouble getting work started. He is enthusiastic and gives the owners every reason to believe he is reliable. Being a ready talker he encourages the owner in every way; even does unusual things to gain his confidence, but before he is through with the job he lays down and then the owner's troubles begin. This contractor is known to draw ahead on his jobs, so well has he worked on the owner's generosity, and then he turns around and takes advantage of him. Why he does this no one seems to understand. There are many contractors who though they probably do not carry it quite to this extent, still they are apt to let small things remain undone. Whether they are paid in full or not, it is certainly to their interest to finish up their work and then forget about it.

As we look around, we find that the good contractor gets the best work. True it is that price counts with most owners. It is also true that the good man more often has the refusal of the job at even a better price.

The careless contractor does get some work, but to do so, it must be at a low figure. It's this low price he is obliged to make that keeps him from advancing and he is as a result always poor.

TO CARRY OR NOT TO CARRY A STOCK

To what extent should a carpenter contractor carry on hand a stock of materials? Of course, the very first thing to think about is the money end, but in this article we must assume that he has the ready money to carry a good size stock. Then, should he do so? There are, of course, many things to consider:

First: Is all of this work in his home town?

Second: Are his buildings of a like character?

Third: Has he a place to store the material?

Fourth: Does it pay on the investment, considering the advantages, allowing for damage and depreciation?

1. Of course, if he is an itinerant contractor he cannot afford to carry a stock on hand and ship or haul to distant points. The freight or drayage, adding thereto damage, would eat up any possible advantage he would have in buying cheaper in larger lots.

2. Unless his buildings are of such a class as to take the same kind of materials, he could not save money in keeping a stock on hand. If one job is a residence, the next a church, followed by a public building, the chances are the class of materials used would not conform to any of the stock he had on hand. The idea of having a stock is to use it up, and this means quickly. If he were to put in a stock of timber on which he saved $3.00 per thousand in buying carload lots, he could not afford to carry it on hand for a few years, but if he were putting up residences taking the lumber he bought, it would certainly pay him to lay in a stock. Such things as nails, screws, building paper and outside mouldings are used almost daily, and if there is a saving in quantity purchased, it should be done.

We are not considering here any possible advantage in buying away from home. Even your local dealer will gladly sell quantity lots cheaper than small lots. It costs money for a dealer to weigh out 20 pounds of nails, assorted kinds, and wrap them up separately. He expects to be paid for his time. If you bought a full keg, the whole time taken in handling this one full keg would be less than the wrapping up of a five pound order.

3. It would not pay to build a large place to store stock. It would take many dollars saved to pay for the cost of erecting a building specially for stock.

4. It only pays to carry a stock where the saving is considerable. Of course, its foolish for a contractor to go to a lumber yard and pay a cent a foot for fifteen feet of quarter round, when he could buy a few hundred feet at even less than thirty cents a hundred lineal feet. It's an item he always uses. This he should stock. There is a little loss from damage and depreciation, but consider the difference in cost—and so it is with nails and with building papers. These are staple with him. Every new job or repair job is apt to take some of it. The investment need not be large, not much room is needed to store it, and it pays to have it on hand for every emergency.

In the April issue of THE NATIONAL BUILDER we gave some short method rules of calculation. These cannot but benefit the young men if they will but take some little time in their study.

The aliquot parts of the table which was given in former article leads the way to practically all short rules of multiplication, division and substraction.

There is a short rule, however, which has no bearing on the table referred to, yet is so simple a process of multiplication that you are apt to wonder why you did not learn it at school.

THIS RULE IS APPLICABLE ONLY WHERE THE TWO UNITS NUMBERS ADD TEN AND THE TWO TENS UNITED ARE LIKE NUMBERS.

They are such multiplications as,

25	32	43	54	61
25	38	47	56	69

In the first one, the two fives add ten, while the tens numbers are alike (or like numbers.) This is true on all the above. In the second, the two and the eight add ten, and the tens are like numbers.

Here is the rule:

Let's take the first one.

Multiply 5×5 which equals 25. Set this down. Then say 2×3 (increasing the upper figure one number) equals 6. Set this down before the 25 and you have the answer, 625.

Now take the next one:

$8 \times 2 = 16$

$3 \times 4 = 12$

The answer is 1216

Prove it the long way of multiplication and see if it is not correct. You will wonder if this rule finds much application. It will work out even in fractions.

You have bought from your hardware man a lot of nails in a keg. His price is 2½ cents a pound and there are 25 pounds in the lot. What's the price? Answer quick 62.5 or 62½ cents.

Simply say 2.5c per pound
25 pounds

62.5

You point off the decimal same as you were taught at school. In working out the fractions you reduce them to decimals.

ARCHITECTURAL USES OF MICA

OWING to the great non-conductivity of ground mica, this mineral is coming into general use for insulating purposes. It has been found to be highly efficient as an insulator in walls to retain heat, on the one hand, or to prevent the entrance of heat on the other, as in the case of refrigeration. Ground mica as used for these purposes is not expensive and is one of the most satisfactory agents that can be employed. Walls lined with ground mica are about as well insulated as it is possible to make them. A similar use for mica is in deadening floors and walls. A layer of ground mica between floors will be found to be a very effective sound deadener.

The increasing use of cement blocks and cement construction of all kinds has made a new use for mica. Many architects are now specifying that the cement blocks they use shall be faced with ground mica. While the block is still plastic mica is sprinkled over its face to give it the sparkle and life of granite or marble, both of which contain a similar substance that adds greatly to the appearance of the work. In this connection it is worth noting that all the new cement monolithic lamp posts made for Lincoln Park, Chicago, as also the settees, drinking fountains and curbs of the same are impregnated with mica.

The fireproof qualities of mica make it an excellent finish for a ready roofing. It is a non-conductor of electricity and has many other qualities that recommend it to roofing manufacturers and users. For this reason mica-coated roofings are coming into very general use and are sustaining and extending their already good reputation.—American Roofer.

STAIRS AND THEIR CONSTRUCTION

(Continued from June.)

PITCH OF STAIRS.

It is found in practice that the best pitch for stairs is that inclination which by twicing the rise and adding the going equals 23. This agrees very well with the French theory: the labor of moving vertically is about twice that of moving horizontally, if the average human stride be taken as 23 inches.

Rise.	Tread.
5½	12
6	11
6½	10
7	9
7½	8

The limits of the variations of steps vary from 9x7 to 11x6 for ordinary purposes, and are the most useful in practice, the former measurement for ordinary and the latter for more important buildings.

WIDTH OF STAIRS.

The minimum width of stairs should admit of two persons conveniently passing each other. This cannot conveniently be done under 2 feet 9 inches, but 3 feet is the more common dimension of all ordinary work of a good character.

The winders should have at least the width of the fliers on a curved line 15 inches from the center of the newel.

HEIGHT OF STRAIGHT FLIGHTS.

To prevent giddiness the number of steps will vary with the pitch of the stair, 8 feet being the maximum vertical rise without a landing or turn. Greater heights should only be reached by flat pitches, such as 11x6 inches or 12x5½ inches.

WOOD FOR STAIRS.

In ordinary practice pine is used for all parts of stairs, but oak and teak are used for more important work, and are better for resisting great wear.

Pitch-pine is hardly suitable, although often used for ornamental effect for all parts of stairs, but unless thoroughly seasoned it shrinks and the joints open.

Italian walnut, for its color and figure, is sometimes utilized for strings, balusters, newels and handrails of stairs. Mahogany and teak are preferable for handrails, as they are durable, ornamental and take a good polish.

FRAMING AND SETTING UP OF STAIRS.

The pitch and going are first determined, and a pitch-board made as shown in Fig. 5. The strings and newels are then dressed

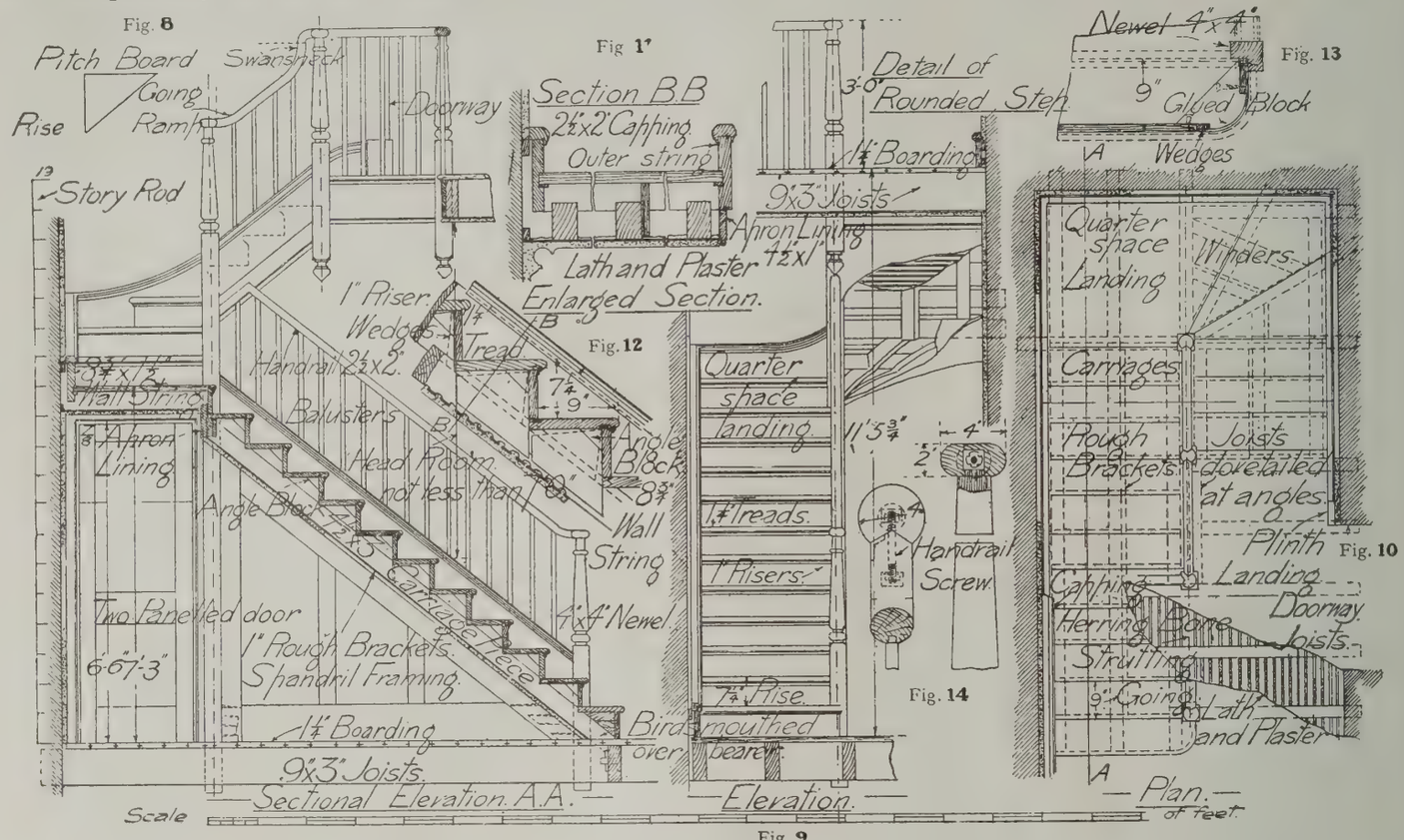
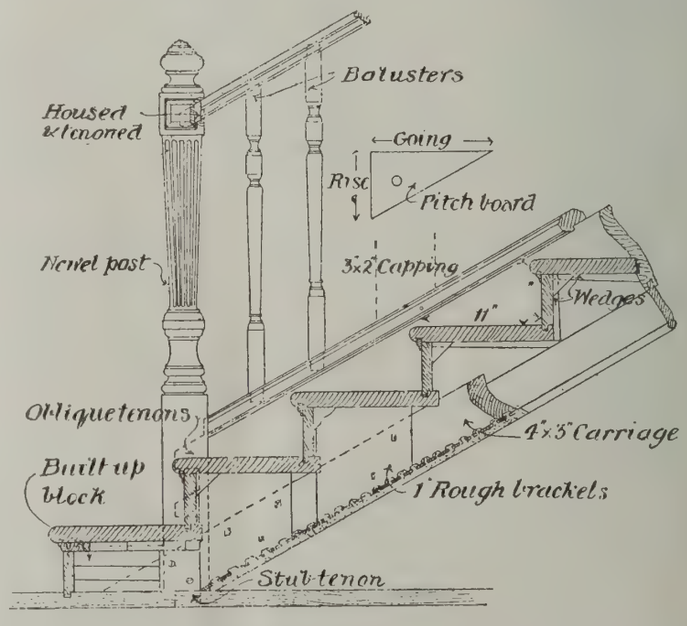


Fig. 9

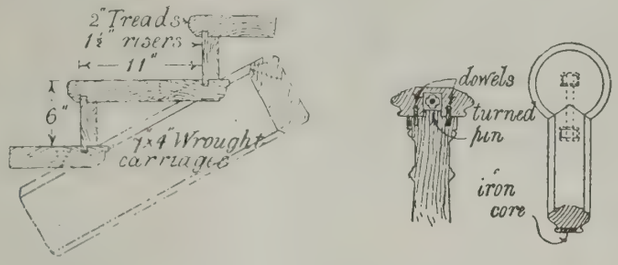
and set out by the aid of the pitch-board and plan of stairs; these are then housed, and the strings tenoned to the newels.

The risers and treads are prepared and fitted and glued; blocked to each other they form steps, and when set are fitted into the strings. After all have been fitted together the oblique tenons



of the strings are glued and doweled to the short newel, as shown in Fig. 5 (the longer newels not being secured until the work is in position, owing to the difficulty of transport); the steps are wedged to the strings, which then are ready to be fixed, and when *in situ* the rough carriages are then fixed beneath, and to prevent

distortion of the steps when subjected to rough usage, pieces of wood, termed brackets, usually 1 inch in thickness, are cut and fitted to the under side of the step and spiked to the rough carriages, and cut flush with the under side of the latter.



CLASSIFICATION.

Stairs are of two kinds: (*a*) Newel, (*b*) Well.

Under (*a*) come the straight, dog-legged, solid newel, and circular or rectangular.

Under (*b*) are included the open newel and the geometrical.

Straight stairs are useful for long narrow chambers; dog-legged for staircases the width of which is slightly more than that of two stairs; geometrical or open newel for those chambers of a greater width.

Open newel stairs present the best appearance and are strong.

Geometrical stairs require care and a good deal of skill in their construction; they are not so imposing as the open newel, and are comparatively weak; they were extensively used in middle-class houses of the Georgian period.

NEWEL STAIRS.

Figs. 8 to 14 show plan, section, elevation and details of steps adaptable to newel stairs, showing treads, risers, rough brackets, rough carriages, wall and outer strings, cappings, apron lining, and plaster soffit.

Fig. 13 shows the form of construction and method of fixing a quarter-round bull-nosed step by a block glued and screwed and formed of three pieces, the grain of each pieces crossing the other at an inclination, forming the fixing for the sunk and wedged riser.

Figs. 7 to 14 give the working drawings showing pitch-board, story-rod, handrail with ramp and swansneck, and showing accurately all the necessary details.

LAYING AND SCRAPING OF OAK FLOORS

Oak flooring requires some care in laying, as it is very easy to ruin, by incompetent workmanship, what would otherwise be a perfect floor. Judgment must be used in selecting the different pieces so that they shall blend well and the floor shall present an even shade, and not be dark and light in streaks. This can be done if a little care is used.

If the floor is to be laid over an old floor, remove the quarter-round and sweep the floor clean. Lay the new strips at right angles to those of the old floor. In new houses, the sub-floor is usually laid diagonally. The top flooring is laid across the joists, starting from the longest straight wall, and striking a chalk line from end to end just far enough from the base-board to admit one piece of flooring. Nail the first piece of flooring straight on this line, setting the nails well through the piece. Then start by selecting the light-colored strips and laying aside the darker ones until all of the light pieces have been laid. Then select the lightest of the dark, and so on, until the floor is finished. By doing this, a floor of even color can be obtained. This is the most important part of laying oak floors. When the hearth is reached, miter a hearth-strip or a piece of floring around same, continuing until the wall is reached, and then nailing the last piece through the face in the same manner as the first piece was nailed.

If more than one room is to be laid, it is much better to select separate shades for the different rooms, laying the light stock in the darkest room. It is best, when laying over old floors or sub-floors, to use a good quality of damp-proof paper or deadening felt under the top flooring.

The flooring should be securely nailed. On 3/8 and 1/2 inch, the nails should not be over six inches apart; on 5/8 and 13/16 inch, not over eight to twelve inches apart when laid on sub-floors, and twelve to sixteen inches when laid on joist. On sub-floors, the nails should be "staggered." Be careful in nailing not to mar the surface of the floor in driving up the nails.

While there are a great many machines made for scraping floors which give good satisfaction, on high-class work it is much better to do this by hand, using a cabinet scraper. This part of the work should be done with the greatest care, as proper scraping is essential for a perfect finish. Always scrape lengthwise of the wood—not across the grain. No amount of sand papering will remedy the defects in scraping, such as wavy surfaces or the strokes left by the knife. These defects show much more when the floor is finished than when it is being scraped. A floor properly scraped looks very smooth, but still it should be thoroughly gone over with "No. 1½" sandpaper to obtain the best result in finishing. This should be done carefully by getting on the knees, throwing the weight of the body on the sandpaper, and running it in long, even strokes with the grain of the wood. When the work is done, the floor swept clean, and the dust removed with a soft cloth, the floor is ready for the finish.

HYDRATED LIME FOR WATERPROOFING CEMENT MORTARS

SINCE void filling is to be sought as the panacea of waterproofing ordinary field concrete, comparative tests through the additions of percentages of colloidal clay or hydrated lime and the various advertised waterproofing compounds have been carried on continuously with the conclusion at this date that no general results are obtainable from the additions of patented or proprietary compounds which cannot be obtained equally well through the use of colloidal clay or hydrated lime.

Additionally, it seems to be very generally proved by corroborative tests, results of which will be submitted later when long-time results will be available, that, as stated in last year's report, to be likely a weakening in tensile strength in time followed the use of many of the patented compounds, which effect is not generally marked when colloidal clay or hydrated lime is used. It has been concluded that the so-called patented compounds fail to remedy defectively proportioned concrete of poor materials as effectively and positively as colloidal clay or hydrated lime simply because they do not carry sufficient fine material called for by existing conditions. The apparently waterproofing effect of some of these proprietary compounds at early stages, with the very common loss of strength later on, only confirms the opinion as to their temporary effect being mechanical entirely, in aiding, through deposits, to fill voids to the desired end, which can be permanently better assured by the use of proper percentages of fine material such as colloidal clay or hydrated lime.—American Society for Testing Materials.

MECHANICAL HOISTS

ONE of the articles of progress of the mechanical equipment that comes in to relieve the burden of hard physical labor in building is the mechanical hoist, a power hoisting apparatus for conveying building material from the ground to the upper stories of the building.

These have already received a fair amount of attention from the builders of large buildings, those which run more than two stories high, but many a carpenter and contractor specializing in residences might also help himself and add to his profits by taking up with something of this kind.

The trouble with the average man doing comparatively small construction work is that he looks upon all of these things as being within reach only of those big contractors who handle the large undertakings. This is an idea that should be gotten rid of, because in this work, as in woodworking machinery, there has been a lot of special attention given lately to devising equipment expressly for the lighter work, portable equipment that can be easily moved from one place to another and even still lighter equipment that is operated by hand.

The gasoline engine and the electric motor have made practical many things in light power driven hoists and the ingenuity of mechanics has also made possible several improvements in hand power hoists that will do much to lessen the burden and insure the safety of handling material from the ground up on to the building and a really progressive builder cannot afford to let these things pass by without investigating.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

(Continued from June.)

PLATE XIV.

WITH this plate we begin the actual study of architectural drawing. The previous plates were of an elementary character and were introduced to familiarize the student with the use of the drawing instruments and also to acquaint him with the fundamental principles of drawing.

As was stated in a previous lesson, the plan of a building is a representation of each floor as if the building were cut between this floor and the one above it, so as to show all doors, windows, stairs, etc., in their proper relation to each other and to the rooms

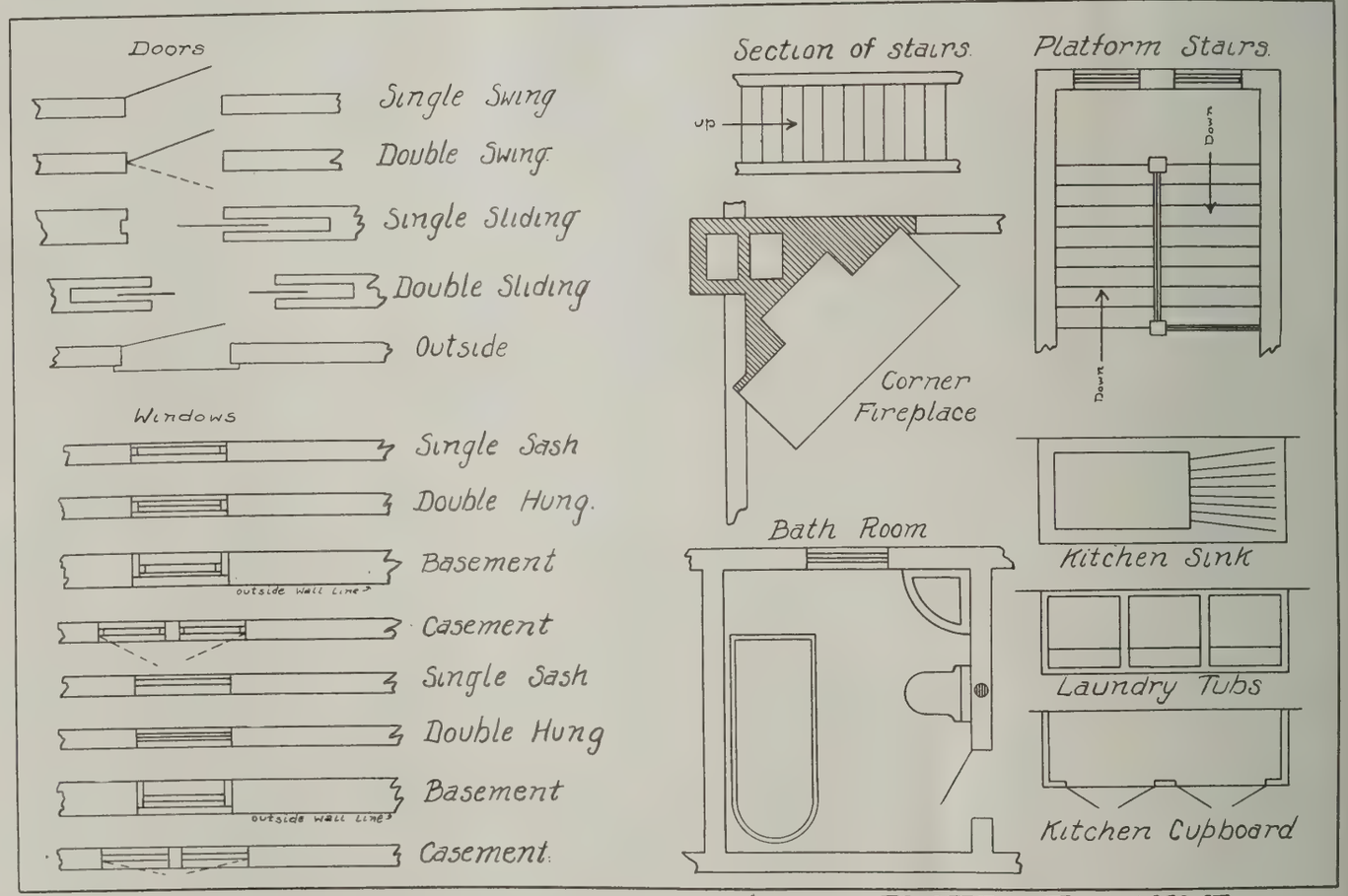


PLATE XIV NAME.

of the floor. It is evident that it would be almost impossible for the draftsman to show the plan as it would appear if so cut as each individual stud would have to appear in section, each window and door frame as if they were cut in two, and all of the other parts, as lath, plaster, siding, etc. So draftsmen have established a conventional method of representing these parts on their plans and when an actual section is to be given they draw it in detail to a larger scale.

Of course the elevations appear as the sides of the completed building would appear.

Now let us consider Plate XIV. The student should make a careful study of this plate and the one following it and should be perfectly sure that he understands every figure perfectly. The conventions here given are largely for a frame building.

The first elements shown are the doors. The first one of these is the single swing door. It will be noticed that the walls are represented each side of the opening as two parallel lines. Th door itself is a single line swinging from one corner of the oper ing in the direction it is to swing in the completed building. Th second one is the double swing door. This is drawn in the cente of the opening, a solid line in one direction and a dotted line i the other. The third is a single sliding door and the fourth a dou ble sliding door. It will be noticed that the walls here are thicke The last door given is an outside door in which the threshold represented.

Next on the plate are shown the windows. The first thin apparent on these is the fact that the windows are not shown openings in the wall, but the wall line runs past them. On th first four the outside and the inside sills are both shown as a also the sash openings and the glass openings. The last four a modifications of the first in which the glass openings are left o It is easy to understand that they should be there and the leavi of them out saves the draftsman much time. Notice the diff ence between the single sash and the double hung windows. A the basement window in which the frame is shown. The ca ment window shows which way the sections swing, also the m lion in the center for each sash to strike upon.

Remember that these representations are only conventio with a certain number of draftsmen and some others may have different system of which there are a great many, each of which h its own particular merits.

Next the section of a stairway is given. It will be understo that in a plan only the treads can be shown, that is, the horizon

members of the stairs. The vertical portions, or risers, can only be shown in detail or in a vertical section. Notice the arrow and the word "up" which are always given on plans. The riser is generally figured at 7 or 7½ inches. The tread then must not exceed 10 inches, as the sum of the two must be 17 or 17½ inches. This shows us that the narrower the tread the higher the riser and vice versa. In planning stairways we must always know the ceiling height of each floor in order to determine how many risers we need, and from this how many treads to put in. In the next figure we have a platform stair as drawn in a second floor plan. Notice the walls and the two windows, also the newell posts and the handrails, etc. Starting from the top we go down nine steps to the landing, then down until the steps disappear under the floor. They are completed on the first floor plan.

A convenient method of representing an inside corner fireplace is next shown. The section lines show the brick as distinguished from the wooden partitions. The flues, one for the fireplace and one for the kitchen range and furnace, are each 8 by 12 inches inside. The hearth extends out into the room about 18 inches. An inside well fireplace is shown in the same manner, but of course it has a rectangular shape.

The bath room conventions are given comprising a tub, a seat and a corner basin. A vent is shown in the wall directly back of the seat.

The kitchen sink is shown with a drip board. Laundry tubs should be represented as illustrated. The kitchen cupboard should have doors swinging out unless there is room for sliding doors.

The student should make his drawing at a quarter-inch scale, remembering that the walls on a frame building are 6 inches thick.

PLATE XV.

This plate is largely taken up with Standard Wiring Symbols as represented on plans. The symbols here illustrated are those adopted by the National Electrical Contractors' Association and the American Institute of Architects. Complete copies may be obtained from the secretary of the Association at Utica, N. Y., or from the secretary of the Institute at Washington, D. C. It is advisable that every student obtain a copy.

The symbols are self-explanatory and it is a very easy matter for the student to draw them in, properly lettered.

In the lower right-hand corner of the plate a few conventions are given. Here we have the representations of some building materials when they are shown in section. Notice that terra cotta is the same as brick with the lines running in the opposite direction.

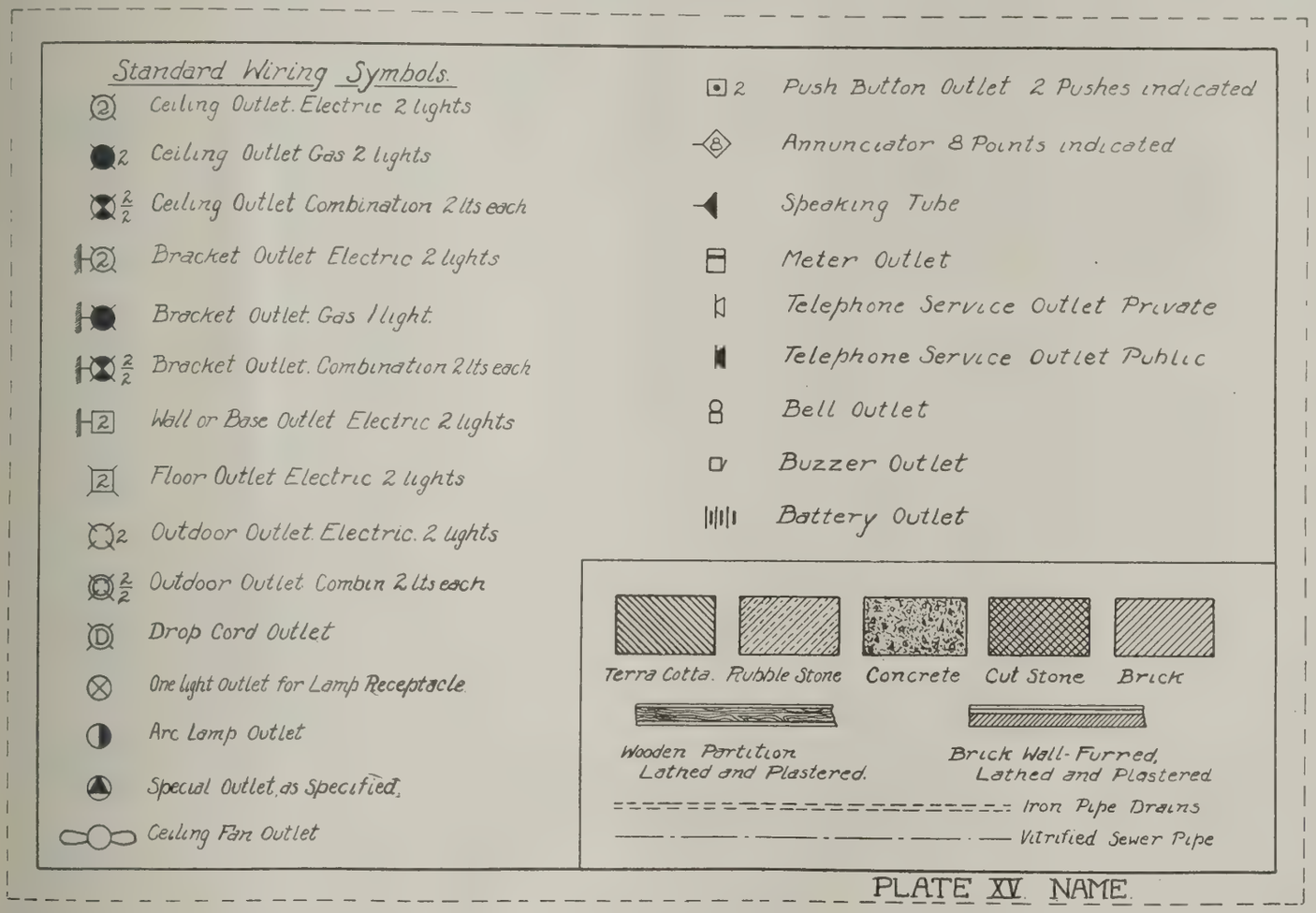
A wooden partition in a frame building may be shown in detail as illustrated. Plaster is represented by parallel lines on opposite sides of the wall.

The brick wall shown is furred on the inside and plastered.

On basement plans various lines of pipe are sometimes shown. For the sewer connections inside the building and extending 6 feet outside the wall, the iron pipe drain should be used. Then it should be connected with the vitrified pipe and carried to the mains. Both pipe representations are here illustrated.

There are a large number of conventions used that are not on either Plates XIV or XV. These will become familiar to the student as the work proceeds, or when he goes into an office as a draftsman.

(To be continued.)



Mr Alfred Hudson, before the Royal Institute of British Architects, said:

"One of the first matters with which an architect will have to deal when he confers with his employer is the question of cost, and to this all his ideas must be made subservient. For this purpose he must be trained to measure and estimate, and he must learn the value of different materials. It falls to the lot of very few architects to find clients of unlimited means, and it is still more rare to find even such clients willing to disregard questions of cost. Another example of equally necessary instruction is the proper specifying of the materials, and the various works which are required to be carried out. This is a matter in which great foresight is required, besides a knowledge of every kind of detail. One of the first essentials in the student's instruction should be to teach him to describe accurately the various materials and methods of construction upon which he is receiving instruction during the course of his studies. It is not uncommon to find that a specification has been copied from an obsolete model inscribing materials which have ceased to be sold, or even manufactured."



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]



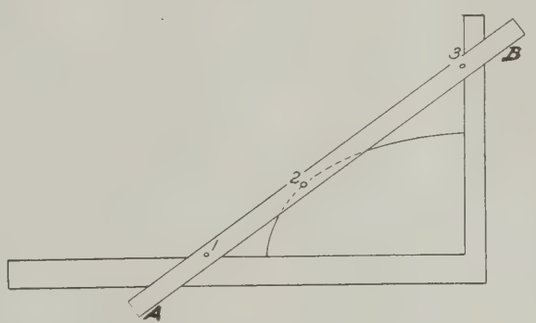
ANSWERS

TO DRAW AN ELLIPSE WITH A SQUARE.

Answer to J. E. L., Shenandoah, Iowa.

In a thin strip A-B locate the points 1, 2, 3. Two being a hole for a pencil. One and 3 being brads projecting slightly below the strip. The distance 1-2 is equal to ½ the minor axis; 2-3 equal to ½ the major axis.

Place the square with the inner angle at the center of the ellipse. Slide the strip, keeping the points 1 and 3 against the square, as shown, and the point 2 will describe one-quarter of the ellipse.



FRAMING.

From a "Wood Butcher."

In reply to H. C., Mansfield, Mass., and Young Farmer, Seattle, will say, brothers, that a good square and roof framing is my hobby. I have an old Eagle square with the old board scale on that a carpenter never uses. I also have had a square for twelve years, and would advise all brothers to use one like it in a locality where framing is done. It has a rafter rule on it, giving figures for lengths per foot run of rafters, and side cuts, for more pitches than H. C. will ever frame in his lifetime. Get No. 100 ox. copper as advertised on page 20 of May NATIONAL BUILDER. Now if you want side cut for hip rafter, say for 10-inch pitch, look under 10 on the blade-line 6, gives you 13-15. Cut on the larger number always.

Now, brothers, buy two books also; "The Steel Square and Its Uses," by Fred T. Hodgson. This will give you more tricks with the steel square and roof framing than you will ever have occasion to use. On page 85, volume 11, we find length of rafter, rim and side cut, which to my satisfaction is absolutely correct. That means, H. C., if your hip rafter is 18 ft. long and the run from the corner of plate to a point plumb under the top of the hip rafter is 15 ft., 18-15 on your square gives you the side cut to fit common rafter, ridge board or deck—anything that is at right angles to your plate line, length and run of your common rafter, cut jacks, etc. If you get figures too large to work on square, diminish equally by dividing both figures by the same number. Thus, 18-15 would be 9-7½ or 6-5. Don't forget to use a little mental effort with your work, and learn to be a keen mechanic.

SOLDERING COPPER.

From A. M. C., Chicago.

Replying to H. Schroll, St. Louis, Mo., with regard to soldering copper, the process is identically the same as soldering tin, except that cut acid is used for the flux in place of rosin. The acid is cut by dropping pieces of zinc in muriatic acid until it will not dissolve any more. For the best work, it is necessary to tin the joints first, which is done by applying a little of the acid and covering the edge with solder by running a hot iron over it. This leaves a thin film of solder on the edge where the two pieces are jointed together. This can be a half inch or more wide, according to the lock of the joint. It is necessary to have the iron rather hotter than for soldering tin in order that the solder may be sweated well into the joint.

GYMNASIUMS.

From E. N. B., Maywood, Ill.

Reply to J. W. A., Birmingham, Ala.

In regard to gymnasiums, the best articles on the subject which the writer has seen published came out in The Bricklayer, published by Rogers & Manson, Boston, Mass., in the February, March, April, May and June, 1909, issues. You can probably obtain these at the publishers, or possibly they are in the files of your public library. Some thirty or forty gymnasiums are shown in plan and elevation with considerable instructive reading matter.

FROM N. E. N., KALAMAZOO, MICH.

In regard to the question on hip rafters in the May issue, the correspondent no doubt made the mistake of using the figures for common rafters in obtaining the side cut of hip, in which case it would not make a joint.

The rule for finding the side cut of any rafter is to take the length and the run of that rafter on the square, cut on the length. So to get the side cut of a hip rafter, take the length and the run of the hip rafter, cut on the length—not the length and run of the common rafter.

JACK RAFTERS.

From K., Vancouver.

In reply to "Slivers," Flushing, N. Y., who wants to know how to get the side cuts for jack rafters, also hip and valley rafters, I will say that if he will get one of Nicholl's framing squares, he will have just what he wants. With it he can get the lengths of any rafter either common, hip, valley or jack with bottom and top cuts, also side cuts of hips, valleys and jacks for any pitch roof he wants. If he gets the 1¾ tongue, he will find it handy in laying out studding, etc. He should be sure to get the pamphlet that comes with the square.

SIX, EIGHT, TEN.

From R. R. D., Fillmore, N. Y.

Squaring a foundation of a building with a ten-foot pole, 6, 8 and 10 is done like this: Commence on corner of building, measure off six feet on one side and eight feet on the other side. When the building is square the ten-foot pole will reach across exactly to these two marks.

From "Old Framer," La Crosse, Wis.

"Country Contractor," when squaring a foundation by this method should measure off, on one side of the line, eight feet exactly, and this line should be a front or main face of the building, and must not be disturbed when once determined. Then stretch another line at right angles to the first, and on this measure off exactly six feet, with your ten-foot pole; and if this distance between the six and eight foot marks is just ten feet, your lines are at right angles, or square, with each other. If not, move the second line at its loose end until the points make the necessary distance. I will not give you the reason why the 6, 8 and 10 rule is correct, as that is uncalled for at present, though pleasingly instructive to those who do not know it.

DAMP-PROOF WALLS.

From "Builder," Port Huron, Mich.

I am afraid "Plasterer" of South Bend is up against a pretty difficult proposition, as the trouble evidently is caused by the damp creeping up from the foundation wall, and this can only be cured by proper draining of some sort, and the drain tile should be placed below the level of the foundation footings and have an outlet, either is the town's draining system below the walls, or into a cesspool lower than the level of the walls. Cementing the

walls will not serve your purpose, but will break away from the brick wall and eventually flake off. You could, of course, dig below the footings and take out the lower courses of brick or stone above the footings, and insert some damp-proof courses, such as slate, or asphalt, underpinning and securing the work as you proceeded, and then if the earth outside was above the dampproofing it could be removed and plastered with cement mortar to a little above the earth line. This would make a good job of it, but would necessarily be a little costly. The cement mortar for such work should be formed of two parts sharp sand and one part cement. Rake out all the loose mortar from joints in brickwork and brush clean with a stiff brush, then flush the whole wall with water, and lay on the mortar while the wall is damp. Float and trowel well, and do not let dry too rapidly.

HOSPITAL.

From "Architect," Montreal, Canada.

If "Committeeman" of Edmonton, Northwest, will enter more into details, and describe the requirements needed, his question could be, in a measure, intelligently answered. There are hospitals and hospitals, and designers of new ones require special training in order to be able to turn out the best building for a given sum; and it follows that very little real useful information can be given in the short reply I must make here. However, it may be well to point out some of the conditions necessary, that are often overlooked in designing the small hospital.

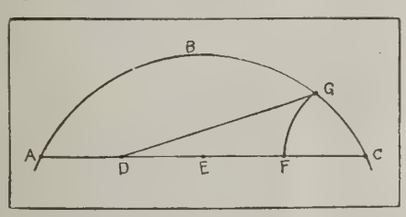
The heating should be of the low pressure hot water system of ample capacity. There should be a well ordered method of ventilation, and there should be, in the larger town hospitals, provision for sheltering families who have been temporarily dishoused while disinfecting operations are being carried out in the houses. There should be a proper mortuary provided, one side of which should abut a passage through which the interior of the mortuary may be inspected, through a heavy plate glass window. Isolation rooms in proper location must be prepared under correct conditions, and supplied with all modern improvements. I would like to extend these remarks, but want of more particulars and lack of space at my disposal forbid. Give us some more particulars.

(Note: If "Committeeman" will send his correct address to this office, we will put him in communication with "Architect" and several other specialists, if he desires.—Ed.)

MEASURING A CIRCULAR ARC.

From "Bolivar," Cornwall, N. Y.

Perhaps the following is what "Young Bricklayer" wants: To find the length of the arc ABC, first draw the line AC and



divide into four equalt parts by points D, E and F; then with C as a center and a radius CF, draw arce FG. The line DG is then one-half the length of the required arc.

SIDING FOR CIRCULAR TOWER.

From E. N. B., Chicago, Ill.

In answer to D. S. P., Scranton, Pa.

To find the radius to work beveled siding to for a circular tower: Divide the radius of the tower in inches by the thickness of the thickest edge of the siding, and multiply by the width of the siding in inches. For a two-foot radius of tower, with three-inch siding one-half inch thick we have $24 \div \frac{1}{2} \times 3 = 144 = 12$ ft. The siding will have to be in short lengths to allow working it to this short radius, but by using clear wide siding, cutting out at top in the center and on the ends on the bottom, it can probably be sprung around all right.

Sometimes it is necessary to have special siding worked out in the mill with a ship lap joint at the bottom, thus letting the back lie flat against the sheathing or studs. In such a case be careful not to make the relate too deep at the bottom, or there will be a joint seen. It is better to leave it a little tight, as a plane will soon fix the top of the last piece put on.

QUESTIONS

RAISING A FRAME BUILDING.

From J. B., Golden, B. C.

What would be the best way to lift a frame building 75 ft. by 35 ft. to a height 10 ft.

SOUND PROOFING.

From H. M. H., Leadmine, Wis.

We have a hall used as an Odd Fellows Lodge room on second story, and as a store on the first. When it was built, to deaden the floor they laid deadening felt on the joist, then laid the floor on the felt. This plan was a failure as one can sit in the store and hear the talking that is going on above. What would you recommend to deaden the floor so that it would stop the above trouble. The size of the building is 20 ft. x 40 ft. with 2x12 joists 16 in. on centers.

STRENGTH OF WOOD BEAMS.

From E. C., Chicago, Ill.

I would like to ask the editor or some reader who is competent, to publish any formulæ calculating the strength of wood beams.

OCTAGON ROOF.

From G. R. A., Bruce, Mich.

I wish to build a building with eight equal sides and would like the roof to be built Mansard style. What pitch would look best, and how do you get the cuts of rafters without drafting the whole thing?

SILO DOORS.

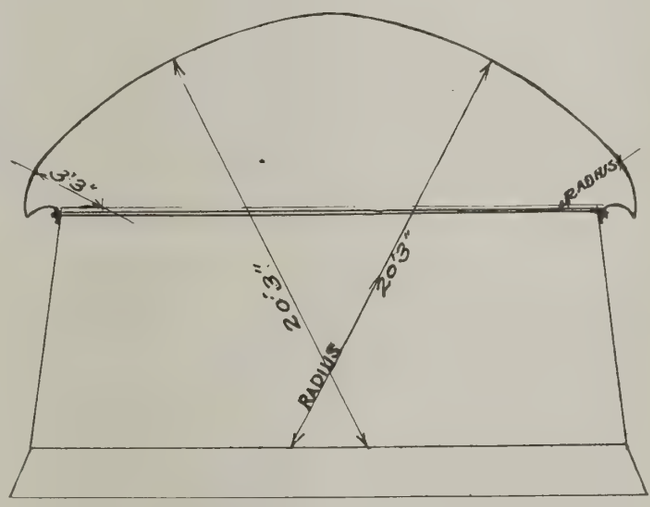
From R. R. D., Fillmore, N. Y.

Please give me the best idea of silo doors, commencing at top and going all the way down.

FRAMING CURVED ROOF.

From C. J. H., Ogden, Utah.

I should like to know the most accurate and easiest way to lay out the hip rafters for a roof as shown.



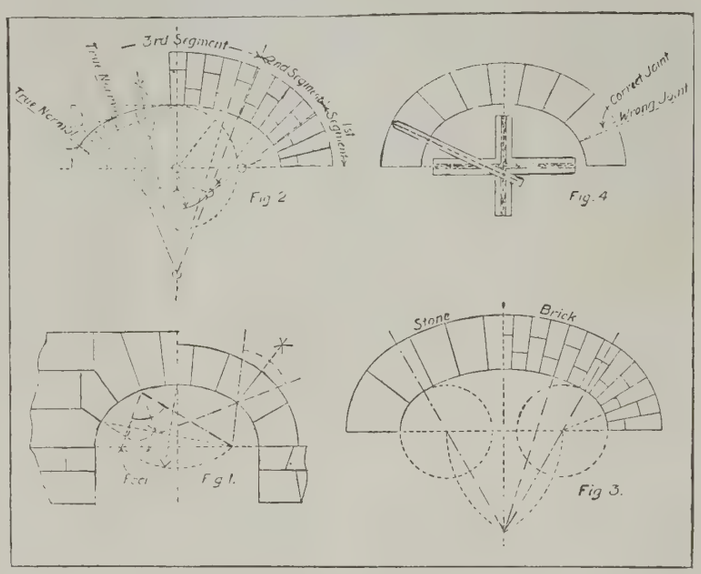
SELECTING HAND SAWS.

From a "Boy Apprentice," Kansas City, Mo.

In a few months I will have served what may be called an apprenticeship, but which is in reality the completion of a mutual contract, in which I agreed to work so many years at the carpenter and joiner trade for a fair consideration and a good chance to learn the trade. Just as soon as the time expires I intend to purchase a good working outfit of tools—the best in the market. I have already secured a few, and I would like, if such of your readers as may feel inclined, will advise me as to what kind and make of hand saws are the best, from their experience in the use of them. Just now this is a live matter with me, and I will feel obliged for any information or suggestion in the matter.

OUR PRACTICAL PAGES

THESE drawings show several methods of drawing joints for elliptical brick or stone arches. Fig. 1 shows the correct method of jointing and stepping for to receive ashler, Fig. 4 shows the trammel, as before mentioned, and the joints here have been purposely set out wrong in order to show the trap into which

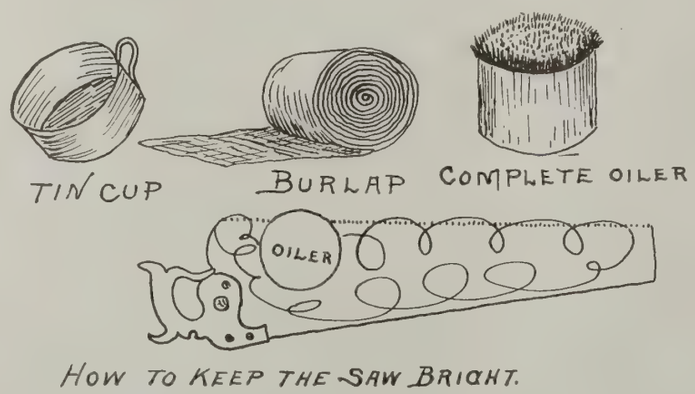


so many fall when using the trammel—viz., setting out the joints to coincide with the centre line of trainer upon trammel. The correct joints are normal to the soffit curve (see Fig. 1) Fig. 2 is an approximation of the ellipse, and handy for brickwork. The junctions of segments are joints in a true ellipse. Fig. 3 is of the same span and rise, and is set out by what may appear to the novice as a simple method. With stone arches, divide the intrados for voussoirs. For brickwork divide the extrados, place a whole brick in centre for key (see Fig. 2) and divide round.

OILER FOR HAND SAW

By W. A. LANE

Keeping saws bright and free from spots is not an easy thing to do, while oiling them with a cloth is rather a mussy affair, so if this oiler is tried once I think all will like it. Take a small tin cup, or part of a tin can, about 2½ inches deep is a good size. Cut a strip of burlap, or some similar material, 3 inches wide or ½ inch wider than the depth of the receptacle used. Roll this tight, having the roll large enough to be a very sung fit into



the cup. The part which projects should be raveled out to form sort of a stubby brush. Soak this cloth thoroughly with oil and it is ready for use. Keep it well saturated all the time and when oiling the saw, use a circular movement as shown in the drawing. Should there be any spots or rust on the saw, sprinkle a little emery dust on the oiler. Before sawing lumber containing much pitch, rub the teeth of the saw with the oiler and they will not become gummed.

THE sideboard shown herewith is designed in a simple and effective style, and may be easily made by any careful workman in wood. The original from which this photo is talken, are made of quartered oak and polished, but there is no reason why it may not be made of other woods. The three panels in the back

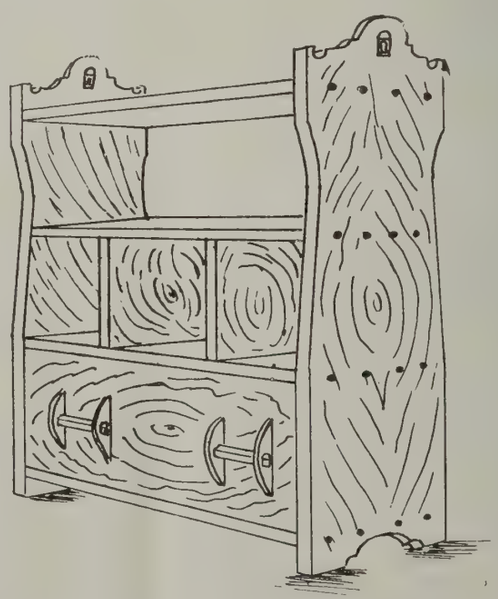


of sideboard are formed of bevel glass mirrors, and the upper panels may be formed of leaded colored glass, oil paintings, or framed chromos or prints, to accord with taste or extent of purse.

A MISSION BOOK CASE

By EDITH C. LANE

AS women use furniture more than do men, I think they have clearer ideas as to what is most useful. In this piece of furniture I have a combination affair, saving space in the room, and the expense of extra pieces. At the bottom is a large roomy drawer, this will hold drawing materials, stationery and many needful things, right at hand, yet are not exactly "things of beauty" when lying around a room. The next shelf is in three compartments and serves to hold different size books. The top shelf is large enough for several magazines and a pot of flowers or



A MISSION BOOK CASE.

a vase with one's favorite blossoms. At each end there hangs, in the opening, a small bell, as in the old mission towers. The lines are very simple, so that the man of the house can easily construct it, while the madame herself may enjoy staining it. It may be made of ordinary pine and stained to harmonize with the other furniture in the room.

METHOD OF OBTAINING HIP-RAFTER HEAD BEVELS

THIS article is written with a view of giving a method of obtaining the edge cut for the head of a hip-rafter in any case where the rafter fits against the side of the ridge.

First Example.—When the end and side-walls are at right angles and the plan of hip-rafter bisects the angle between walls (see Fig. 4), fix a line as shown in Fig. 1, and set a sliding bevel or a steel two-foot to the angle at A. Apply this to the side of the hip-rafter, and draw ab (see Fig. 2). Next set a pair of wing compasses to the thicknesses of the hip-rafter (in this case 2 in.), and with any point on ab as center describe an arc as shown. Tangent to this arc and parallel to ab draw cd. Draw from c square across upper edge of rafter to e. Join e to a. This gives the edge cut and ab is the side cut. If the upper edge of the hip-rafter has previously been "backed" or beveled, then the edge cut must be set out on the lower edge.

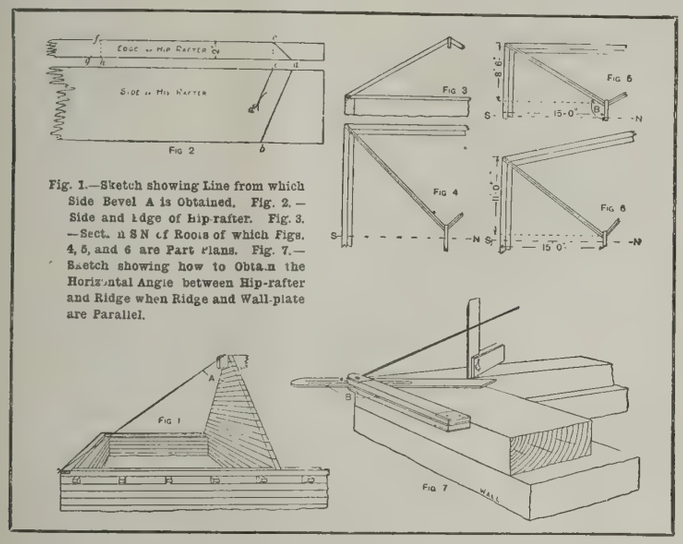


Fig. 1.—Sketch showing Line from which Side Bevel A is Obtained. Fig. 2.—Side and Edge of Hip-rafter. Fig. 3.—Sect. on S N of Roofs of which Figs. 4, 5, and 6 are Part Plans. Fig. 7.—Sketch showing how to Obtain the Horizontal Angle between Hip-rafter and Ridge when Ridge and Wall-plate are Parallel.

Second Example.—When the end and side walls are at right angles, but the plan of hip-rafter does not bisect the angle (see Fig. 5), proceed just as in first case, but instead of thickness of hip-rafter as a radius, use a measurement which may be obtained in two ways, both of which are given as follows: The first way is to set a sliding-bevel to the angle between ridge and hip-rafter on plan (see B, Fig. 5). If a plan is not available angle B may be obtained as shown in Fig. 7, providing that the ridge and wall-plate are parallel. Apply the sliding-bevel thus set anywhere on edge of hip-rafter and draw fg (see Fig. 2). From f draw square across edge to h. Then gh is the required radius. In the second way the radius is got by using the measurement, $8\frac{1}{2}$ ft. and 15 ft., given on Fig. 5, to make the fraction $\frac{8\frac{1}{2}}{15}$, and multiplying this by the thickness of the hip-rafter. Radius $= \frac{8\frac{1}{2}}{15} \times 2 = \frac{17 \times 2}{2 \times 15} = \frac{17}{15} = 1.13$ in., or $1\frac{1}{2}$ in. full.

Third Example.—When the end and side walls are not at right angles (see Fig. 6), proceed exactly as for Example 2. Here the required radius will be 1 7/16 in. full. Radius $= \frac{11 \times 2}{15} = \frac{22}{15} = 1.47$ in., or 1 7/16 in. full.—Building World.

The attention of people who are able to read is constantly being directed to the poor economy of investing in cheap things. This is particularly true with regard to that which is intended for the home. That which is inexpensive is not always to be scorned, but inexpensiveness is not necessarily cheapness. The policy of furnishing a home well, if slowly, is very much better and usually more profitable in the long run, than at once furnishing the house with cheap materials. That this applies even to little things is shown by the news of the serious condition of an entire family, caused by sleeping in recently papered rooms. Arsenic had been used in making cheap wall paper.—Furniture.

AMATEUR CARVING

THE illustration of the piece of carving shown herewith is the work of a boy—A. S. Burroughs of Melville, Sask. On inquiry we have discovered the boy has had no training only such as was given him in the manual training school of the little town in which he lives, and that his opportunities for obtaining knowledge of the art of carving have been limited and of short duration, and chiefly confied, he states, to the instructions given in Fred T. Hodgson's work on "Practical Wood Carving." His tools were few and consisted of a small set of amateur wood-carving tools. The material out of which the figures are graven is douglass fir—not a very good kind of wood for the purpose. The figure measures 21 inches high by 15 inches wide. This is a



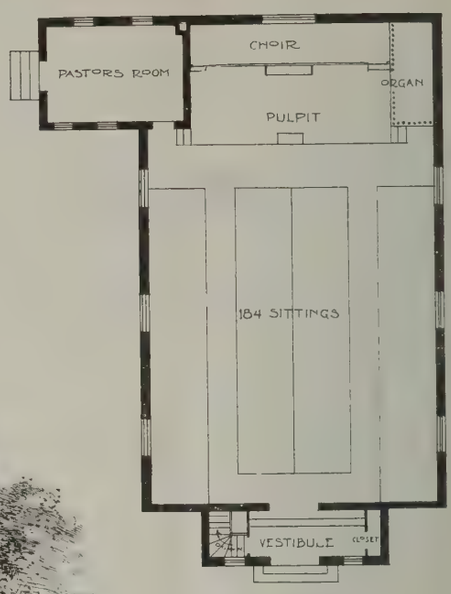
remarkable piece of work to be wrought by a boy scarcely out of his teens, who has never seen any sculptural work of note and had no opportunities for the practice or study of the art, but who has been obliged to work during the day, since he was able, for his livelihood. The boy is more than clever, and his work gives indications of his possessing the qualities, in a large measure, that go to make an artistic carver.

This example shows what may be accomplished by earnest application and perseverence, and it speaks well for the habits of the boys who inhabit that far-off northwestern part of this continent, if they are formed on the same lines as this "Mellville Lad."

It is a portion of their duty to be among those who will help this cause of proper fireproof construction upward. They must recollect that not only are there thousands of dollars consumed each year from this single cause in this country, but they must bear in mind that precious lives are too frequently sacrificed in these catastrophies that could be saved, if there was more intelligence and care exercised by both manufacturers of materials, and constructors of buildings. When each man considers himself a committee of one to enforce this law of right and duty, then we may hope to see a full realization of the age for which we are all so eager, that of the epoch of fireless disasters.

Design for A Small Country Church...
E.G.W. DIETRICH - ARCHITECT -
118 E 20th ST. NEW YORK





Floor Plan



Church to be Built near Washington D.C. E.G.W. DIETRICH ARCHITECT

118 E. 28th ST. N.Y. City

BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

THE CONSTRUCTION OF CONCRETE FENCE POSTS, prepared by the office of Public Roads, United States Department of Agriculture, Washington, D. C. Farmers' Bulletin No. 403.

The growing use of concrete has been the subject of much investigation and experiment in both public and private laboratories. Not only is the monolithic skyscraper the subject of much thought, but even the farmer's fence posts are carefully considered. In the bulletin under discussion, the experiments of the government engineers show that the cost of concrete posts does not vary greatly from the cost of wood posts under ordinary conditions, while the concrete post lasts practically forever without repairs or replacement, and after three months' curing are as strong as wood at the strongest and increase in strength while wood retrogrades.

Various forms of posts are shown and the drawings will enable one to manufacture the posts, either at home for use on the place or in a yard for sale to farmers and others. The Bulletin is sent free by the Department of Agriculture.

PLUMBING AND HOUSEHOLD SANITATION, by J. Pickering Putnam, member of the Boston Society of Architects and of the American Institute of Architects. Many illustrations, 718 pages. Price in cloth, $3.75 net, postage 35c.

A course of lectures delivered before the Plumbing School of the North End Union, Boston.

In common with most other authorities who have given close study to the science of sanitation, the author believes that the present laws and systems for caring for sewage and plumbing waste are susceptible to material improvement. As our present systems, designed during the few years, are utilizing the same principles in vogue almost back to the Dark Ages, if not Roman times, it would seem just that such revision be made as will bring the sanitation on a level with the more recent discoveries, inventions and methods.

In the course of the discussion, the author asks for simplicity, reducing the amount of unnecessary machinery, piping and fitting now connected with the fixtures, accessibility, exposing practically all piping, as a workman is certain to be more careful when his work is forever open to inspection; avoidance of mechanical obstruction, trapping the fixtures by a water seal only, and cutting out balls, valves, gates and other unnecessary obstructions; tightness and flexibility of jointing, making all joints permanently tight, and avoiding the use of substances which are apt to be injured by use, changes of temperature, shrinkage, etc.; soundness of material; thorough ventilation from end to end of soil and drain pipe; adequate flushing; automatic and noiseless operation, and economy and prevention of water waste. While all these principles are admittedly good, there is difficulty in finding the most practical method of obtaining the results, and still maintain the high standard of efficiency required under modern conditions. Too often leniency on the part of the engineer or inspector results in faulty work, thus causing the very defects it was intended to avoid, so it cannot be left to the workman to decide how a system can be simplified. The work calls attention to many matters which should receive careful consideration from law-making bodies, as well as engineers, architects and workmen. The experiments of the author show why these reforms are needed.

The volume contains a review of Dr. Teale's interesting work on "Dangers to Health." Did we not know that even worse examples are found in the country, it would be hard to believe that such conditions as are here shown were found in England. On the whole, it is possible that conditions in the better districts of the large cities are better than on the average farm, and it may be that a little well directed effort toward the improvement of "Farm Sanitation," would be well rewarded by increased health on the farm and purity of milk and other farm products.

The volume is the result of twenty-five years' research and study of sanitary plumbing from both the theoretical and practical standpoints. The simple and popular style in which it is written renders it of value to the needs of the general public as well as to legislators and sanitary engineers.

THE ENGLISH STAIRCASE; an historical account of its characteristic types to the end of the eighteenth century. By Walter H. Godfrey, architect, author of "The Life and Works of George Devey" and "The Parish of Chelsea." Illustrated from photographs by Horace Dan, etc., and from measured drawings and sketches. Published in London by B. T. Ratsford, 94 High Holborn street, and imported by Charles Scribners' Sons. Price, $7.50 net.

Few parts of a building, public or private, are more in view than the staircase, and none have received more attention from the architects and builders of modern times. The development of what might be termed "domestic architecture," was truly centered about the main hall and its staircase, and it is with the historical development from the early fifteenth century to the late eighteenth that the author especially treats.

At the beginning of this period there were but two commonly used styles of stairs, one a straight flight of enclosed stone steps, the other a winding circular stair, also of stone with little or no attempt at elaboration or ornamentation. In France the development of the stairway led to the most elaborate stone vaulting or brick work, while the tendency in England soon manifested itself in the form of woodwork in an open well.

The author has made a great effort to properly classify the work and characteristics of the various periods and has collected an exceedingly interesting number of illustrations to accompany the historical sketch. The charm of simplicity is shown as well as the ornate and magnificent, and the plates, as well as the measured drawings, faithfully represent the sequence of architecture during the periods included.

ELECTROPLATING. A TREATISE FOR THE BEGINNER AND FOR THE MOST EXPERIENCED ELECTROPLATER. By Henry C. Reetz. Pouplar Mechanics series. Price, in cloth, 25c.

This book is one of the series of handbooks on industrial subjects being published by the Popular Mechanics Company, and like the others which have been reviewed here from time to time, is written so as to be understood, not by the scientist but by the one who may have occasion to refer to it. The information contained is apparently correct and complete, and is intended to give brief and practical directions to those already engaged, or about to engage, in the electroplating business. Unnecessary technical detail is omitted, and yet such explicit directions concerning the actual operation are given as an old hand at the business would think might be useful to the beginner.

Among the subjects treated are plating with copper, nickel, silver and gold, as well as the necessary shop equipment, and preparing the goods for plating. A chapter is devoted to the treatment of accidents due to the use of the materials employed, many of which are extremely poisonous and dangerous.

PROPERTIES AND USES OF DOUGLAS FIR, by McGarvey Cline, Director Forest Products Laboratory and J. B. Knapp, Assistant District Forester. Published by the United States Department of Agriculture.

The purpose of the bulletin is to present the facts about the properties and uses of Douglas fir, as collected by the Forest Service.

Tests were made at the laboratories of various universities and other reports were obtained from many manufacturers and users. The tests made were very exhaustive and should be of value in future working with this material.

There are approximately 350,000,000,000 feet broad measure of Douglas fir in the western states, which makes it the leading American wood. The list of uses to which Douglas fir is put includes mine timbers, railway ties, bridge timbers, car material, all kinds of lumber for houses, furniture, boats, as well as miscellaneous commodities.

OUR HOME CITY, by William Arthur, author of "The New Building Estimater," "The Contractors' and Builders' Handbooks," "How to Build American Homes," "Everybody's Building Book," etc. 133 pages. Paper covers. Price, 25c.

The dream of the idealist has often centered on the model city, sometimes with a view of residence, sometimes business, and too often without fixed ideas at all. Seldom have we seen cities rise by a predetermined plan, or even follow well-thought-out lines. For the conveniences of today we can easily plan, but as even now our streets and cities are not ideal for automobiles, and practically no provision made for airships, how can we tell what our wants will be a hundred or even fifty years hence?

In this volume the author endeavors to interest the reader in advanced lines of thought regarding ownership of land and public utilities, sanitation, amusements, etc. It is proposed to lay out, where the topography will allow it, a symmetrical city, complete with wide streets, parks, boulevards, etc. In other words, lay out for a present population of 5,000 the municipal system which will serve as a center for the needs of an unknown population years hence. As we have no means of knowing what the future will develop, there is no way of determining which way the trend of population will be, or why. Should the town grow one-sided, it would mean expensive improvements wasted on the prairie, and possibly a city with two business centers.

The book is well worth reading, as it shows up many of the inherent defects in our present cities and towns. Whether it is possible to forecast the future sufficiently to obtain the necessary land before the real estate boomer gets it, is another question. The plan suggested would, if it worked out, alleviate many of the present day troubles, but the writer is reminded of a certain city in Asia designed and planned with the greatest foresight, only to pass from Russia to Japanese control before it was finished.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

994,091. Reinforcement for concrete construction. H. Brussel, assor. to Reinforced Concrete Co., St. Louis, Mo.

994,001. Sash-lock. Chas. Hunt, Newburgh, N. Y.

993,457. Metal-door construction. F. E. Nelson, Jamestown, N. Y.

993,930. Expanded-metal structure. H. E. White, assor. The General Fireproofing Co., Youngstown, O.

994,448. Track for door-hangers. H. L. Ferris, assor. Hunt, Helm, Ferris & Co., Harvard, Ill.

994,325. Truss-bar for concrete construction. D. Maxwell, Detroit, Mich.

994,336. Collapsible core for constructing hollow concrete walls. Wm. T. Redman, Brentwood, Md.

995,212. Door-closing device. Jno. P. Bair, Belvue, Kans.

995,008. Reinforced-concrete wall and like structure. Geo. W. Jackson, Chicago, Ill.

995,069. Reinforced concrete construction. H. L. Lewen, San Francisco, Cal.

994,961. Window-ventilator. J. Steinhelper, Williamsport, Pa.

995,665. Door-check. A. Danielson, Chicago, Ill.

995,673. Door track and hanger. Geo. J. Hatz, Omaha, Neb.

RECENT COURT DECISIONS

Where a subcontractor abandoned the work before it was completed, he could not maintain an action for the value of the materials furnished and the work done without justifying his default.—Berkstrom v. Ryan, 122 N. Y. S. 878.

Where the scaffold from which plaintiff fell was erected by inexperienced men, the boss directing the work, and with ordinary care he could have made the staging safe, the fellow servant doctrine does not arise.—Craesafulli v. Winston Bros. Co., 108 P. (Idaho) 740.

Where the scaffold from which plaintiff fell was erected by inexperienced men, the boss directing the work, and with ordinary care the boss could have made the staging safe, the question of assumption of risk does not arise.—Craesafulli v. Winston Bros. Co., 108 P. (Idaho) 740.

Where the scaffold from which plaintiff fell was erected by inexperienced men, the boss directing the work, and with ordinary care the boss could have made the staging safe, the question of contributory negligence does not arise.—Craesafulli v. Winston Bros. Co., 108 P. (Idaho) 740.

The surety of a firm of building contractors cannot escape liability on a bond for performance of a contract by the firm for the construction of a building for $37,994 on the ground that the owner should not have let the contract to a firm which had undertaken contracts to the amount of $200,000 on a capital of only $400.—Y. M. C. A. of North Yakima v. Gibson, 108 P. (Wash.) 766.

An excavation, made by an adjacent owner, so as to take away the lateral support, afforded to his neighbor's ground, by the earth so removed, and cause it, of its own weight, to fall, slide, or break away, makes the former liable for the injury, no matter how carefully he may have excavated. Such right of support is a property right and absolute.—Walker v. Strosnider, 67 S. E. (W. Va.) 1087.

Where competent men were employed to erect a scaffold for the use of themselves and co-employes, and suitable material was furnished therefor, and they were not instructed outside of a direction to construct it, and a co-employe not present when the scaffold was built thereafter fell and was injured on account of defective construction due to the use of improper material, the employer is not liable.—Muehlman v. Spokane & I. E. R. Co., 108 P. (Wash.) 764.

Where a subcontractor, having abandoned the work before completing his contract, filed a lien for the whole sum mentioned for the entire work, on the theory that the contract remained in force when the lien was filed, nearly a month after the work was abandoned, and that plaintiff was still continuing to perform it, such lien claim was inconsistent with the complaint, seeking to enforce the same for the reasonable value of plaintiff's work and materials on a quantum meruit.—Berkstrom v. Ryan, 122 N. Y. S. 878.

A building contract requiring the contractor to file receipts with the superintendent and owner showing that each subcontractor had been paid in full to the amount of the estimates, as per the certificate of the previous month, etc., does not require the superintendent or the owner to exact receipts for all claims for labor and material, a subcontractor being one who takes from the principal contractor a specific part of the work, and does not include laborers or material men.—Y. M. C. A. of North Yakima, 108 P. (Wash.) 766.

Where plaintiff owned a lot on which he intended to conduct a lumber business, and had contracted to pay for a stock of lumber, and paid the freight on the shipment, and had actually placed a small part of the lumber on his lot, his contract to sell the lumber purchased, and not to engage in the lumber business in the town for two years, was not a sale of merely a right to engage in the business, but valid under the rule permitting one to sell his business and agree not to engage therein for at least a limited period.—Sauser v. Kearney, 126 N. W. (Iowa) 322.

Where a bond for the performance of a building contract by the contractor reserved to the surety the right to complete the building in case of an abandonment by the contractor, and the surety waived such right after abandonment on condition that the contract for completing the building should be let to the lowest of three bidders who should give a bond for the faithful performance of the contract, and the building on the abandonment of the contractor was completed under a special contract let to the lowest of three bidders, the provision in the original contract for auditing the expense of completion did not apply to the special contract.—Y. M. C. A. of North Yakima v. Gibson, 108 P. (Wash.) 766.

In altering the condition of his land adjoining another's building by excavating the soil and replacing it with a structure, the owner must not only abstain from collateral negligent or wrongful acts, such as unnecessarily heavy blasting, digging out the adjacent wall, projecting heavy articles against the wall or building, and the like, but must perform the work with reasonable care for the safety of the adjacent building, such as diligence in the construction of his wall after having removed the soil, removal of the soil and replacement thereof with the wall by sections, if necessary as a measure of reasonable precaution, or the adoption of other reasonable and practicable precautions.—Walker v. Strosnider, 67 S. E. (W. Va.) 1087.

If an adjoining owner, about to excavate along the side of a building belonging to another person, for the erection of a building on his own property adopt, as a means of protecting the building, the cutting of a trench and construction of a concrete retaining wall therein four feet from the building along the side thereof, and then running directly to one corner thereof, and let the work of cutting the trench and constructing the retaining wall to contractors, under contracts, leaving to them no discretion as to where or how such wall shall be constructed, and such measure of protection does not amount to the exercise of reasonable and ordinary care for the safety of the building, and, by reason of such neglect, the building falls, the employer is liable.—Walker v. Strosnider, 67 S. E. (W. Va.) 1087.

Shingles Required in a Roof.

To the square foot it takes 9 if exposed four inches; 8 if exposed 4½ inches, and 7 1-5 if exposed 5 inches to the weather.

Find the number of shingles required to cover a roof 38 feet long, and the rafters on each side 14 feet. Shingles exposed 4½ inches.

$28 \times 38 = 1{,}064$ (sq. ft.) $\times 8 = 8{,}512$ shingles. Ans.

To find the length of rafters, giving the roof one-third pitch: Take three-fifths of the width of the building. If the building is 30 feet wide, they must be 18 feet long exclusive of projection.

The average width of a shingle is four inches; hence, when shingles are laid, four inches to the weather, each shingle averages sixteen square inches, and 900 are required for a square of roofing.

If 4½ inches to the weather, 800 will cover a square.
If 5 inches to the weather, 720 will cover a square.
If 5½ inches to the weather, 655 will cover a square.
If 6 inches to the weather, 600 will cover a square.

This is for common gable-roofs. In hip-roofs, where the shingles are cut more or less to fit the roof, add five per cent to above figures.

A carpenter will carry up and lay on the roof from 1,500 to 2,000 shingles per day, or two squares to two squares and a half of plain gable-roofing.

One thousand shingles laid four inches to the weather will require five pounds of shingle-nails to fasten them on. Six pounds of four-penny nails will lay one thousand split pine shingles.

By the "pitch" of a roof is meant the relation which the height of the ridge above the level of the roof-plates bears to the span, or the distance between the studs on which the roof rests.

The length of rafters for the most common pitches can be found as follows from any given span:

If ¼ pitch, multiply span by 559, or 7-12 nearly.
If 1-3 pitch, multiply span by 6, or 3-5 nearly.
If ⅜ pitch, multiply span by 625, or ⅝ nearly.
If ½ pitch, multiply span by .71, or 7-10 nearly.
If ⅝ pitch, multiply span by 8, or 4-5 nearly.
If full pitch, multiply span by 1.12, or 1⅛ nearly.

Safe Heights and Lengths of Brick Walls.

For first-class buildings (the workmanship being good), as a general average the walls should not exceed a greater number of feet in height than three times their thickness in inches, and the length should not exceed double the height, without lateral support or stiffening by pilasters, buttresses or wing walls, say for

	Safe height.	Length should not exceed.
8½-inch walls	25 feet	50 feet
13 -inch walls	40 feet	80 feet
18 -inch walls	55 feet	110 feet
22 -inch walls	65 feet	130 feet
26 -inch walls	75 feet	160 feet

When the length must exceed these distances, as in depots, warehouses, etc., the thickness must be increased, or lateral braces provided (such as pilasters or buttresses) and at as short intervals as practicable.

Direction for Using Mortar Colors.

1. The mortar must be cold before mixing in stains, but do not let stain freeze if liquid stain is used.
2. Keep soft in package by covering with water, and pour off before using.
3. Work in your stain thoroughly to have your color uniform.
4. For very fine work strain your stained mortar though a fine sieve.

PROPORTIONS FOR STAINING MORTAR BY WEIGHT.

A fair average for staining mortar for 1,000 bricks: Fifty pounds red, Windsor, terra cotta, amber, seal, fern geen or salmon; 40 pounds buff, brown, purple, French gray; 26 pounds black. By measure, one bucket of stain to seven buckets of mortar.

Facts Concerning Stone-Work, Brick-Work and Plastering.

STONE-WORK.

1. A cord of stone, three bushels of lime, and a cubic yard of sand will make 100 cubic feet of wall.
2. One cubic foot of stone-work weighs from 130 to 175 pounds.

BRICK-WORK.

3. Five courses of brick will make one foot in height on a chimney.
4. One cubic foot of brick-work with common mortar weighs from 100 to 110 pounds.
5. A cask of lime will make mortar sufficient for 1,000 bricks.

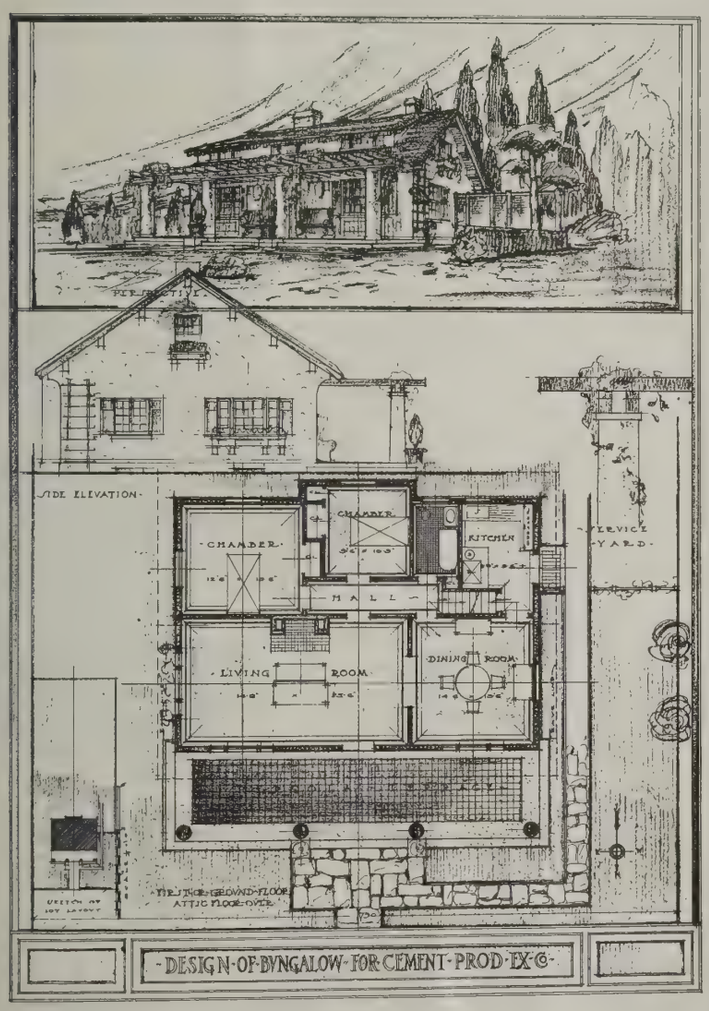
Walls laid up of good, hard-burned bricks, in mortar composed of good lime and sharp sand, will resist a pressure of 1,500 pounds per square inch, or 216,000 pounds per square foot, at which figure it would require 1,600 feet height of twelve-inch wall to crush the bottom courses, allowing 135 pounds as the weight of each cubic foot. It also appears from accurate calculations and measurements that walls laid up in the same quality of brick and mortar, with one-third quantity of Portland cement added to the same, are capable of resisting some 2,500 pounds per square inch, or 360,000 pounds per square foot; this would require a height of wall 2,700 feet to crush the bottom bricks.

THREE CONCRETE BUNGALOWS

The competition for designing a concrete bungalow held by the Cement Products Exhibition Company, 72 West Adams street, Chicago, closed on Saturday, June 17. A great number of designs were submitted by architects and draftsmen from all over the country. The plans have been on exhibition in the offices of the Cement Products Exhibition Company for the past few weeks.

The jury of award in the competition, consisting of Messrs. Hugh M. G. Garden, Sam A. Marx and Walter Burley Griffin, all of Chicago, made their report on June 21. The jury recommended that the amount of the first three prizes be divided equally among three of the contestants whose designs were given equal rank and were in the opinion of the jury of equal merit. The prize money was distributed accordingly, $100 being given to each of the following:

Frederick J. Meseke, New York City.
F. W. Kerrick, South Bend, Ind.
Harry F. Robinson, Chicago.

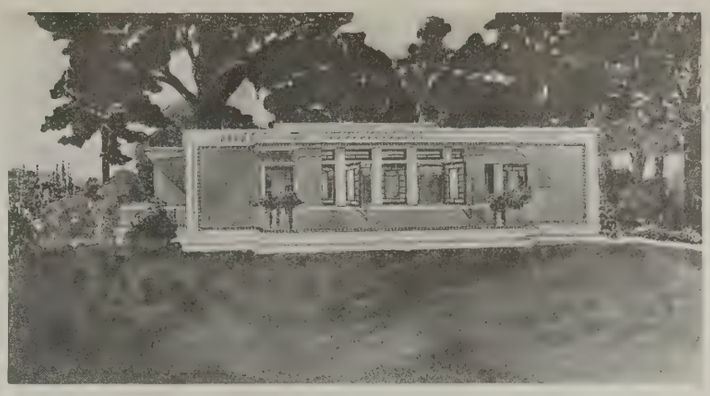


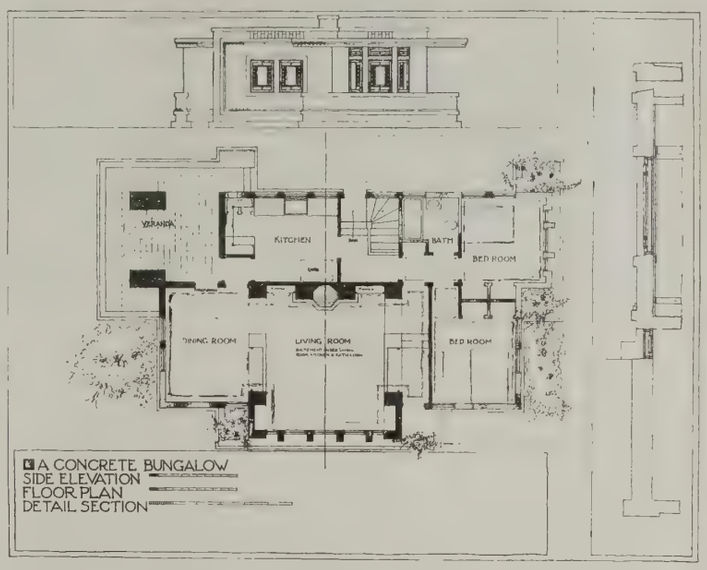
Favorable mention was made of the bungalow designs submitted by the following:

Mr. Drummond, River Forest, Ill.
E. S. Sommors, Chicago, Ill.

The competition was considered successful in every way, both by the Cement Products Exhibition Company, and the jury.

The program of the competition called for designs for a bungalow to cost $4,000, not including heating apparatus, plumbing, electric wiring or fixtures. The competition was open to any architect or draftsman desiring to enter. The bungalow was to have at least two bedrooms and a total of not more than five rooms and bath. The program called for foundations of plain or reinforced concrete, hollow cement tile or plain concrete blocks. The exterior walls and interior partitions were to be of monolithic reinforced concrete, hollow cement tile or concrete blocks and cement plaster on metal lath or wire mesh was also permissible on the interior partitions.





The principal object of the competition was to secure a suitable design for a cement bungalow to be built for Mrs. Lucile Bishop of Chicago, who won the prize bungalow at the Fourth Annual Chicago Cement Show, February last.





TRADE REVIEW

ACETYLENE GAS LIGHTING.

Farm life and the charm of the country is nearly always dimmed, literally and figuratively, by the quality of the lighting plants with which the buildings are equipped. Only a few years ago, candle light was about the only light, but there has been a vast improvement. Even the poorest now use oil lamps, and some, near cities and towns, can secure gas and electric lights.

To a great majority, however, the isolation of the farm house,



RESIDENCE OF W. J. BRYAN, LINCOLN, NEB., EQUIPPED WITH A DAVIS ACETYLENE GENERATOR.

and many village and town houses, precludes the use of either gas or electric light. To such the use of separate acetylene gas machines gives a lighting and heating medium superior to city gas or electric current, and at a less price.

Acetylene is a colorless, tasteless gas having a peculiar odor. It is generated from calcium carbide in a very simple and relatively small apparatus. Toy generators have been made no larger than a thimble, but for practical use, the generator and tank is about the size of a small stove. Calcium carbide, which is made by fusing coke and lime, needs only the addition of water to liberate the gas. The purpose of the generator, therefore, is simply to mix enough carbide with water to liberate the gas required. Connected with the generator as a rule is a tank to contain the manufactured gas, and to keep a



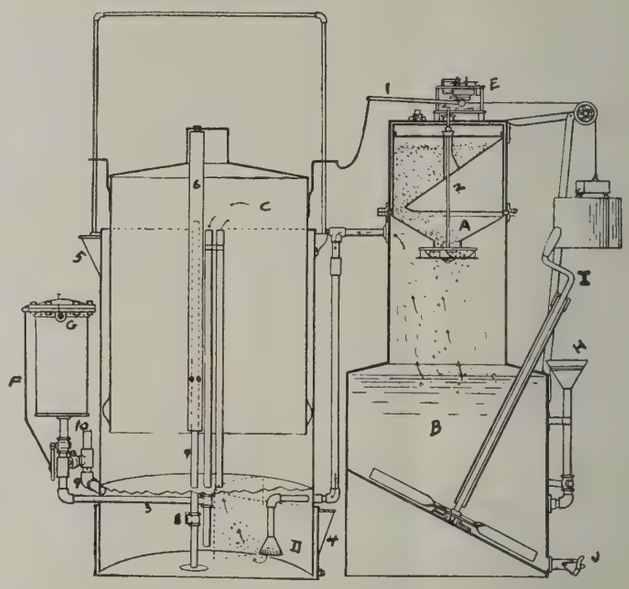
HOME AND SANITARIUM OF DRS. CROW & CROW, ELKHART, IND., EQUIPPED WITH A DAVIS ACETYLENE GENERATOR.

uniform pressure in the piping system. The piping system in the building is the same as for ordinary gas, except that only about one-fourth as much acetylene gas is required to produce the same light or heat as illuminating gas. For this reason the piping can be made smaller. The less gas consumed requires a special tip to the burner, but otherwise it is about the same in operation as the ordinary gas supplied in the large towns and cities.

Considerable apprehension has been felt regarding the danger of acetylene gas. There seems to be little warrant for this, as the limited amount of gas kept on hand, or which could be generated by carbide in the generator, would neither endanger the health of the occupants nor cause an explosion, In this respect it is far safer than ordinary gas, as the supply soon ceases while ordinary gas continues to flow as long as a jet is left open.

Installation of an acetylene plant is as simple as installing the gas piping in an ordinary house. The generator may be set up in the basement or other room where the water in it will not freeze. The generator is charged about once a week for a small house plant, the entire operation requiring only a few minutes.

The operation of the generator is well shown in the cut herewith. Various systems employ slightly different apparatus, but the principle does not vary greatly. The generating-chamber is shown on the right, the gas-chamber on the left. As gas is used the gas bell C gradually falls. When a certain level is reached the chain pulls lever 1 and trips the motor, which revolves shaft 2, plowing off a few lumps of carbide which fall into the water B as indicated.



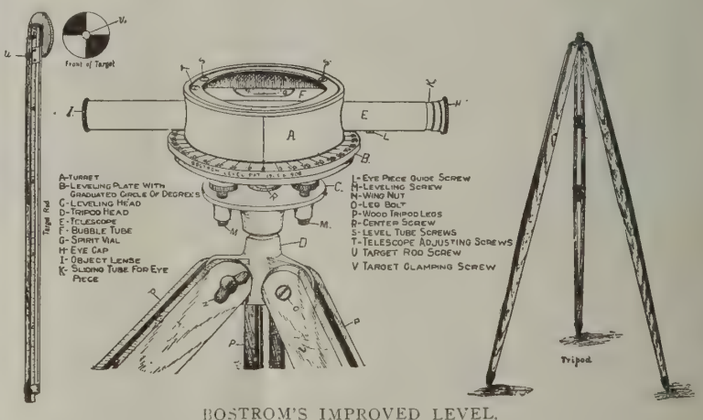
Acetylene is immediately formed, which rises and passes through the pipe, as indicated by the arrows, and enters chamber D, which is filled with water, the gas bubbles through this water and enters the gas chamber through the pipe as shown. As the gas in so doing releases the lever 1. Thus gas enters the bell C, and raises it and checks the supply of carbide. It is thus seen that the generator is automatic in its action.

There are a number of concerns manufacturing apparatus for generating acetylene gas. One of the best known is the Davis Acetylene Company, 35 Prospect St., Elkhart, Ind. A postal to them will bring such information as may be desired.

BOSTROM'S IMPROVED LEVEL.

The expressed appreciation of our readers occasioned by our calling attention to all new and improved equipment which they require, encourages us to be continuously on the outlook for improved equipment possessing real merit, and any article must have real merit before we give it recognition.

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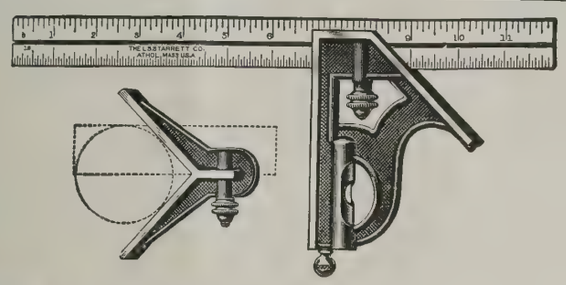
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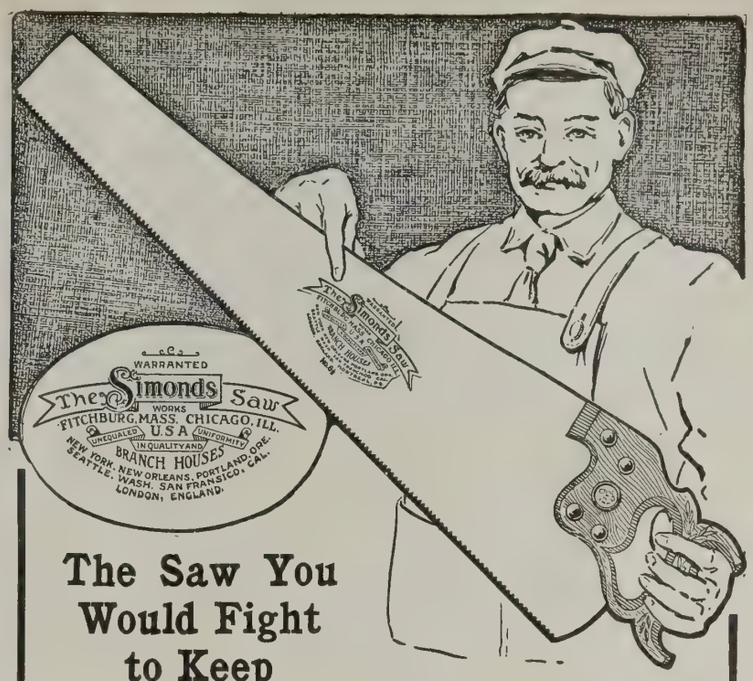
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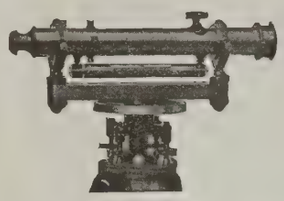


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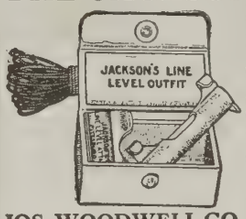
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This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

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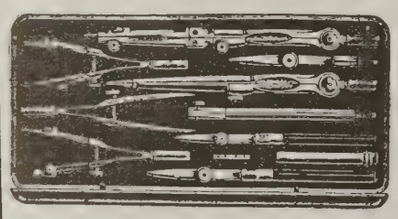
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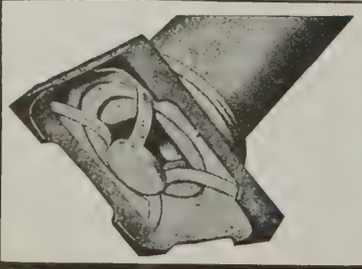


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Many times it is just as desirable to hold the door open as to keep it closed. A door check will close a door gently and keep it closed against ordinary wind pressure, etc., but they will not hold the open when required. Hotels, ball rooms and public buildings all have occasions when some one must be stationed to hold the doors open for a few minutes or several hours at a time.

The Caldwell Manufacturing Company of Rochester, N. Y., have just put on the market a very neat and effective device for holding a door ajar at any desirable point. The device consists of a slightly bronzed bolt, having a rubber bottom attached to the lower end, which by a spring—adjusted by the foot—holds the door in place. There is only one screw-head visible in the bracket which holds the device in place. The illustration shows the little attachment, and is about the same size as the article itself. It is not at all obtrusive or unsightly, as it is oxidized and not unshapely. It is held down, or released at will by the foot, and the rubber end presses against the floor and holds the door in position, no matter how smooth or polished the floor may be, and no injury is done the floor no matter how often the bolt is used. This device will be found very convenient for many places and will be as useful for carpeted as for bare floors. Further particulars as to price and styles may be obtained by addressing the company as above.

PLANNING AND BUILDING A HOME.

Who has not hesitated at the thought of the multitude of details to be considered, and at the result of a possible error in calculation, not so much perhaps at the danger to the stability of the building as to the increase of cost. Everywhere we see instances of buildings costing more than calculated, because not properly planned and thought out in detail, until it has become a by-word that the cost always overruns the highest estimate. The question arises—how much can this be cut down by careful planning?

But let us suppose that the plans and specifications are complete; that the owner understands exactly what he is to receive; and the contractor knows just what he must deliver. The building starts, and for a time all goes well—the local yards can supply plenty of the raw material, such as brick, stone, sand, cement, etc., but suddenly comes the need for frames, lumber, etc. Unless the contractor has been unusually forehanded there is a tedious delay reflecting on the business ability of the contractor. Too frequently these delays hold up the entire work until the arrival of a few pieces of material overlooked in the ordering.

If it were possible for the building contractor to foresee and to prevent the vexatious delays that are constantly occurring in the



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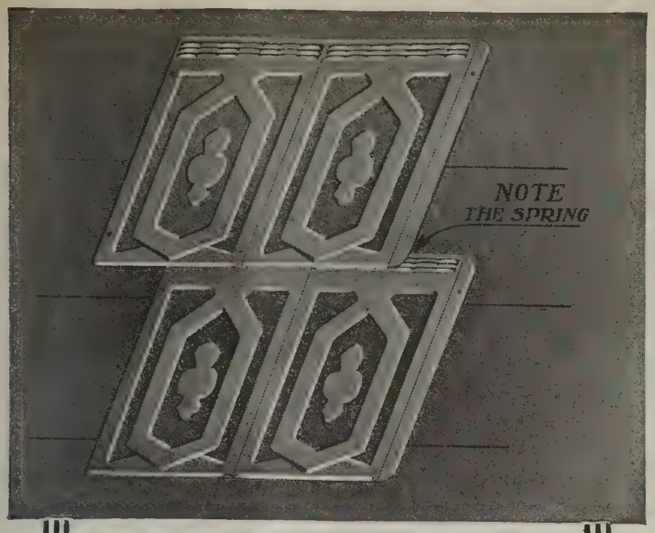
arrival of many shipments of materials and supplies, he would not only preserve his reputation, but there would be fewer disappointing discrepancies between his estimates and the actual costs of his completed contracts.

A high degree of that efficiency for which manufacturers in every line are striving today is impossible in the management of any contracting business unless careful account is taken of the enormous waste represented by time lost in waiting for deliveries of supplies and steps taken to eliminate this waste. Many a building job that was figured to net a fair profit has yielded the contractor a substantial loss instead solely because of delays on the part of his supply dealers to get his materials to him as needed. Many a contractor dares not undertake more than one job at a time because so much of his own time must be spent around freight depots and in writing letters and telegrams while his workmen must make such progress as they can without his personal direction and the aid of his expert knowledge.

The builder whose business is large enough to warrant his employing one or more men for the sole task of following up orders for supplies and seeing that the materials are shipped promptly and delivered according to a specified schedule has an advantage that his less prosperous rival cannot overcome while he is obliged to attend to that important detail in person.

Many builders have not the time to present to their clients their ideas concerning planning and construction. For a house costing well up in the thousands, the services of an individual architect are neces-

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



"Old-Fashion Iron" Shingles

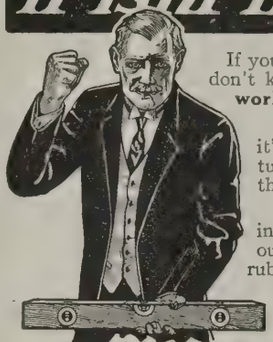
You can now buy metal shingles made of Empire "Old-Fashion Iron"—that means a roof that will give from 30 to 60 years of perfect service. Our Booklet No. 22 for the asking.



THE EMPIRE IRON & STEEL CO.

64 E. Lake St. CHICAGO | 350 Bert St. NILES, O. | 345 Fifth Ave. NEW YORK

If it isn't an Akron it isn't the best Level



If you've never used an Akron you don't know what it means to use **the world's best level.**

You can tell instantly whether or not it's an Akron, by two exclusive features—the Akron double spirit-tube and the Akron "quick finder."

The Akron Spirit-Tube consists of an inner tube of clear-as-crystal glass set in an outer tubing of heavy steam-gauge glass with rubber bearings between. This makes a tube that is practically unbreakable—one that never breaks with the falls and jars incidental to daily use.

The Akron "Quick Finder" is two fine silver lines around spirit-tube, one at either end of bubble when it is exactly centred. The workman can read an Akron level quickly, at any angle, with absolute accuracy even in a very dim light.

AKRON ECLIPSE LEVELS

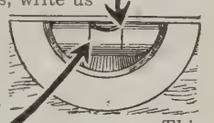


Made in 33 styles and sizes for carpenters, masons, concrete men and everybody who uses a level. Some are brass bound, some made with two plumbs, but all have the "quick finder" and double spirit tube. They cost no more than the ordinary kind, but they last longer.

See those 2 lines around spirit-tube?

Sold by Hardware Dealers Everywhere

If your dealer does not sell Akron Eclipse Levels, write us for catalog, mentioning dealer's name. Mail orders will be filled direct at lowest retail price where there is no Akron dealer.



This quick "finder" shows L-E-V-E-L or otherwise, instantly

TRADE MARK AKRON ECLIPSE SPIRIT LEVEL

The Baker, McMillen Co.
Dept. A, Akron, Ohio
U. S. A.

ASBESTOS "CENTURY" SHINGLES

"THE ROOF THAT OUTLIVES THE BUILDING"



Asbestos "Century" Shingle Roof—Stable, Theodore M. Davis, Newport, R. I.: Architect, Theodore Davis Boal, Washington, D. C.; Contractors, Simpson Bros., Corp., Boston, Mass.

For the sake of your building investment ask these four questions about every roofing material

1. What protection does it give the building from fire, weather and time?
2. How long will it last?
3. Will it need repairs and painting?
4. What does it cost, including UP-KEEP CHARGES?

And remember this, Asbestos "Century" shingles are the only TRULY indestructible roofing known to the building trade. Made of REINFORCED CONCRETE. They are fire-proof, time-proof, weather-proof.

You can get Asbestos "Century" Shingles in shapes to suit any architectural style—in several sizes—and in three colors: Newport Gray (silver gray), Slate (blue black), and Indian Red. Ask your representative roofer about this indestructible roofing—or write us. Send for booklet "K. & M. 1911." It will settle your roof problems to your great satisfaction.

The Keasbey & Mattison Company, Factors **Ambler, Pa.**



These Samples Free

—write for them

Everybody interested in a Material for Roofing and Siding Buildings should have them, because they show exactly the reasons for the great success of

READY-TO-LAY **Burmite**
(Reg. U. S. Pat. Off.)

FLEXIBLE-CEMENT-BURLAP INSERTED **MATERIAL**
for Roofing and Siding

These samples are not cut from material made up especially for advertising purposes, as is so often the case—they represent the exact weight, lasting qualities and artistic appearance of "Burmite" as it goes out from our plant every working day of the year, in the two separate surfaces, i. e.,

BIRD-SAND and "Twolayr" SLATE-CHIPS
(PATENT PENDING)

Recognized and acknowledged to be the most Durable, Practical and Inexpensive for use on Buildings of any kind of construction. **Guaranteed for 10 years without Coating,** and if properly laid will last from 20 to 25 years. **"Burmite" lasts longer than shingles—costs less, lays smoother, looks nicer and requires no paint to preserve it. Can be laid over old shingles or tin;** is odorless, will not "run" on steep roofs; and on account of its unusual flexibility, is especially well adapted to flat or uneven surfaces.

Used in any climate, can be applied in cold or hot weather without danger of buckling, expanding or contracting.

WRITE TODAY for Samples and Booklet,

"Burmite Quality Counts"

illustrated with buildings printed in colors showing beautiful effects of "Burmite" applied as a Roofing and Siding on Residences, Cottages, Summer Homes, Bungalows, Garages, Barns, etc.



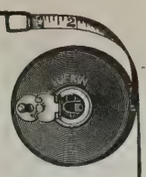
Bermingham & Seaman Co.
Roofing Mfrs.
Tribune Bldg.
Chicago

Request for Samples and Booklet, "BURMITE QUALITY COUNTS"

Name..... Street..... City..... State..... N. B.

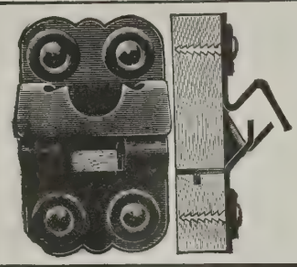
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN
Steel Measuring Tapes



With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catologue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor

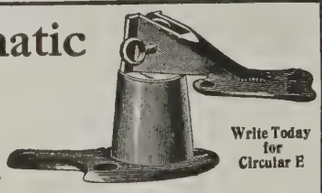


THE WATROUS No. 18 SAFETY SASH HANGER
EASIEST AND QUICKEST TO SET

Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.

E. L. WATROUS MFG. CO., Des Moines, Iowa

Whipple's Automatic Blind Hinge



Reasons Why THEY ARE THE BEST { Cannot slam or blow off. No fastening required. No blinds to trim or catches to interfere. Will hold blind—open, half open or closed.

Write Today for Circular E

We also manufacture a flush hinge, constructed on same principle
Two styles, for brick or wood buildings

R. P. WHIPPLE & CO. 277 Main St., Springfield, Mass.



The Window Chute
FOR BUILDERS OF MODERN HOMES

Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

HOLLAND FURNACE CO.
HOLLAND, MICH.

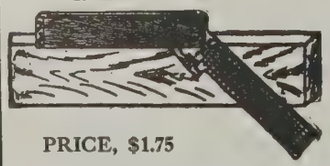


Electric Light Systems
for RESIDENCES, STORES, HOTELS, CHURCHES
or any building not connected with a city plant.

Low cost to install and operate. Just press button for flood of light. Electricity for door bells, burglar alarms, flat irons, vacuum cleaners, etc., can be had from the same plant. Architects, contractors and builders write for our special proposition for installing the first plant in your town.

JOHNSTON MANUFACTURING CO.
Makers of the "Best" Water System for Country Homes.
No. 6-A Eleventh Street, - KANSAS CITY, MO.

Topp's Framing Tool
A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.

PRICE, $1.75

G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.



Van Dorn's Steel Joist Hanger Has no Equal

Send for Catalogue

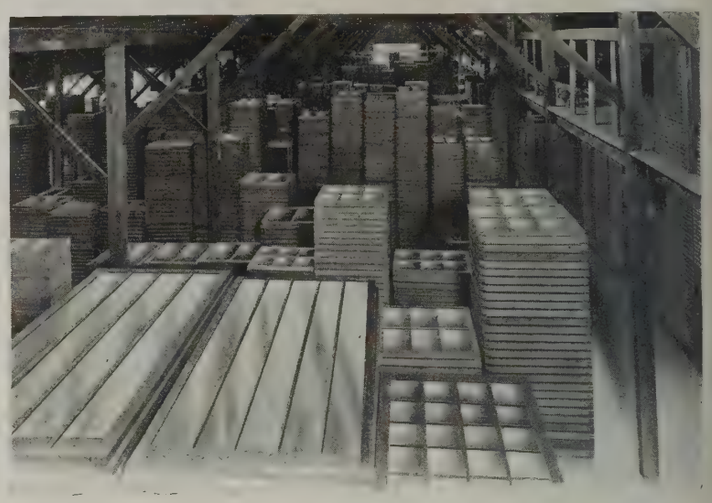
THE VAN DORN IRON WORKS CO.
CLEVELAND, : : OHIO
Structural Steel and Ornamental Iron Workers



No. 1—Steel Joist Hanger for Wood Header.

No. 4.—Steel Joist Hanger for Brick Walls.

sary, as the owner has his own ideas concerning arrangement, which would not be of interest to another owner. To many others, economy is a necessity and the greatest economy can be exercised by using one of the standard plans, on which a large amount of individual architectural work has already been expended with a view of utilizing all the space, regular lengths of material, standard sizes of doors,



A CORNER IN SASH WAREHOUSE. 100,000 WINDOWS, GLAZED, READY TO SHIP.

windows, trim, etc. With such a plan it is possible to list the materials required with great accuracy, so that the assembling and shipping is greatly facilitated.

Minor changes in plan or construction can easily be made, adapting each plan to the individual taste of the owner, at the same time causing no delay in getting out the material.

There are advantages in purchasing the bulk of the material from one concern. When properly listed fewer mistakes in packing, marking and shipping are made, and the material filling one or more cars goes forward with few delays and without danger from loss through transshipment. Sufficient material is always on hand, so there are no delays from lack of material.

A concern catering to the building trade in this manner is able to keep a sufficient supply on hand to fill all orders, thus giving exceptional service to each individual case. The quantities for which a large concern can place orders insures a flexibility through standardization which cannot be obtained in individual orders.



SHIPPING DEPARTMENT NO. 1. ESPECIALLY EQUIPPED FOR HANDLING CARLOAD ORDERS. CAPACITY, TWENTY CARLOADS A DAY.

The plan followed by Sears, Roebuck & Co. provides the contractor or owner with the services of architects of the highest ability in the design of economical buildings. The service is without cost and can be only obtained when used in conjunction with a large concern such as this. Briefly, the plan is as follows: The intending purchaser secures a copy of the Book of Modern Homes, which is sent free by writing to Sears, Roebuck & Co., Chicago, and mentioning the national builder.

The Book of Modern Homes is the product of the best skill of a corps of high class architects employed by Sears, Roebuck & Co. and contains pictures and plans of nearly a hundred bungalows, houses and cottages of every modern type, adapted to the requirements of every climate, and embodying all the newest ideas in home building. The intending buyer, having selected from this handsome book the house he desires to build, has only to send a dollar to the firm to receive a complete set of blue prints, specifications and bill of materials. (This nominal charge of $1.00 is credited upon the customer's first order for materials.)

A new feature of the builders' supply service lately perfected by Sears, Roebuck & Co. is designed to afford a complete solution of

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

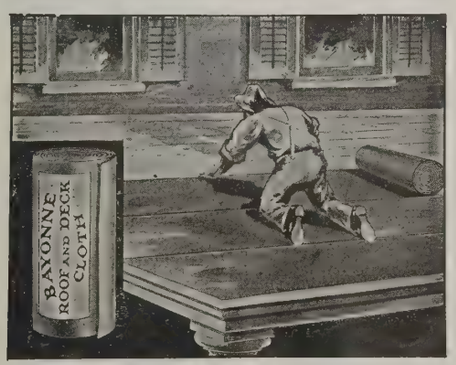
The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instruction for laying
BAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.

A Roof of Slate is the Best Roof You Can Buy



On Churches, Schools, Public Buildings, Dwellings, Barns or Buildings of any kind—a roof of slate improves property values and lowers fire insurance costs; and where drinking water is collected off the roof, **it is the safest roofing obtainable.**

—As a roofing material of solid rock slate still stands supreme; not because it **costs** less, for the **first** cost is a trifle more than for shingles, iron or felt, but because it **never** wears out nor requires repairs.

Sea Green or Purple Roofing Slate

is absolutely impervious to climatic conditions. It resists the action of air, water, snow, ice, fire, sun and lightning; it cannot warp, crack, splinter, or decay. It is perfectly water-tight, and once laid—will outlast the building it covers.

Write to Us for Delivered Prices

on all sizes and grades of roofing slate delivered at your nearest railroad station. Also prices on Slater's tools and supplies.

Ask for FREE Book of Instructions

We solicit correspondence—even if you won't require the slate until later. Write to us today—now.

American Sea Green Slate Company

"Roofs that Never Wear Out"

Box 150 **GRANVILLE, NEW YORK**

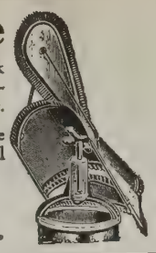
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

With Its Back to the Wind and the upward sloping opening in the back taking the full force of the wind, the Iwan Volcano Revolving Chimney Top makes a sure draft on the chimney.

Mountings can be bought separately and the hood and vane can be made in your shop according to patterns furnished free with all iron mountings. Sizes 6 to 12 inches.

Prices and catalog sent promptly.

Iwan Brothers, 1509 Prairie Avenue, **South Bend, Ind.**



ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS



and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa



CALDWELL SASH BALANCE

Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.

"Diamond N" Expansion Shields



Have increased holding power on account of the corrugated ribbed exterior surface.

Securely clamped together without the use of springs or wires.

A better shield at the same price.

DIAMOND EXPANSION BOLT COMPANY

90 West Street, corner Cedar, - - - NEW YORK

50 Cents

For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO.
321 N. May St., CHICAGO

this aggravating problem. It provides that every order for a bill of house materials shall immediately on its receipt be turned over to a trained order man, who becomes virtually the customer's personal representative in the house, being charged with the duty of following through the warehouses and factories every item included in the order and seeing to it that the materials are laid down at the contractor's freight depot promptly as needed and in perfect condition. The tracer's responsibility extends to every article included in the bill of materials, from lumber to paints and varnishes.

Among those who have not followed the remarkable growth of building supply business of this firm much wondering comment has been caused by its advertisements appearing in current issues of the national builder.

Through the editor, the company offers the explanation that no advertisement, or series of advertisements, can give more than a suggestion of the almost unlimited service they have organized for the benefit of the builders. Only an examination of the Sears, Roebuck & Co. building material and millwork catalogue can give an adequate idea of the variety and extent of its stock and manufacturing facilities.

In more than a score of factories which it either owns outright or whose entire output it controls, this great merchandise institution produces every kind of building material required in modern construction work, excepting only brick, plaster and cement, and not forgetting to include gasoline engines, wood working machinery, carpenters' tools and concrete block making machines.

A condensed list of builders' supplies manufactured and sold by Sears, Roebuck & Co., being priced in every instance at the actual cost of making, plus one single profit, embraces the following:

Dimension and finishing lumber, including flooring and siding, shingles, etc., in all suitable woods, shipped from great lumber yards



SHIPPING DEPARTMENT NO. 2. ESPECIALLY EQUIPPED FOR HANDLING LESS THAN CARLOAD ORDERS. CAPACITY, TEN CARLOADS A DAY.

in the central west or from their southern mills adjoining the choicest timber lands in the country.

Mill work of every description, manufactured in a plant modernly equipped and with facilities for shipping 1,500 doors, 3,000 windows and other materials in same relative quantities during one working day.

Roofing of felt, asphalt, flint coat and corrugated steel.

Bathroom fittings and plumbing goods of all kinds.

Paints and varnishes, wall paper, mantels, wood, tile and brick, consoles, metal ceilings, tile floors and walls, builders' hardware, art glass windows, parquetry floors, ornamental fencing, lighting fixtures, electrical goods, lightning rods and pumps.

By means of lot numbers every piece of material is easily checked from the blue prints against the bill of materials and the catalogue and wherever any minor change in the plans is desired by the builder he has only to substitute other materials by selection from the catalogue. Thus the finished building will express, when completed, his individual tastes, ideas and preferences to the last detail, at the same time including in its design and construction every improvement sanctioned by the most skillful architects and the best informed builders.

The reader is reminded that the foregoing is merely an outline of the plan under discussion. To secure further information, it is only necessary to write to Sears, Roebuck & Co., Chicago, Ill., mentioning the NATIONAL BUILDER, and the fullest information can be secured, as well as the Book of Modern Homes.

NIAGARA

12″ Wall Tie Galvanized for Stone, Brick and Concrete Block Walls

Made in two widths, 1 3-16″ and 2 3-8″

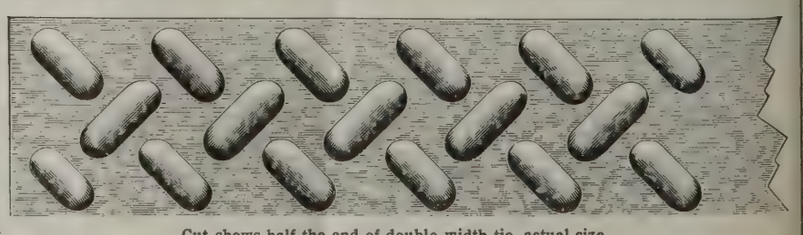
We have introduced into these Ties principles that give them the strength of the keystone, and with top and bottom both bedded in mortar, nothing but a break can move them. Samples mailed to interested persons. Folder 11-M.

NIAGARA FALLS METAL STAMPING WORKS

Manufacturers of Hardware Specialties

NIAGARA FALLS, N. Y., U. S. A. 11-M

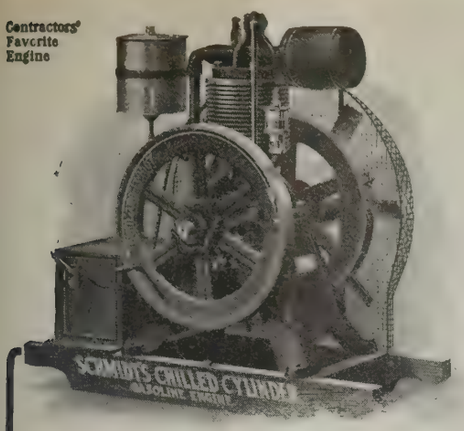
Wall and Veneer Ties, Wall Plugs, Sash Pulleys, Sash Chain, Sash Fixtures, Embossed Sheet Metal Letters and Figures



Cut shows half the end of double width tie, actual size

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Contractors' Favorite Engine



SEND NO MONEY—Don't send us a cent when you ask us to ship this engine. Remember it is air cooled and the easiest engine to handle.

$7.50 and You Keep This Great Engine

Yes, sir, that's right—you keep this engine for $7.50, a wonderful gasoline engine offer, an offer without a parallel. We ship you Schmidt's Chilled Cylinder Gasoline Engine on your simple request without an order or any promise from you. You use the engine 10 entire days, use it all you want to. Then if you don't want it, send it back at our expense. If you do wish to keep it, pay us **only $7.50 and the rest in the easiest monthly payments. We send you the engine free,** to prove that it is the greatest **air cooled** 3-horse power engine on earth. It is the only engine with the marvelous, powerful **chilled cylinder.** The only small engine with a **spark retarder.** The new type gasoline engine that has revolutionized the gasoline engine industry. The only engine good enough to send out on **actual free trial** without a cent down in any way.

Ten Days' Trial FREE—This is the first genuine free trial ever offered on gasoline engines for farm and shop use. We want you to see that women and children can run this engine. Use the engine to run any machinery you have—the pump—lathes—saws—drills—hoists—concrete mixers—anything. Engine is ready to run when you get it. We will send you prepaid our sensational offer and our very useful book, "How to Use Power," free.

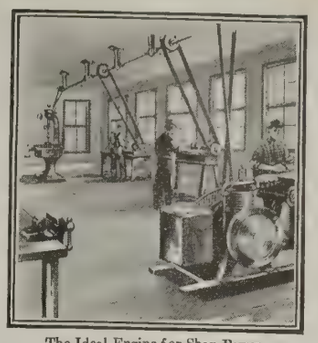
5 Years Guarantee—Schmidt's Chilled Cylinder Gasoline Engine is absolutely guaranteed for 5 years in every piece and part. The biggest bank in Iowa backs our $1,000 challenge offer.

Long Time to Pay

If you like this engine after trying it out for 10 whole days you can keep it and take long time to pay for it on **easy monthly payments,** or after using it free for 10 days, just send it back at our expense.

How to Use Power

To all who will write promptly we will send our useful book, "How to Use Power," free. Send us your name and address today.

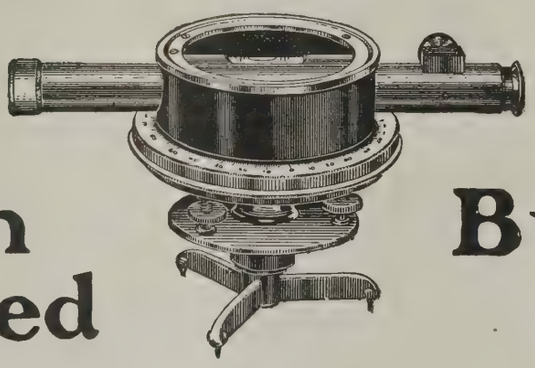


The Ideal Engine for Shop Power

Schmidt Bros. Co. Engine Works, Dept. 697X, Davenport, Iowa

EVERY CONTRACTOR

LARGE OR SMALL WOULD BUY A



Bostrom Improved Builder's Level

If he would just drop us a line to ship him one for inspection and approval. We say that because we have never known a Contractor, Builder, Architect, Surveyor, Civil Engineer, or even Instrument manufacturer to inspect a BOSTROM LEVEL who did not concede that at the price there had been nothing yet produced which would compare with the Bostrom in all the necessary essentials of a simple, accurate, durable and throughly dependable Level

Another thing, the Bostrom Level possesses means of adjustment for proving its accuracy, not surpassed by the highest priced Engineer's Level, and this principle is applied in such a novel and simple manner that even the inexperienced operator can **prove his work right on the spot,** and it can be done in a mere fraction of the time required to prove the accuracy of any other level, regardless of the price.

You have to examine the Bostrom Level to appreciate all of its merits, but the above feature alone makes sales on sight, and a sale always means a Bostrom endorser.

We back up every statement we make with a GUARANTEE of satisfaction or money back.

Our terms are cash with order, or shipment made C. O. D. SUBJECT TO EXAMINATION. Prices: No. 3, $25.00; No. 4, $30.00, f. o. b., Atlanta. Shipping weight 15 lbs., and complete outfit includes Level, Tripod, Graduated Hardwood Rod (not furnished by any other manufacturer without extra charge), Target and Plumb-bob, Trivet, and neat oak box for keeping Level when not in use. Eyepiece in No. 3 Telescope has magnifying power of 10 to 12 diameters, with sliding focus; and eyepiece in No. 4 Telescope has magnifying power of 18 to 20 diameters, with rack and pinion focus.

If you are needing Level at once, order direct from this article, as we do not even require you to guarantee express charges (and no other instrument manufacturer ever made such an offer). We don't hesitate to do it, as we have shipped thousands of Levels in that manner, and the enthusiastic endorsements of these purchasers gives us the unlimited confidence that the Instrument will please you. If you are not needing Level right away, write for full description and get acquainted with the Bostrom before buying. Bostrom's Levels are used and endorsed in every State in the Union, and are rapidly taking the place of instruments much higher in price, and you owe it to yourself to inspect the Bostrom before buying.

BOSTROM-BRADY MANUFACTURING CO.

126 Madison Avenue **ATLANTA, GA.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Gale Wall Safe



It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.
No Home or Apartment House complete without one. It has a combination lock.

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Fred Liebrich, Agent for Cook County, 1102 Monadnock Bldg., Chicago, Ill.

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saves cord, weights, pulleys and materials—no pockets—easier to install—for old or new windows. Send for sample and catalogue today. Agents wanted. Sold by the hardware trade or direct from 277 Broadway, New York.

Automatic Sash Holder Co.

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Slate Blackboards Guaranteed Strongest and Best Finish

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PHŒNIX INSIDE SLIDING BLINDS

COMFORT CONVENIENCE ECONOMY

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.
Write for Catalog P-T.

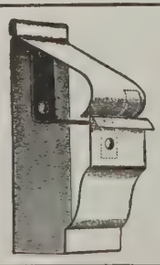
PHOENIX SLIDING BLIND CO., PHOENIX, N. Y.

BUNGALOWS

Over 4,000 Builders and Architects bought copies of the second edition of "California Bungalow Homes" during 1910. Half of them wrote back that the book was worth many times its cost. New (3rd) edition is just ready. Price $1.00 postpaid. Send for a copy. The Bungalow *is the thing*, and this is the only book published which shows the REAL California Bungalow inside and out. Better send at once.

Smaller book, showing 38 Bungalows and floor plans, 25 cents postpaid.

The Bungalowcraft Company, 407 Chamber of Commerce, **Los Angeles, Cal.**



Cassens Ideal Eaves Trough Takes Water Only

The Ideal completely overcomes the disadvantages of the old style open gutter. It satisfactorily catches and carries away the water that falls on your roof. Its use insures clean, healthful cistern water. Leaves, trash, gravel, etc., cannot enter it. Neither can birds build nests in it. Therefore it is never clogged. Ice will positively not break down the trough

A unique and important feature of the IDEAL is that it will not fill with snow and ice. When it sleets the small opening (about one-eighth inch) is quickly closed. This prevents the bursting of the trough, also of the down spout. When it thaws the ice melts, and the entrance opens automatically before the water from the roof reaches it.

The Ideal can now be erected with a Wire Hanger if face-board has mouldings.

Special Propositions to Contractors, Builders and Architects

WRITE FOR FREE BOOKLET

CASSENS MANUFACTURING CO., Edwardsville, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

EXTENSIVE ADDITIONS.

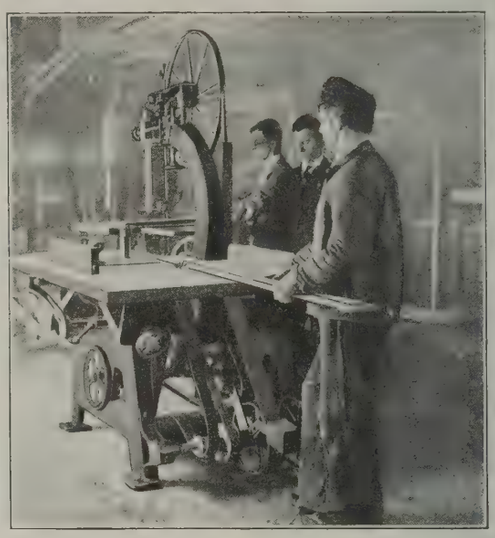
We are pleased to learn that the Niagara Falls Metal Stamping Works are compelled to again enlarge their plant. For the third time in seven years they find their shops too small to accommodate their increasing business.

The new buildings now under construction will give them a basement 60x100 feet with ample headroom for new and heavier machinery, as well as a large fireproof vault for storing dies.

By the latter part of August their new plant will be in operation and they believe that it will be one of the best equipped in the country for specialty jobs.

TANGIBLE PROOF OF WOODWORKER EFFICIENCY.

We want to call the attention of those carpenters, builders and contractors who desire to quit making planing mills rich, to the letter and illustration reproduced below. It tells graphically how one contractor got a complete machine shop when he installed one machine, and how his every requirement has been met and satisfied.



Ogdensburg, N. Y., April 20, 1911.

The Sidney Tool Co.,
Sidney, Ohio.

Gentlemen:

By this mail I am sending you a picture of the No. 20 Universal Woodworker that I installed this winter. It is without exception one of the finest and most compact machines of its kind on the market.

One of the most desirable features is that I can work three men at one time without interfering, as the picture shows. The work I have to do is the heaviest kind and have found that the machine will stand up under severe strain and also do the finest work and at the same time occupies very little floor space.

I certainly recommend this machine to any one needing a first class woodworker. Thanking you for the courtesies shown in the past and trusting to be able to be of some service to you, I remain,

Respectfully yours,

CHAS. C. IVES.

The machine referred to in above letter was the famous Universal Woodworker, built by the Sidney Tool Co., Sidney, Ohio, who inform us that over six hundred of their woodworkers are in use, and that not one has ever been returned for repairs.

Their No. 14 machine, which they claim is a special favorite among contractors, embodies the qualities of sixteen individual woodworking machines, and performs each class of work as good as a machine built expressly for doing only one kind of work.

To read the foregoing a person's imagination would conjure up a machine very complicated, very delicate and very difficult to understand. But, strange to say, the reverse is the case. The principle of construction is so unique that complicated and delicate parts are conspicuous by their absence. As a matter of fact, there is practically nothing about the machine that could break down or cause trouble in any way. In operation it is so simple that any machinist possessing a rudimentary knowledge of woodworking machinery can operate it with ease. The bare fact that out of the six or seven hundred in use not one has ever caused the least trouble, is sufficient evidence of its durability.

It costs nothing to get full particulars of this remarkable machine if you mention THE NATIONAL BUILDER. The Sidney Tool Co., Sidney, Ohio, state they will be extremely glad to answer any question concerning it.

NON-BREAKABLE LEVELS.

The value of a level is determined not so much by the cost of the materials that are used in its making as by its wear-resisting and fall-resisting qualities.

In this regard the Akron Eclipse Level no doubt excels all others, for its double spirit tube is practically unbreakable. It will stand the falls and jars incident to daily use without the least danger of breaking. In Akron Levels the spirit tube proper is encased in an outer tube of heavy steam gauge glass, with rubber bearings between the tubes. Then the spirit tube is suspended in the laminated wood frame by two brass arms, making it far less liable to break than any ordinary level.

Another exclusive feature of Akron Levels is the use of two fine silver lines around the spirit tube, one at either end of the bubble, to define the exact center. This leaves nothing to guesswork

Build Artistic Stairways From Gordon-Van Tine Stock!

Save 50%! Special Millwork Catalog FREE

Our Stair Department Will Save You Big Money

Through our ceaseless efforts of selling reliable stairwork at cost plus one small profit, we have been able to produce and sell stairwork at prices which leave a handsome profit for the contractor. In our Grand Free Millwork Catalog we itemize individually, each and every article required for the stairs, and explain fully just how this material comes to you and attach net prices. With this information at your command, an infinite variety of arrangements of stairs can be figured within a few moments, and you know the exact cost without entrusting your interest to any outsider.



A Flight of Stairs Complete for **23.93**

The fact that part of this material is already machined ready to go right into the stairs, reduces the erecting cost very materially. We use only thoroughly kiln-dried material in making up the different parts of this stair stock, and only the most skilled and expert mechanics are employed in the production of the finished article. By using kiln-dried lumber you avoid any of the annoying effects of shrinking or coming apart of the stairs after they are put in the building. The itemized list for a flight of stairs which is given on this page, shows you at a glance how reasonable the material for a complete stairs can be purchased.

The fact that you have had no previous experience in the stair building line should not deter you one moment from learning its simplicity now. If there are any points which are not practically clear to you regarding the proposed stair for which you are in the market, write us, and we will give you the advice of an expert stairbuilder.

Vast Assortment of Oak and Yellow Pine Stair Material

Our stock designs of Stair Newels, Rails, Balusters, Steps, Risers, Face and Wall Stringers and miscellaneous materials in Oak and Yellow Pine is very complete. A line which is at once adapted to the swell and modest cottage or most elaborate home.

Correct in Every Detail

We call particular attention to the style of construction, for instance, of our posts; the correct size of all mouldings, in order that the assembled effect may be harmonious and complete. Likewise, the turning of the balusters and shape of rails are especially adaptable for these specific purposes.

With the styles illustrated, an infinite variety of arrangements of stairs is permissible, and it is a very rare exception when special work will be required for any particular purpose. Our designs are modern and up-to-date. All Newels are hand smoothed and made from thoroughly kiln-dried stock. All carvings are handmade and not composition ornaments. Every Newel from one-inch lumber, with glued lock joint. Height of all starting Newels 4 feet, with 8x8 base and 6x6 shaft, suitable for open or closed stringboard. Base of post, 20 inches long, allowing one or two risers. Every Newel wrapped in paper and carefully packed. The stock is all thoroughly machined, well kiln-dried and can be shipped promptly.

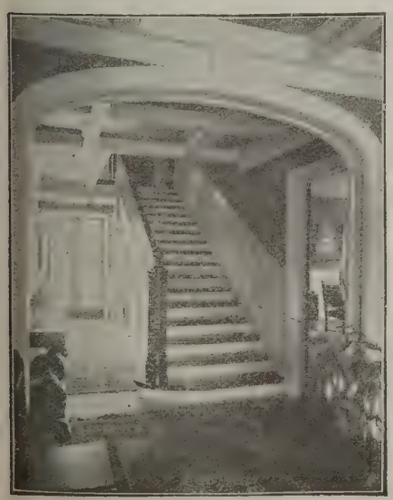
List of Material Required for Stairs Shown Above

E349	14 feet Face Stringer	Yellow Pine @	$0.06½	$0.91
E731	10 feet Wall Stringer	" "	.05	.95
E8421	7 feet Base	" "	2.80	.20
E725	18 ft. Wall Stringer, Extension	" "	.01½	.27
E8420	26 feet Base Moulding	" "	.82	.21
E347	13 Steps	" "	.40	5.20
E961	2 Landing Steps	" "	.15	.30
E726	1 Round End Step	" "	2.90	2.90
E727	14 feet Return Nosing	" "	.02	.28
E348	15 Risers	" "	.20	3.00
E8060	75 feet Scotia	" "	.30	.23
E336	1 Newel	" "	2.57	2.57
E341	2 Angle Newels	" "	1.60	3.20
E343	14 feet Rail	" "	.11	1.54
E962	12 feet Fillet	" "	1.00	.12
E345	11 Balusters, 28-inch	" "	.08½	.94
E345	13 Balusters, 32-inch	" "	.08½	1.11
	Total Cost			$23.93
	Dealers' Prices			90.00
	Saving to You			$66.07

This Saving of $66.07 Should Appeal to You

You get a high standard of workmanship, superior qualities of lumber, choice designs, prompt shipments and ***guaranteed safe delivery***. You get low freight rates and quick delivery. These are facts, and should appeal to you at once. Send us your order for Stairs today.

YOU WILL BE SATISFIED AND SAVE $66.00 OR MORE



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Buy Building Material From Us at Wholesale Prices

Write for the Gordon-Van Tine Catalog of Millwork, Sash, Doors, Lumber and Builders' Hardware. We Save our Customers a Million Dollars a Year.

Many of the most successful Contractors and Builders in the United States buy from us exclusively. We guarantee quality, satisfaction and safe delivery.

Give us a trial order.

Get our latest Catalog. The prices speak for themselves.

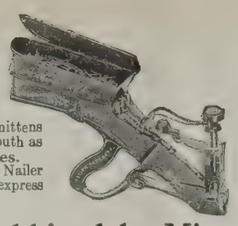
GORDON-VAN TINE CO., 585 Federal Street

DAVENPORT, IOWA (129)

We have been in the Building Material Business since 1865

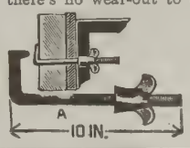
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COLD WEATHER TROUBLES IN SHINGLING
OVERCOME BY
Pearson's Nailer



for it works as well in one season as another. Wear your gloves or mittens and (with it) drive more nails than you ever did. Quit using your mouth as a nail pouch. PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 wire nails, and the Red Nailer is for the galvanized 3d, No. 13, 1¼-in. wire nails. $5.00 each, express prepaid. Money cheerfully returned if Nailer is not as represented.
Write for Circular "N."
PEARSON MFG. CO. : Robbinsdale, Minn.

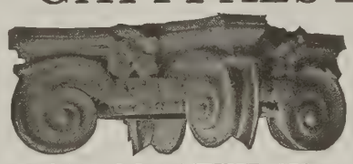
$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)
THE TAYLOR STEEL SCAFFOLD BRACKET
ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalogue of Builders' Specialties
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POUGHKEEPSIE, N. Y.

LOW FREIGHT RATES
On Machinery and Household Effects
That's what we can offer SHIPPERS from points east of the Mississippi River destined to Interior and Pacific Coast Points by our plan of shipping in CARLOAD LOTS. Latest maps of any principal western state free on application by addressing Forwarding Department of the
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INTERIOR AND EXTERIOR CAPITALS and Ornaments
Plastic Relief Work a Specialty



Most Complete Catalog ever issued
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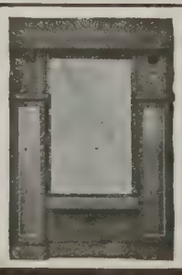


DON'T ORDER
Lignine (Wood) Carvings, Unbreakable
INVESTIGATE
Send postal for FREE sample and catalog. One cent investment saves dollars. LET US PROVE THIS.
ORNAMENTAL PRODUCTS CO.
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Wood Carvings for Interior Finish



SEND 15c for catalogue showing 1,000 designs on Ramps, Easements, Newel Posts, Mouldings and Balusters.
Write Today
WADDELL MFG. CO. 67 Colbrook Street Grand Rapids, Mich.



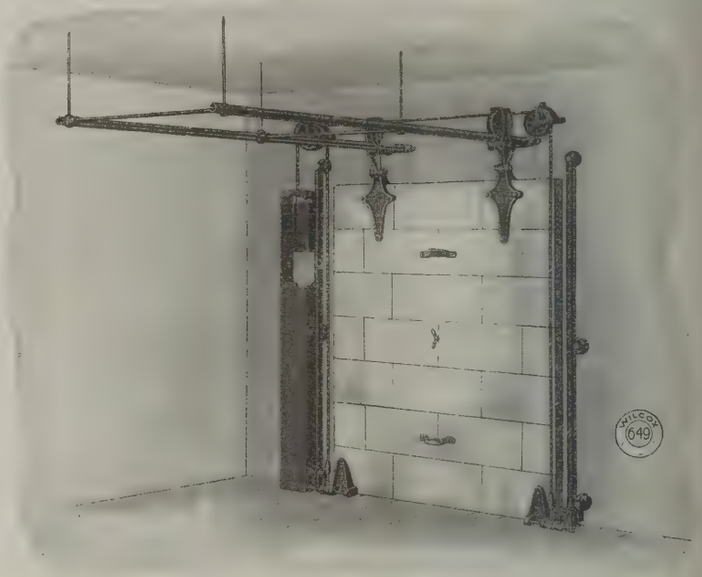
Consoles, Columns and Grilles
add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.
SEND FOR CATALOG No. 16
It contains many beautiful designs of Consoles, Columns and Grilles.
NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

and makes it possible to read the level in any position and even on a dull, cloudy day. Akron Levels are made by the Baker, McMillen Co. of Akron, Ohio, who are pioneers in the level industry of America, and have undoubtedly done much to bring the spirit level up to its present state of efficiency.

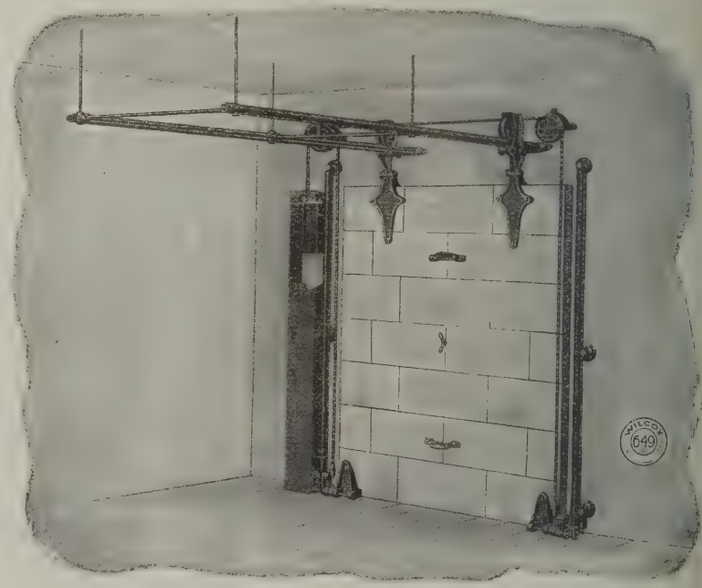
A catalog of Akron Levels and full particulars may be obtained from the Baker, McMillen Co., Dept. A, Akron, Ohio, mentioning THE NATIONAL BUILDER.

RICHARDS-COLBY HORIZONTAL TROLLEY DOOR FIXTURES.

The Richards-Wilcox Manufacturing Co., Aurora, Ill., are offering the "Wilcox-Colby" Horizontal Trolley Door Fixtures. Builders frequently have doors to hang where the headroom is not sufficient for vertical doors and obstructions prevent the use of regular sliding doors.



This device is also provided with an automatic fusible link device for tin-clad fire doors. The simplicity and ease of operation make this a desirable proposition. We suggest our many readers, if interested, write the above company regarding this "Wilcox-Colby" device and in writing mention THE NATIONAL BUILDER.



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Von Gerichten Art Glass Co.
Designers and Workers in Decorative Glass
Quality not Quantity
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Workers in Art Glass and Mosaics.
Catalogue Free

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6 Months' Free Trial



Hand and Foot Power

Mechanics' Special—will not draw temper

Don't take our word that this tool grinding, buffing and polishing outfit will save money for *you*. We offer you 6 months' absolutely *free use* of this outfit in your own work on your own tools, and let you prove for yourself that it is a money-saving and money-making outfit for any tool user. Use it a whole half year free, and if you don't find it a money-maker for you, send it back. The half year's use will not cost you a cent. If you want to make your own work and the work of the men you hire count for the most profits, how can you neglect this liberal offer? Return the coupon at bottom of page for 6 months' free trial offer.

Luther Tool Grinders

6 times faster than emery wheels
25 times faster than grindstones
Built like a high grade lathe



Special attachments enable inexperienced persons to sharpen Chisels, Twist Drills, Etc.

The genuine Carborundum wheels will not draw temper from tools; no need of cooling with water—all your tools will last longer, which means that much money saved. The wheels cut hardest steel as emery does soft copper—it is only a moment's work to do any job of tool sharpening, so easy in fact that tools are always kept razor-keen and that means more work accomplished with less effort, which means more money saved. The wheels outwear any number of emery wheels and that means another money-saving.

11 Tools in One

consisting of Mechanic's Special, built like a high-grade lathe, with steel and malleable construction, machine cut spur gears, bronze bearings in oil bath, etc., and the following accessories: rough Carborundum wheel, fine Carborundum wheel, 1 chisel attachment, and 1 twist drill attachment by which inexperienced persons can sharpen chisels and twist drills, 1 polishing spindle, 1 buffer, 1 polisher, 1 oil stone, 1 Carborundum hone in leather case, 1 Carborundum scythe stone, 1 foot-power attachment.

Return this Coupon for 6 Months' Free Trial Offer

This perfected sharpening, polishing and buffing Mechanic's Special Outfit is a business and labor economy—can you afford to neglect our liberal offer? Return this coupon for 6 Months' Free Trial Offer, and free booklet reprinting the story of Carborundum as it appeared in McClure's Magazine.

LUTHER GRINDER MFG. CO.
1508 Madison St. Milwaukee, Wis.

COUPON

LUTHER GRINDER MFG. CO.
1508 Madison St., Milwaukee, Wis.

Please send me free and prepaid your free Carborundum booklets and 6 months' free trial offer on Mechanics' Special outfit.

Name.....

Address.....

Dealer's name.....

Address.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

IS A MOTOR DRIVEN VEHICLE A GOOD BUSINESS INVESTMENT FOR CONTRACTORS AND CARPENTERS?

We have been asked the above question so often by our subscriber friends that we are led to believe that at this time an open statement will be more or less timely. This is an age of speed. It makes no difference the line of business one may be in. There is always competition. The "low man" (price and quality being the same) always gets the work. To be "low man" necessitates careful figuring and low cost. Contractors



who have under way several pieces of work often find they are unable to adequately superintend the construction of a number of different jobs, especially if they are all scattered. Inadequate superintendence always means more or less mistakes, etc. To this kind of a contractor a motor driven vehicle is almost a necessity. The day has passed when an annual small contract or so would provide sufficient remuneration. Today the contractor must have a number of contracts. The more he can handle the greater his profit. It is almost impossible to specify at all clearly just what contractors it would pay to invest in a motor driven vehicle. This depends on the amount of work in hand, the amount of the original investment in the vehicle and the "up-keep." Perhaps the most generally used of these motor vehicles is the motorcycles. It supplies the owner with even greater speed in "getting about" than an automobile, and the "up-keep" cost and original investment is much smaller.

The writer recently talked with a contractor who used such a machine in his work and he stated that he would be lost without same. Out of curiosity he had figured the maintenance of his machine and found that same amounted to about one-eighth cent per mile traveled. This, of course, is much less than even street car fare. The machine he has is a "Harley-Davidson," made in Milwaukee, and is equipped with a luggage carrier, which enables him to carry bundles or packages, not exceeding 200 pounds in weight. He further states that many contracts have been secured by him through his ability to get to see the prospect. It is but a few moments' work for him in the evening, and pleasant work at that,



to run a few miles and call upon the prospective builder. Of course, this same service could be obtained with the aid of an automobile. One large contractor who owns an automobile has told us that his automobile has more than paid for itself and its "up-keep." We do honestly believe that a motor driven vehicle of some sort would pay a handsome dividend to every contractor. It certainly is a matter worth looking into.

The above photograph was taken of a private dwelling near Wauwatosa, Wis., which was demolished by an explosion of gas. The roof is supported only by the center partition. Although the sides of the house were peeled off like card board by the force of the explosion, the windows in the attic are not even cracked. The writer and friend were on the scene ten minutes after the explosion, thanks to their Harley-Davidson motorcycles.

Henry Danielson, a prominent contractor of Milwaukee, originally used an automobile almost entirely for getting around in his work. Finding that a motorcycle was much less expensive he changed to a motorcycle and found that it was altogether more desirable than the motor car. Any of our subscribers who are especially interested, should write to the Harley-Davidson Motor Co., 707 L street,Milwaukee, Wisconsin, and get in communication with contractors who can give them more information regarding this subject, than herein given.

NEW METAL WORK CATALOGUES.

The Empire Iron & Steel Co., Niles, Ohio, are making advance announcement to the trade of two new catalogues showing their products.

The first contains upwards of fifty elegant half-tone illustrations of cornices and skylights, with appropriate descriptions and other information regarding this class of work.

The second catalogue comes from the Ceiling Department, and calls particular attention to ten new ceiling dies which have recently been added to their former large equipment. These ten designs are particularly prepared for "The Empire" in French Renaissance, Colonial, etc.

These art catalogues will soon be ready for distribution, and we are advised that copies of either catalogue will be sent immediately on publication to those mentioning THE NATIONAL BUILDER. As the demand will undoubtedly be large, it is suggested that requests for catalogues be made at this time.

HOT WEATHER TOOLS.

With the first day of warm weather the Editorial Department of THE NATIONAL BUILDER received from the Simonds Manufacturing Co. what appeared to be a box of fine cigars. The illusion was perfect, but a close inspection revealed the fact that the present was Japanese fans, which opened into a close representation of a buzz-saw. The pleasure of using these fans is the same as is supposed to come from the use of other tools bearing the Simonds name.

We understand that the mention of THE NATIONAL BUILDER to the Simonds Manufacturing Co., Fitchburg, Mass., will bring one of these beautiful presents.

A UNIQUE SIGNATURE TRADE-MARK.

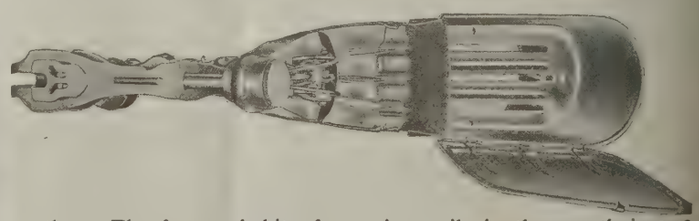
FOX MACHINE'S CO.'S products are too well known to readers of THE NATIONAL BUILDER to require any particular mention at this time. The value of a trade-mark is a subject of much discussion, but it is conceded that it has a value in calling attention a particular gods and names. In this case, the Fox Machine Company has an ingenious method of signing their name, as shown at the head of this item.

The use of a symbol of this character, which is so perfectly adapted to the firm name, goes a long ways toward impressing the name on the public. It is the unusual which always attracts attention, after which there must be real merit in order to be of value. The Fox Machine Company have long been known as the manufacturers of the Fox Universal Wood Trimmers, and to keep their name before the users of carpenters' tools are sending a neat souvenir button bearing their trade-mark. We understand that this unique ornamental button will be sent free by the Fox Machine Co., 26 N. Front St., Grand Rapids, Mich., if THE NATIONAL BUILDER is mentioned.

SHINGLE NAILING MACHINES.

When one mentions driving nails by machinery the thought instantly arises that there must be a cumbersome apparatus necessary to do all that the human hands do in picking up a nail, holding it until the first blow of the hammer starts it, and finishes it with a harder blow. Is it possible a two-pound machine, so simple it can really be called a tool, can take the place of the hand and do the work well? That it is possible is answered by the thousands of Pearson Nailers in steady use.

The Pearson Improved Nailer can be used on a roof of any pitch. Its use allows the operator to wear gloves or mittens during severe



weather. The former habit of carrying nails in the mouth is also discontinued, as the nailer contains a pocket for several pounds of nails.

The cut herewith shows a top view and section of the nailer, showing the device for selecting the nails and getting them down to the plunger which sets them.

But the only way to really know this tool is to own one. The next best is to write to the Pearson Manufacturing Co., Robbinsdale, Minn., and by mentioning THE NATIONAL BUILDER, full information will be sent free.

Amatite ROOFING

Why the buyer of Amatite never complains

When a man buys ordinary ready roofing he usually neglects to paint it, and after three or four years he comes back to the dealer with a protest. It is human nature to neglect painting roofs

When a man buys Amatite Roofing he lays it on his building and in three or four years it is still as good as new and does not need any paint. He forgets he has such a roof, but no harm is done by that.

There is nothing to neglect in the case of Amatite. Amatite has a peculiar surface—a sort of plastic concrete made of pitch and mineral matter.

This surface is plastic enough so that the material can be rolled up into handy rolls in the usual manner and handled just like any other ready roofing. When unrolled on the roof and nailed down, it presents to the weather a continuous surface of mineral matter and pitch. On this surface wind, rain, storm heat and cold have little effect. Year after year it looks up to the sky undisturbed and unaffected. It costs nothing to maintain and relieves the owner from all responsibility.

Dealers can improve their business by selling Amatite, and buyers make a good bargain when they buy it. The price of Amatite is less than that of most painted roofings of less weight and durability.

Sample free on request.

Address our nearest office.



BARRETT MANUFACTURING COMPANY

NEW YORK CHICAGO PHILADELPHIA BOSTON ST. LOUIS CLEVELAND PITTSBURG CINCINNATI
KANSAS CITY MINNEAPOLIS NEW ORLEANS SEATTLE LONDON, ENG.

It's A Question of Cost

and the first cost is not all important—it's the first cost **plus repairs.**

"Buckeye Brand"
RED CEDAR SHINGLES
Reduces Roofing Cost

because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

R. J. MENZ LUMBER CO.
SEATTLE, WASH., U. S. A.
Pacific Coast Lumber and Timber Lands — MENZ TIMBER GOLD BONDS — Buckeye Brand Red Cedar Shingles
Profit Sharing Interest Bearing Deed Protected

For PUBLIC BUILDINGS



CORTRIGHT METAL SHINGLES

Have proven more adaptable than any other form of roofing, because they harmonize with all styles of architecture.

They combine every advantage found in other kinds of roofing, and have many exclusive features of their own.

The demand for them is large and ever increasing.

Your customer is bound to like them, for they last as long as the building, and never need repairs.

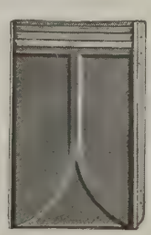
You are bound to like them, for they are as easily laid as wood shingles.

You stand to make just as much money handling them, and probably more than with other forms of roofing.



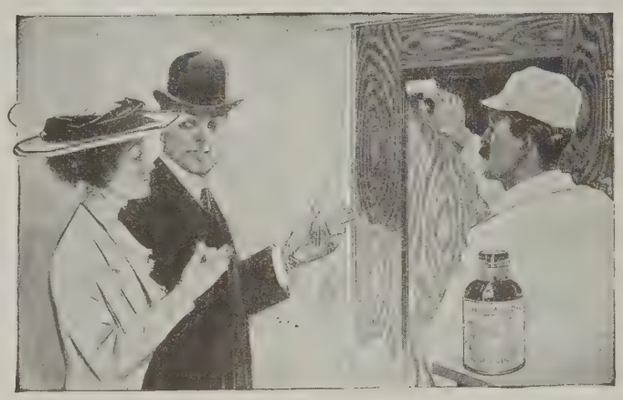
Send for our proposition to contractors.

Cortright Metal Roofing Company
Philadelphia and Chicago



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Write Us Now For Free Samples of Johnson's Artistic Wood Finishes



Johnson's Wood Dye

is not a mere surface stain—but a deepseated dye, penetrating the wood and fixing a deep, rich, permanent color entirely different from ordinary stains, which are only "skin deep."

Made in the following fifteen attractive shades.

No. 126 Light Oak
No. 123 Dark Oak
No. 125 Mission Oak
No. 140 Early English or Manila Oak
No. 110 Bog Oak
No. 128 Light Mahogany
No. 129 Dark Mahogany
No. 130 Weathered Oak
No. 131 Brown Weathered Oak
No. 133 Green Weathered Oak
No. 121 Moss Green
No. 122 Forest Green
No. 172 Flemish Oak
No. 178 Brown Flemish Oak
No. 120 Fumed Oak

Half Gallons—$1.50 each

When used with Johnson's Prepared Wax or Johnson's Under-Lac, inexpensive soft woods such as pine, fir and cypress, may be made as beautiful and artistic as costly hard woods.

Ask your dealer for free samples of any shade of Johnson's Wood Dye and test it, or write us and we will send them from Racine.

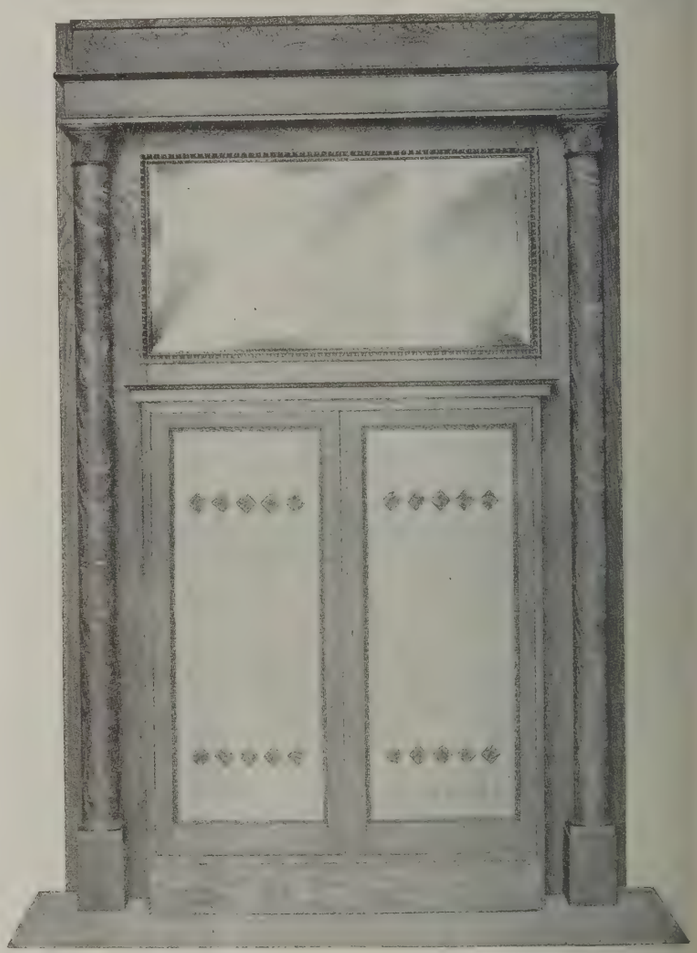
Free Instruction Book, Edition N. B.-8
Sent on Request Also

S. C. Johnson & Son, Racine, Wisconsin
"The Wood Finishing Authorities"

ORNAMENTAL GRILLES



When there is a place for a grille in the house, there is every reason why the design and finish should harmonize with the rest of the furnishings. How often we find a grille perfectly suited to a log cabin or summer house doing service in a mansion. It is not a question of expense so much as knowing that grilles can be had to fit any opening, and to harmonize with any style of ornament. At the head



of this article we are able to show an excellent design from the No. 16 catalogue of the Northwestern Grille Works, 1824 Milwaukee avenue, Chicago, Ill. The same company also make an excellent line of mantels, consoles, etc., of new and original design. The bookcase and mantel shown herewith is an excellent substitute for the antiquated fireplace so often seen in modern homes.

We are advised that the mention of THE NATIONAL BUILDER will secure one of these beautiful art catalogues for those interested.

STAY LOCKED COLUMNS

The manufacturer of any article of wood intended to be exposed to the weather requires the consideration of the severest exposure to which the finished product will be subjected. After the work leaves the shop it is too late to find that it is going where it is subject to severe rains, fogs, dampness or dry, hot weather, or perhaps a succession of other unfavorable conditions. We say unfavorable—perhaps we should say severe—conditions, for if the work stands, it cannot be called unfavorable.

Possibly no part of the building is more exposed than the porch columns, or pergolas. Through sun and storm they must not only retain their strength, but their appearance and dignity. Weather joints, cranks, warping, swelling and shrinking are all forbidden in good work. But the question is, how can we prevent all these disfiguring effects of the weather?

In the manufacture of the Stay-Locked Columns the American Column Company of Battle Creek, Mich., claims to have reached the practical limit of perfection. Not only is the joint locked and glued,

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

but by a patented method they are able to join the separate staves with steel staples driven in after the column is glued up.

As practically all the art of the ancient Greeks and Romans was based on the proportions and appearance of the columns, how neces-



sary it is that the column of today should be as faithful a representation of our ideas as was the ancients. Its use in porches, mantels, pergolas and other supports and ornaments entitle it to the most careful thought in designing it.

As instances of the class of work made by the American Column Company, we are able to show a pergola erected in their plant, where



t is seen from all the passing trains, and also an excellent example of long columns used in a Florida residence. Many other excellent examples of their work and methods of construction are shown in heir latest catalogue, which we believe is sent free to all interested, provided this magazine is mentioned.

CRESCENT WOOD WORKING MACHINERY.

Among the new features shown in the latest catalogue of the Crescent Machine Company, we find a 30x6 inch surfacer, guards for band saws, two more sizes swing saws, two more sizes jointers, and a post borer. A novel feature of the last is that it is arranged with a variable friction drive in place of the usual bevel gearing. This adapts the machine for running at high speed when using small bits and slow speed for larger bits.

A very complete line of power machines for all classes of woodworking is shown, and the catalogue should be before everyone interested in this line of manufacture. If you are not on the mailing list for this and future publications, advise the Crescent Machine Company, 10 Main street, Leetonia, Ohio, and they will keep you informed regarding their new products.

AN AUSTRALIAN SKYSCRAPER.

(From Consul General John P. Bray, Sydney.)

A contract has been signed in this city for the erection of the Culwulla Chambers, a block of business premises and offices, the cost to be about $590,000 and to be completed in two years.

The building will comprise 13 floors, with a roof garden and caretaker's quarters in addition. The ground floor is taken up with three spacious shops, with separate basement quarters. In addition to the usual elevator, provision has been made for an express elevator, which will take its first stop at the sixth floor. Other provisions are an electric freight elevator, 2,800 pounds capacity; a 5,000-gallon water reservoir for fire protection, which can be filled by an automatic electric pump in 3 minutes; a large vacuum cleaner in the basement, driven by an electric motor, and with tubes to all the floors; and letter-box tubes to each floor.

This 165-foot building will be the loftiest of its kind in the Commonwealth. The ground-floor piers are to be in polished trachyte, the first and second floors in freestone, and the remainder in red open-kiln bricks with freestone dressings. The internal joinery is to be Queensland maple, limed and waxed.

Write Us Now For Free Samples of Johnson's Artistic Wood Finishes



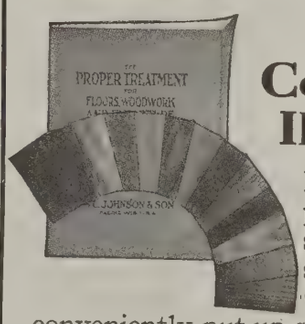
Johnson's Paste Wood Filler

is made in five shades for filling the grain of all wood, soft and hard. Manufactured from the best and most expensive silex, linseed oil and best Japan dryer and guaranteed to give satisfaction.

All wood which is to be finished natural should be given a coat of Johnson's Natural Paste Wood Filler No. 10 and a finish-wax, Under-Lac and Wax or Under-Lac and Varnish.

We recommend the use of our colored shades of Paste Wood Filler where a golden oak, dark oak and Antwerp finish is desired on hard woods, also for use over Johnson's Wood Dye where a filled grain effect is desired.

Ask your dealer for a free sample of any shade of Johnson's Paste Wood Filler



Johnson's Color Panels and Illustrated Book

Let us send you free a complete set of wood panels showing all shades of Johnson's Wood Dye on various woods. These panels are conveniently put up so that you can easily show them to prospective customers. By doing so we are sure you will procure many contracts at profitable prices for work to be finished with Johhson's Artistic Wood Finishes. The dye *always* matches the panels.

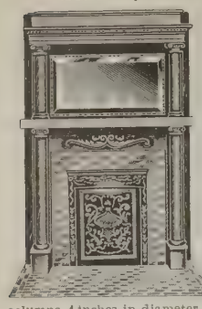
We will also send you a copy of our new book illustrated in many colors and containing color plates of the dye. This book gives full instructions for finishing and refinishing all wood—soft and hard. It is invaluable. Call upon your leading paint dealer for samples, wood panels and book. Or write us giving your dealer's name and we will send them to you from Racine. Ask for booklet Edition N. B.-8.

S. C. Johnson & Son, Racine, Wis.

"The Wood Finishing Authorities"

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Save $15.00 on a Mantel.



Our mantels and consoles are designed by master artists who specialize in cabinet work.

Our catalog shows more than two score up to date designs of every type and grade. It is yours for the asking. Why not ask?

A single instance of our ability to cut prices on high grade mantels is this

Luster Polished Quartered Oak Mantel, $21.60.

Shipped from our factory in Ohio. Sold regularly at $35.00 to $40.00. Price does not include tile or grate. See below.

Dimensions, 7 feet high, 4½ feet wide, with wall plates set to 5 feet. Quartering veneered columns, 4 inches in diameter. Beveled plate mirror, 36x18 inches.

Full set of Enameled Tile for this mantel, $2.94.

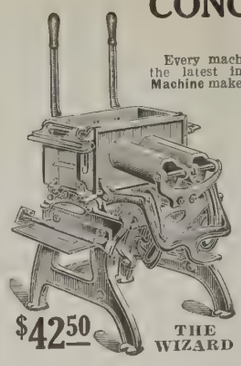


Coal Grates, $2.93 to $12.97.
Gas Grates, $4.83 to $9.33
Oxidized copper and Berlin black finishes.

CONCRETE MACHINERY

At Record Breaking Prices.

Every machine in our large line of concrete machinery embodies the latest improved mechanical features. Our **WIZARD Block Machine** makes more blocks in less time than any other on the market.



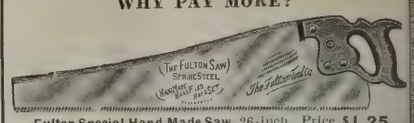
Concrete block making as a side line offers big money making opportunities for the contractor and carpenter. Hundreds of builders are engaging in it.

The illustration shows one of our Wizard Cement Block Machines, made in two models. Its equal in point of construction and capacity cannot be bought elsewhere for less than $80.00. Our low price of $42.50 for this up to date machine, with complete outfit of face plates, pallets and attachments for molding all kinds of blocks, sets a new record. Our line is complete and includes other machines at $13.95 up.

Our Special Concrete Machinery Catalog quotes the lowest prices ever made on concrete building block machines, silo block machines, sill and cap molds, concrete brick machines, molds for concrete porch material, such as ornamental columns, piers, rails, balusters, etc.; molds for well curbing, sewer and drain tile, fence posts, etc., and concrete mixers. Be sure to get this catalog. Just ask for our Concrete Machinery Catalog.

NO BETTER TOOLS MADE.

WHY PAY MORE?

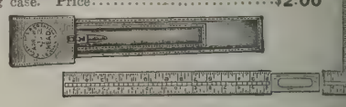


Fulton Special Hand Made Saw, 26-inch. Price, **$1.25**



Fulton Jack Plane, 15-inch. Price..**95c**

Take Down Square, new pattern, blued finish, with carrying case. Price.....**$2.00**



Built-Up Porch Columns



Diameter of shaft at base, 6 inches. Height over all, 6 feet. With composition cap. Price....**$2.10**

How Much Have You Been Paying?

Hundreds of Other Eye Opening Values in Our Mill Work Catalog.

Diameter of shaft at base, 6 inches; height over all, 6 feet. With plain cap. Price **$1.48**

MILL WORK AT FACTORY





Yellow Pine Cap Molding. Price, per 100 feet..**$1.90**

Head Casing. Price, per 100 feet..**$1.75**

Fillet. Price, per 100 feet.....**35c**

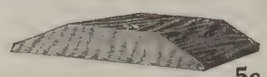
Yellow Pine Base Molding. Price, per 100 feet..**$2.77**

Starting Newels.

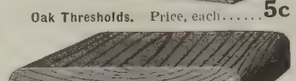
Plain Sawed Red Oak, 4 feet high, 5 inches square. Price.....**$2.21**

Yellow Pine. Price.....**1.98**

Craftsman Oak Stair Rail, 2½x3½ inches. Price, per lineal foot.....**14c**



Oak Thresholds. Price, each.....**5c**



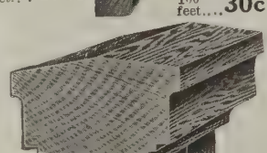
Yellow Pine Casing, 4¼ inches wide. Price, per 100 feet.....**$1.65**



Yellow Pine Window Stool. Price, per 100 feet..**$2.30**

Yellow Pine Window Apron. Price, per 100 feet..**$1.45**

Yellow Pine ¼ - Round Molding, ⅞ x⅞ inches. Price, per 100 feet....**30c**



Buy Your Supplies From th World Selling Direct

The values shown on this page are not specia or leaders, but are picked at random from o big Building Material and Mill Work Catalog.

COMPARE THESE SAMPLE PRICES AND JUD

You'll never get rich, you'll never ma the profits other contractors are makin until you stop paying bonuses to needle middlemen for your supplies.

A trip through Europe, or a new aut mobile, costs less than the amount we c save you on the material required for single $5,000.00 house.

No local dealer or agent can furnish m work as fresh, clean and sound, and of su uniform high quality, as we **guarantee** ship on your orders.

A $500,000.00 stock of mill work, splendid organization of skilled woo workers, packers and loaders, a perfect equipped factory with its modern machi ery, and long experience in making qui shipments to every state in the Union, sure you prompt and safe delivery of yo order, whether large or small.

Clip the Coupon Above an

YOU CAN MAKE $100.00 EXTRA

THIS IS OUR **WHOLESALE LUMBER PRICE LIST**

We Publish Special Lumber Price Lists Quoting "Delivered Prices" to Every City in the United States.

Let Us Send You a List Showing Our Delivered Prices (Freight Prepaid) to Your Station. Mailed Free on Request.

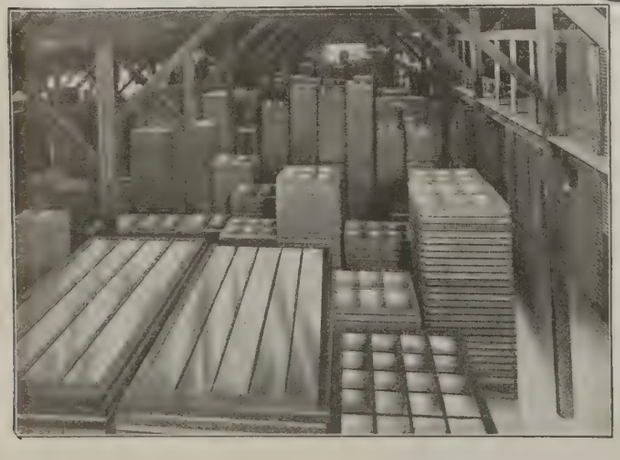
If you cannot wait for our delivered Lumber Price List, SEND US YOUR LIST, we will gladly mail you our bid quoting you our prices on your entire bill of lumber or mill work. The prices, however, will be exactly the same as the prices printed in our wholesale price list.

You can increase your profits $100.00 every job you contract for that requi enough lumber to make a small carload buying from us. **The lowest wholesale pric** our price to you for lumber manufactured us in our own mill adjacent to the fin timber lands in the country.

If bigger profits mean anything to you, s **this minute** for a copy of our **Wholesale De ered Lumber Price List**, showing prices on choice lumber delivered at your station. small profit is all we add to the manufactu cost. We guarantee the quality of every bo we sell. We ask you to let us return y money, including the freight charges, if goods fail to please you in every respect.

QUALITY GUARANTEED

SEARS, ROEBUCK AND



A CORNER OF THE SASH WAREHOUSE.

A CORNER OF THE SASH DEPARTMENT.

This department produces 5,000 sash daily. We have on hand at all times a stock of 100,000 windows of every size and pattern, glazed and ready for crating and shipment.

Delays cost a lot of money in the building business. We avoid them for you by shipping your entire bill of materials complete, whether your order amounts to $5.00 or $10,000.00.

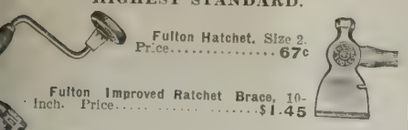
We Have IT in Stock, Ready to Ship.



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

FAMOUS FULTON TOOLS.

HIGHEST STANDARD.

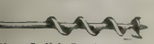


Fulton Hatchet, Size 2. Price..... 67c

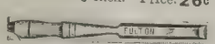
Fulton Improved Ratchet Brace, 10-inch. Price..... $1.45



Fulton Square Shank Screwdriver, 6-inch. Price. 26c



Fulton Solid Center Bits, ch. Price..... 27c



Fulton Special Chisel, ½-inch. Price..... 34c

or complete range of sizes and prices of tremendous stock of high grade carpen- tools and builders' hardware, send for Special Hardware Catalog.

HERE IT IS! MAIL IT NOW.

- ☐ Wholesale Delivered Lumber Price List.
- ☐ Book of Modern Homes.
- ☐ Building Material and Mill Work Catalog.
- ☐ Catalog of Home Heating Systems.
- ☐ Plumbing Catalog.
- ☐ Paint and Varnish Catalog.
- ☐ Wood Working Machinery Catalog.
- ☐ Hardware and Carpenters' Tool Catalog.
- ☐ Roofing Catalog.
- ☐ Mosaic Tile Booklet.

Sears, Roebuck and Co., Chicago, Ill.

Gentlemen:—As per your offer in the National Builder please send me, without charge, postage prepaid, the booklets and printed matter opposite which I have placed a check mark.

Name _____

Postoffice _____

R. F. D. No._____ State _____

P. O. Box No._____ Street and No._____

OST PLUS ONLY ONE PROFIT

est Mill Work Plant in the tractors and Builders

catalog quotes prices on the same goods in sawed red oak, Wisconsin birch, cypress, oft pine, yellow pine and clear soft wood.

URSELF THE BENEFITS OF OUR PLAN.

e value to the builder, from an ad- ing standpoint, of a good job well cannot be overestimated. One or houses built with our mill work will l your fame far and wide.

ndreds of successful contractors have us a silent partner in their business. ave increased the demand for their es and swelled their profits. Let us e same for you.

d us a trial order for flooring, doors, ws, shutters, porch material, stairs, nd of interior or exterior trim or mill It will be carefully selected, double ted, packed by experts, and shipped u promptly under a plain shipping aking it impossible for anyone to tell om the goods were shipped.

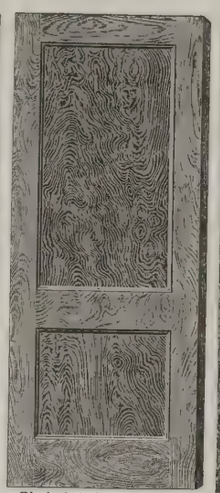
for the Catalogs You Desire



Outside Window Frame, 2 feet by 4 feet 6 inches, with pulleys. Price..... **$1.40**

Two-Light Check Rail Window, 2 feet by 4 feet 6 inches, complete with glass. Price..... **82c**

Our line of sizes is complete.



Birch Interior Door, 2 feet 8 inches by 7 feet, 1¾ inches thick. Price..... **$3.46**



Craftsman Oak Front Door, glazed plain plate glass, 3x7 feet, 1¾ inches thick. Price..... **$8.25**



Yellow Pine Window Stop, ⅜x1⅜ inches. Price, per 100 feet..... **33c**

A Few Flooring Figures.

We quote our price per 1,000 feet on ⅞x2¼-inch face only. See our MillWork Catalog for complete range of sizes and grades.

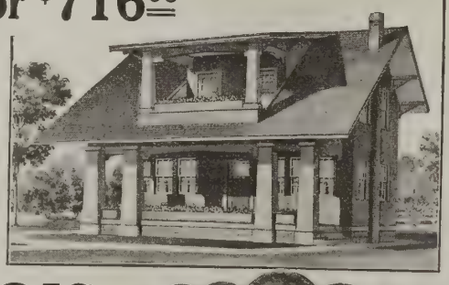
Quarter Sawed Oak Flooring, clear. Price.....	$86.30
Plain Sawed Oak Flooring, clear. Price.....	59.50
Maple Flooring, clear. Price.....	49.00
Royal Acme Gum Flooring, clear. Price.....	34.80
Cypress Flooring. Price.....	43.00
Yellow Pine Flooring, B and better, ⅝x3¼-inch face. Price.....	28.75

IS BUNGALOW COMPLETE for $716.00

$716.00 we will furnish all the material to build this Craftsman Design om Bungalow, consisting of mill work, flooring, ceiling, siding, ; lumber, building paper, pipe, gutter, sash weights, hardware, painting material, lumber, lath and shingles. By allowing a fair r labor this up to date home can be built for $1,630.00. the open air sleeping porch, 8 feet 6 inches by 11 feet 9 inches. ations include Craftsman design oak doors and highest grade finish out. Send for our Book of Modern Homes showing plans of this and r up to date residences;

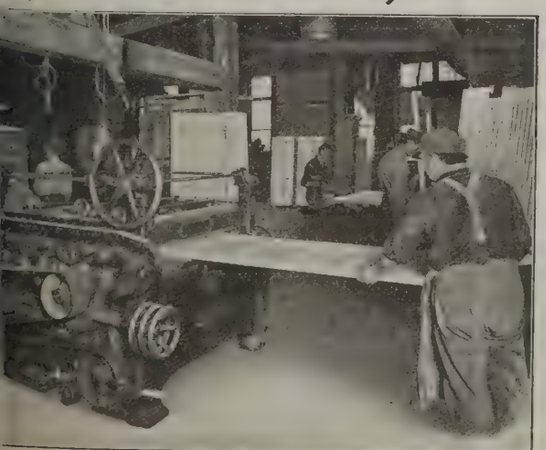
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d by our own corps of skilled licensed architects, experts who are famil- the conditions, climatic and otherwise, in **your section** of the country w exactly the best type of house adapted to the needs of your clients. service avoids all the annoyances, delays and difficulties that go to make tractor's life a burden when he orders his supplies from a hundred Put your problems up to us and let us take care of them for you.



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Among the 75,000 doors in this warehouse are the doors you want, no matter what kind or in what quantity. We can ship them immediately and save you money.

Ask the builder who uses our goods about the character of our service and the quality of our goods. Examine the materials yourself. Send us a trial order.

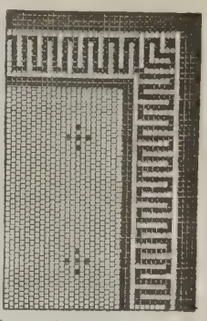
Our Shipping Department is equipped to load and ship thirty carloads of mill work daily.

We Guarantee Safe Delivery.



Ceramic Mosaic Tile Floor, 16 Cents a Square Foot.

Also a wide variety of new and artistic designs in combinations of all colors up to 25 cents a square foot. Our Tile Book, reproducing patterns in colors, sent free on request.



Perfect Cleanliness Is Economy, Not Extravagance.

Modern hygiene demands Ceramic Mosaic Tile Floors for the bathroom, kitchen, pantry, laundry, vestibule and other places in the home, store, hospital, dairy, school, hotel and cafe.

Tile floors are aseptically clean, more enduring than marble and as easily kept clean as chinaware. The longer they are used the brighter they becomes.

We have put this former luxury within reach of the most modest purse. Our direct from factory selling plan and our improved method of preparing the tile for laying, so that anybody can lay a perfect tile floor without any previous experience, has cut the cost of these floors one-half.

We furnish our Ceramic Mosaic Tile in the design illustrated for **only 16 cents a square foot.**

Our Tile Book shows similar savings in wall tile. Send for it.

Build an Oak Stairway at Half the Regular Retail Price of Yellow Pine.



$75.00 STAIRS, $22.80.

Choose your materials from our complete up to date assortment. Any workman of ordinary ability can build a perfect fitting and artistic staircase with our stairwork.

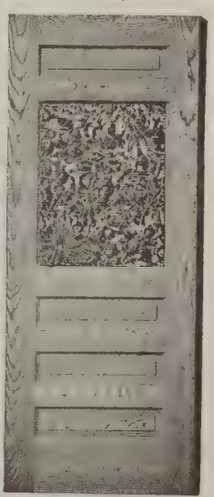
A bill of materials for a fifteen-step staircase in yellow pine of the design illustrated costs only $22.80 when ordered from our catalog. The same staircase bought from the average stair builder would cost you $75.00. Our bill of materials includes everything required—fifteen stair steps or treads, sixteen stair risers, one starting newel, two angle newels, twenty-six balusters, 18 lineal feet of rail, 34 feet of string board, 60 lineal feet of cove and fourteen stair brackets, all for $22.80.

If you will send for our Mill Work Catalog you will see that you have been losing money unless you have been building your own stairs.

We Carry Sixty-Five Doors of Different Styles. A Full Range of Sizes and Grades of Each Style.



Kitchen Door, soft pine stiles and rails, yellow pine panels, 2 feet 8 inches by 7 feet, 1¾ inches thick. Price..... **$2.50**



Rear Outside Door, Nona white soft pine, glazed chipped glass, 3 x 7 feet, 1¾ inches thick. Price..... **$4.80**

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Fine Teeth Need Fine Files

Filing a saw is one thing—putting a saw in trim to cut fast and true, without pinching or jumping, is another thing. Men who know that every kind of file isn't suited to every kind of saw, sharpen fine saws with

E. C. S.

KEEN KUTTER

Special Slim Taper Files

the slimmest files ever produced. Made from blanks of specially prepared tool steel that takes a hard and lasting temper. Milled by a new and improved method which cuts them absolutely even and uniform from tip to heel. This makes a fast cutting file.

Use an E. C. S. Special Slim Taper File and feel it "bite" the full length of the stroke—no lost labor—no slipping. These files—properly used—never change the shape of the saw teeth. Cut to the bottom without altering the bevel or lowering the point. Every mechanic's kit should hold an assortment of E. C. S. Keen Kutter Special Slim Taper Files.

E. C. SIMMONS KEEN KUTTER CUTLERY TOOLS

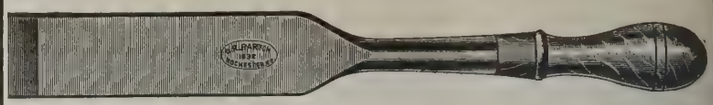
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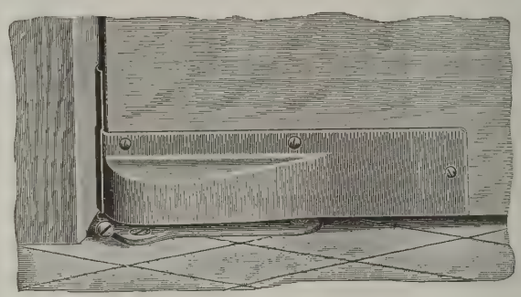
The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. R. BARTON 1832. ROCHESTER, N.Y.

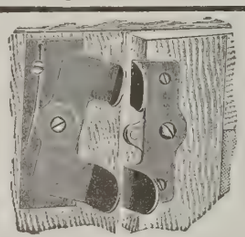
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Brown's Race **Rochester, N. Y.**

1910 "Standard" Floor Hinges



sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio



Screen Door

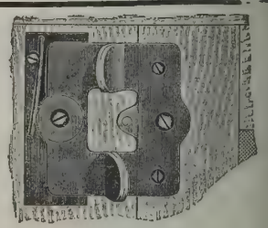
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A New Idea

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A Cleveland to Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every other trip.—**Special Day Trips Between Detroit and Cleveland, During July and August.—Railroad Tickets Available on Steamers.**

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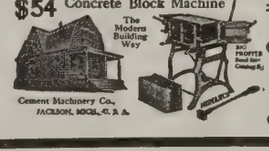
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Our screens are made from kiln dried lumber and have waterproof coped joints and the frames are weather-proofed before the finishing coats are applied.

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Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced

Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

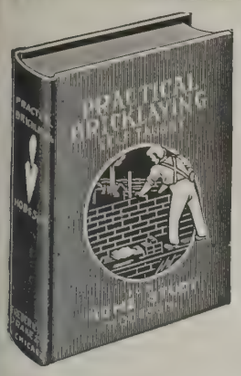
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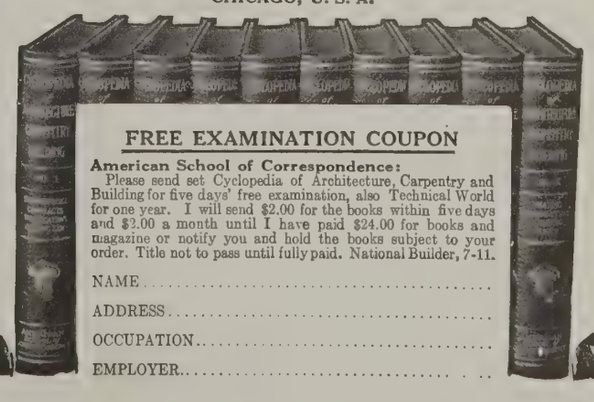
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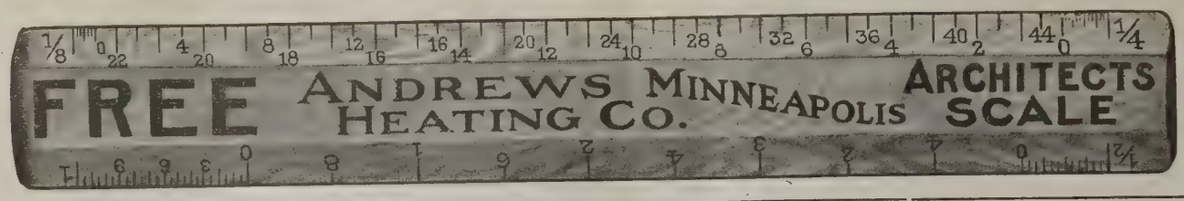
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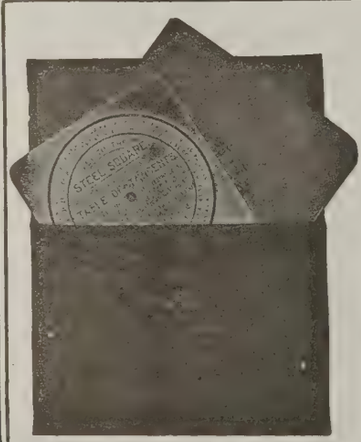
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Send your order at once and it will be shipped prepaid to your address

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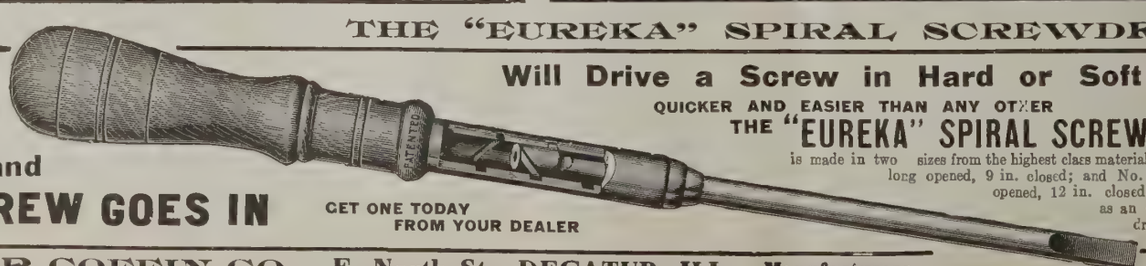
They have a prestige that wins trade—good, sound, substantial trade—for dealers all over the country. Are you getting this business—these dollars? If not write this very day to the nearest Berger Branch House—ask for the *steel ceiling catalogue* and the *co-operative agency proposition.*

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PUSH ON THE **HANDLE and THE SCREW GOES IN**



Will Drive a Screw in Hard or Soft Wood
QUICKER AND EASIER THAN ANY OTHER
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is made in two sizes from the highest class materials—No. 1, 14 in. long opened, 9 in. closed; and No. 2, 19 in. long opened, 12 in. closed. Can be used as an ordinary screwdriver.

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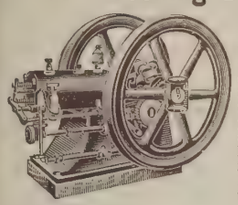
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Price Wrecking Bargain 8 and 12 H. P. ENGINE **only $200 AND UP**



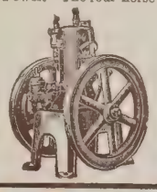
We are willing to have our Superior Heavy Duty Gasoline Engines compared with any on the market no matter what the price. Built with the greatest care and every mechanical detail is carefully provided for. Best Engine for all around work on the farm and in the factory. Most popular Engine we handle, powerful and reliable, made for heavy work and continuous service. The 8 horse power is large enough for the ordinary work on the farm, also for elevators, factories, etc. The 12 horse power we recommend for small threshers, silo fodder cutters, etc.

30 Days' Free Trial AT OUR EXPENSE | **OUR GUARANTEE PROTECTS YOU**

Our two horse power "Superior" Engine is designed to meet the demand for a low priced Engine to take the place of Wind Mills, Hand, Foot or small Tread Power. The four horse power is designed for general farm or machine shop work.

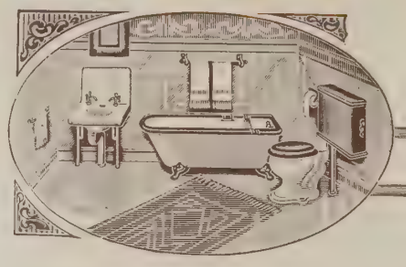
The simplicity of construction makes them the most serviceable, easy to operate and Practical Gasoline Engine ever produced. We can recommend them with the utmost confidence to our patrons to give entire satisfaction.

They are just as convenient as any Electric Motor or Windmill would be for pumping water, running cream separator, washing machine or other labor saving devices in the house. It does not require any more practice or experience to run or keep these engines in order than the Motor or Windmill.



2 H. P. $36.00 **4 H. P. $64.00**

PLUMBING AND HEATING



Complete Bathroom Outfit As Illustrated Only $37.50

GUARANTEED

Price Wrecking Opportunities

To obtain high grade, brand new Plumbing Material at prices that mean a Positive Saving of at least One-half. We can equip the Home, Factory or any Public Building throughout with a Plumbing and Water System that we will guarantee to be as good as you can purchase anywhere in the land. Send for our "Plumbing Catalog," filled with valuable information, and authority on perfect sanitation, FREE UPON REQUEST.

MODERN HEATING SYSTEMS

In offering to the public our **"PERFECTION BOILER AND HEATING SYSTEM"**

We are confident that we have reached the ACME OF PERFECTION and have solved the question of Heating your Home or Factory for all time to come. Our Heating Systems are the result of tests, experiments and scientific research conducted by expert Heating Engineers and we guarantee them to



HEAT YOUR BUILDING

That is what you want and are paying for.

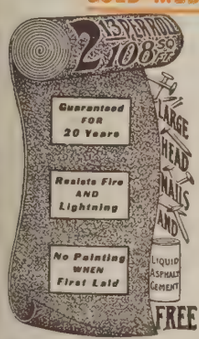
We operate our own factory and are thus able to save you the retailer's profit and quote prices that mean an enormous saving to you.

Send us a plan or diagram of your building and let us make you an estimate.

Fill out the Coupon below and send for our Heating book; it will give you valuable information and SAVE YOU MONEY.



COLD MEDAL ROOFING



Rawhide Stone Faced "Gold Medal" Roofing, put up in rolls of 108 sq. ft. sufficient to lay 100 sq. ft. or (one square) complete, with large head nails and liquid cement for laps. Approximate weight, 58 pounds to the roll. **Price per roll complete $2.13**

FREIGHT PREPAID at above price to States of Illinois, Indiana, Iowa, Ohio, Wisconsin and Michigan.

This Roofing will outwear and outlast any other Ready Roofing on the market. Finished Stone Faced Surface requiring no painting when laid. Unexcelled for homes, barns, warehouses, stores and in fact buildings of every kind **where long service and economy** is desired.

HOW MADE. Only the best long fibre woolen felt is used. **Of extra heavy weight and strength.** Thoroughly saturated with absolutely pure asphalt. Over this is given an additional mechanical treatment, making it more wearproof and durable. **Covered on both sides** with fine powdered marble, giving **it a beautiful appearance,** also adding to its **fireproof qualities.**

STEEL ROOFING PER 100 FEET, $1.60

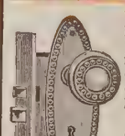


100,000 Squares of New Steel Roofing which we are selling at the following prices freight prepaid;

Flat . . $1.60
Corrugated, V Crimped or Standing Seam $1.85

At these prices we prepay freight to all points east of Colorado except Oklahoma and Texas. Quotations to these points on application. Our high grade **Galvanized Rust Proof Roofing** at prices ranging from $3.00 per square up. Write today for Free samples and Great Book on roofing.

SAVE 30 PER CENT IN NEW HARDWARE



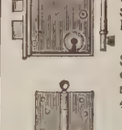
Wilmette Design Inside Door Lock Sets; Lot No. 4-A-1608. 2000 sets as illustrated. Wrought steel, antique copper finish, plated front mortise locks 3¾x3¼, one plated key, one pair knobs two escutcheons, packed complete with screws. **Per set $0.47**
Per dozen $5.20

Lot No. 4-A-1604. Wilmette Wrought Steel, Copper Finish Front Door Sets.
Complete, per set $1.40

Lot No. 4-A-699. Upright Rim Knob Locks, japanned, complete as illustrated and shown. **Each . . . . . $0.10 Per dozen $1.10**



Lot No. 4-A-706. Mortise Door Locks. Japanned, complete as shown. Each $0.25
Per dozen 2.75



Lot No. 4-A-719. Wrought Steel, ball tipped, loose pin butts, copper finish, complete with screws, 3x3, 16c, 3½x3½, 17c, 4x4, 21c per pair.



Lot No. 4-A-753. Sash Locks, copper finish. **Each $0.05**
Per dozen 48



STRUCTURAL STEEL BARGAINS

Over 10,000 tons of plain and fabricated steel and Builders' Iron Work in stock for immediate delivery. We save you 20 to 40 per cent on Structural steel work of every description, also Builders' Iron Work. Write for copy of our Great Book, "Structural Steel News." Send us a list of your wants for prices.

STRUCTURAL STEEL SHAPES

STEEL "I" BEAMS



Illustration shows "I" Beams which are made in standard sizes ranging from 3 to 24 inches high.

STEEL ANGLES



Illustration shows Angle Steel, made with equal and unequal legs, ranging from ¾x¾ to 8x8 inches.

STEEL CHANNELS



Cut shows Steel Channels which are made in standard sizes, ranging 3 to 15 in. high.

STEEL TEES



Cut shows Steel Tees made with equal and unequal legs, ranging from 1x1 to 1x4 inches.

NOTE—When writing for prices on Structural Steel Shapes, please state quantity, pattern, sizes and lengths. We can furnish all shapes cut to any length desired.

FILL OUT THIS COUPON

Chicago House Wrecking Co., Chicago:

I saw your advertisement in **June,** 1911, National Builder. I am interested in the following items: 833

_____

_____

_____

Do You Want? Gasoline Engine Book ——— Do You Want? Free "Book of Plans" ———

Do You Want? Free Roofing Book ——— Do You Want? Free Plumb. and Heating Book ———

My Name _____

Town _____

R.F.D. _____ P.O. Box _____

County _____ State _____

FREE VALUABLE BOOKS FOR SHREWD BUYERS

MAIL COUPON AND MARK BOOKS YOU NEED

"GASOLINE ENGINES"



Illustrates, describes and quotes the "Superior" Gasoline Engines. They are, without question, the best engine made, and offered to you at bargain prices. By reading this book you can become familiar with the method of operating Gasoline Engines successfully. **Write for free copy today.**

OUR BOOK OF PLANS

This is the handsomest **illustrated book of designs of over 100 Bungalows, Houses and Barns** ever produced. It contains the productions of Photos and is true to life in every way. Also a very **valuable book for carpenters, contractors or builders.** Sent to you absolutely free. Fill out coupon shown at the left.



ROOFING BOOK

The greatest book on roofing ever printed. Tells you how to lay all styles of roofing, quotes you money saving prices so that you can buy roofing and save 30 to 70 per cent. Write for copy today.



COLD WEATHER COMFORT

A practical treatise on Plumbing and Heating. Explains in detail how you can buy a complete Plumbing or Heating plant from us and easily save 50 per cent. Also quotes Greenhouse Heating plants at extremely low prices. Do not fail to send for copy at once.

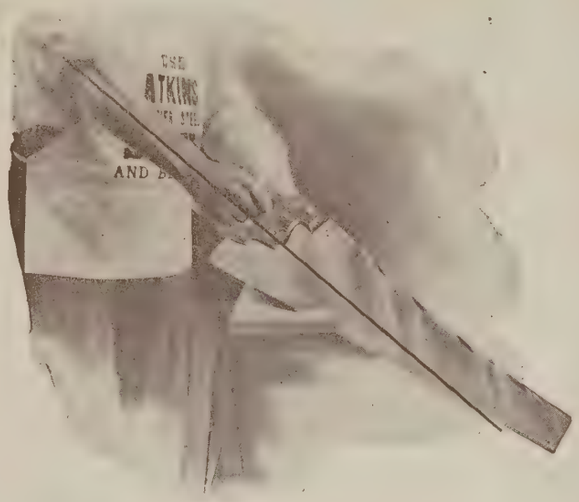


CHICAGO HOUSE WRECKING COMPANY 35TH & IRON STS. CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Two Famous Silver Steel Saws

We want to call particular attention to the two Saws shown in the pictures below. Both blades are of SILVER STEEL—both are Taper Ground—both are genuine ATKINS SILVER STEEL SAWS—BUT the handles are constructed on entirely different principles.



No. 53. Genuine Perfection Handle



No. 51. Old Style Handle

"Pay Your Money and Take Your Choice"

ATKINS No. 53

The picture to the left shows ATKINS No. 53 SILVER STEEL SAW equipped with ATKINS Genuine Perfection Handle and illustrates plainly why this type of handle is easiest on the saw arm. While it may feel strange to the beginner—a few days use will demonstrate that the Perfection Handle is the most *scientifically* constructed and much easier on the saw arm than any other style.

Note the line running through the saw arm straight through the blade to the cutting edge. See how every ounce of power is directed to the point of contact. Observe the wrist and saw arm, how easily and naturally the blade drops into its work without pressure.

ATKINS No. 51

If you are under the impression that all ATKINS SAWS are made with the Perfection Handle, we wish to particularly call your attention to the saw shown to the right. This handle is similar to the old straight across handle that you may have been using heretofore. Note the saw arm in this case and see that the pressure back of the saw arm is *not* directed on the cutting teeth, but rather to the back of the saw. Notice this wrist and see how it is necessary to push downward in order to secure proper contact. But even with this old style handle, the No. 51 is superior to any other, because the blade is made of genuine SILVER STEEL (our own exclusive formula) and is Taper Ground, which enables it to run free and easy, even in wet lumber, with but little set.

If you do not wish to try the Perfection Handle, then try the No. 51. Either of these saws or any of our other popular numbers may be purchased through your regular dealer, who should order for you from his wholesale house in case he does not carry them in stock. If he will not order for you, let us know and we will see that you are taken care of. Be sure to see that our name, E. C. ATKINS & COMPANY, and the words, "SILVER STEEL," are on the blade. None other are genuine.

OUR FREE OFFER

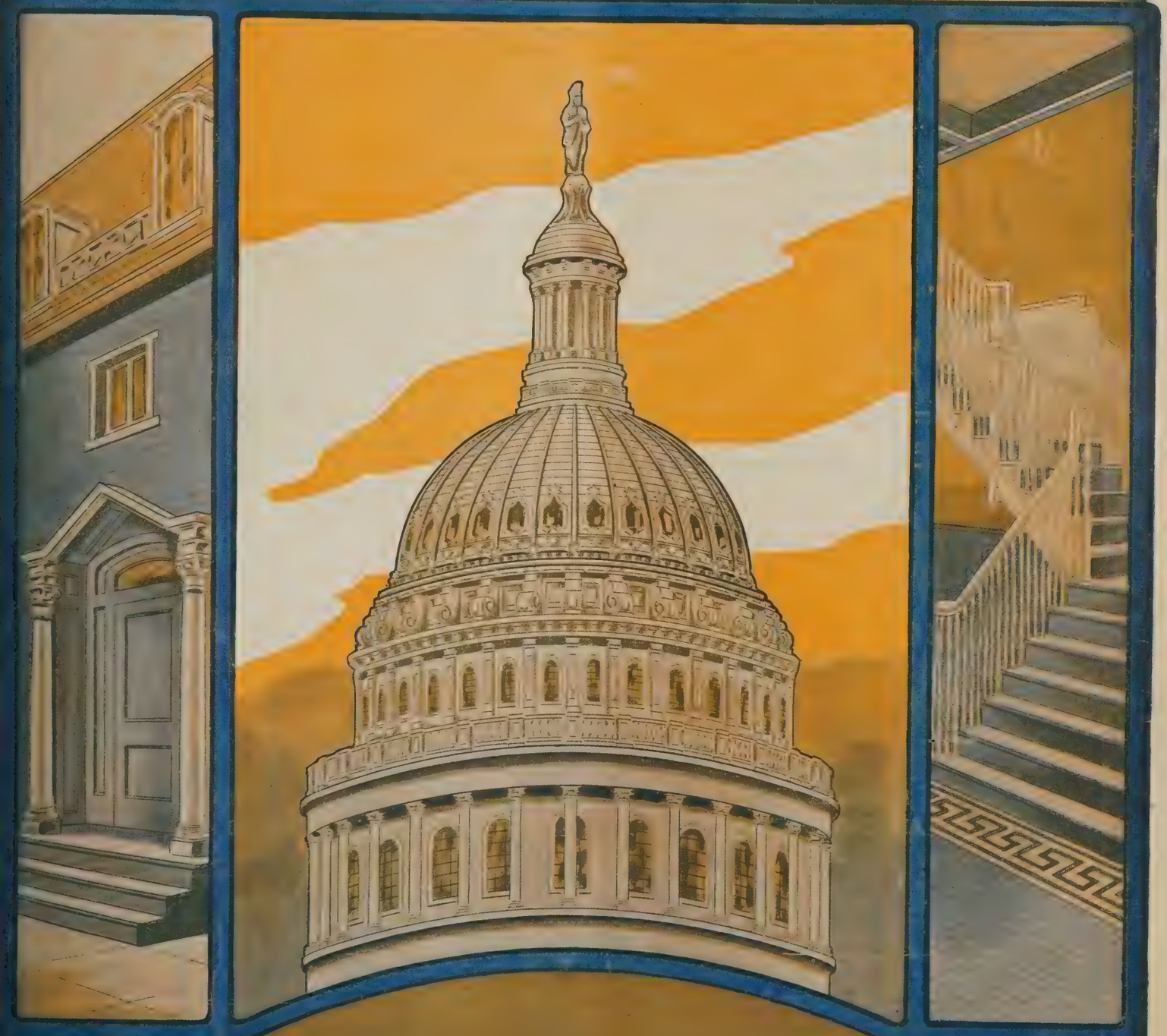
We are securing the names of high class mechanics who appreciate fine tools and if you will send us ten cents in stamps to pay postage, we will mail you one of our fine carpenter's nail aprons, Saw Sense Book, Time Book, and a great deal of useful information on the purchase and care of saws. Write today and learn "Who's Who" in the saw world.

E. C. ATKINS & CO., *Inc.*

INDIANAPOLIS, IND.

MORE COPIES
PRINTED AND CIRCULATED THAN ANY OTHER BUILDING PAPER IN AMERICA.

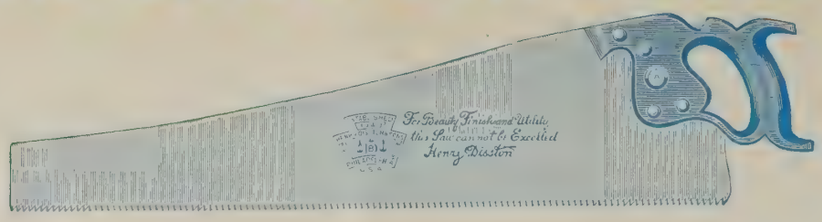
THE NATIONAL BUILDER



PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

AUGUST, 1911

Disston Saws, Files and Tools



For fifty-six years we have been making Disston Crucible Steel. It is made under the exclusive Disston process. The long life and cutting properties of Disston Saws are due to Disston Crucible Steel and the treatment it undergoes in our shops.

The Disston establishment is the ONLY ONE making steel for its full line of saws and tools—one reason why Disston Saws are uniformly durable and efficient.

Disston Saws are hardened and tempered by the exclusive Disston process.

It pays to buy Disston Saws and Tools. For any and every kind of work Disston Saws, Files and Tools are the most reliable.

We have been making saws for over seventy-one years.

Henry Disston & Sons, (Incorporated) Keystone Saw, Tool, Steel and File Works PHILADELPHIA, PENNSYLVANIA

YOU NEED NOT TRY BEFORE YOU BUY

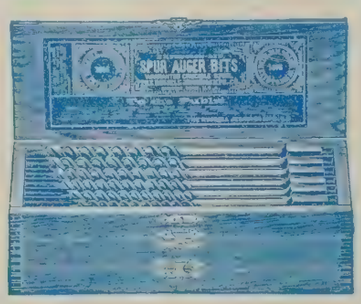
if you see

"RUSSELL JENNINGS"

ON THE ROUND OF THE BIT



FOR SALE AT ALL HARDWARE STORES



THE STANDARD FOR OVER 50 YEARS



The name stands for Genuine Crucible Steel, long bit-making experience, the most rigid inspection—in short "Russell Jennings" is synonymous with "standard."

RUSSELL JENNINGS MFG. CO.

CHESTER, CONN., U. S. A.

21-16

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS, IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

ANY WEATHER is "Good Building Weather" when you use Bishopric Wall Board as a substitute for lath and plaster. It is cheaper and better and does away with all delays in building. It is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

FOR WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

This substitute for lath and plaster is made of kiln-dried, dressed lath, imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut at the factory into 4x4 ft. sheets, which are easily and quickly nailed to studding, ready for immediate application of wall paper, paint, burlap, or other decoration.

It is applied dry, is guaranteed not to swell, shrink, warp, crack, flake or blister; is clean, sanitary, and odorless; is proof against moisture, cold, heat, and vermin; saves fuel in winter and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



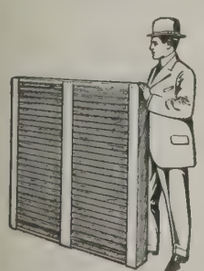
Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.

One Wagon load of Bishopric Sheathing covers an area from six to ten times as great as one load of lumber—a tremendous saving in hauling. Five thousand feet can be hauled in an ordinary wagon.



Wall Board and Sheathing are shipped in crates

The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space

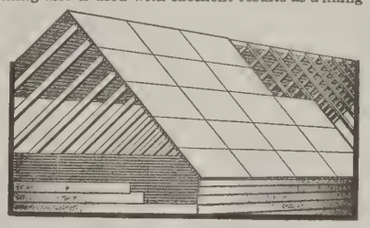
In applying ordinary lumber, heavier scaffolding, more tools and greater scaffold floor-space are required In applying Bishopric Sheathing, one man drives a few nails in each sheet; a common laborer or boy can finish the nailing.

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

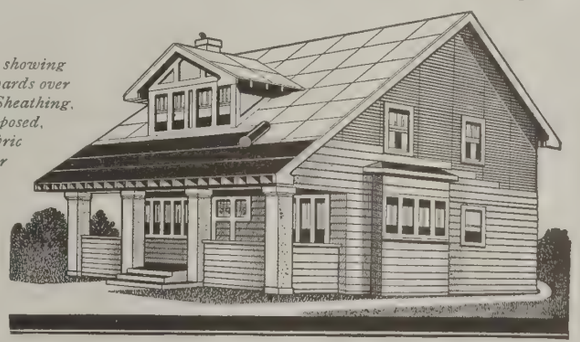
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Don't Take Our Word For It—
Let Us Send You A Sample

TRY Utility Wall Board on just one job—Note how light in weight and how easily handled it is—Yet how stiff and substantial. Try it under the worst possible conditions and note how staunchly it stands up. No other wall board that was ever made is so moisture-proof and at the same time so readily adapted to any style of artistic decoration.

UTILITY WALL BOARD

is made of exceedingly tough, durable fibre. It is more satisfactory than any other substitute for lath and plaster. You can put wall paper over it with perfect safety. A wall or ceiling finished with Utility Board is permanent—there to stay as long as the building stands.

A New Beautifully illustrated book of interiors will give you some valuable ideas. Send for it at once. Also for the Free Sample

Utility Wall Board is sold through dealers in building supplies everywhere

THE HEPPES COMPANY

4502 Filmore Street **Chicago, Illinois**



INVESTIGATE Compo-Board

Best for Walls and Ceilings.

Better then than and plaster. More economical and durable. Can be put on in any weather and will stay up and look well as long as the building lasts.

Compo-board is made of strips of thoroughly dried lumber well glued. These strips are then covered with a specially prepared moisture proof paper, which is cemented under intense heat and pressure.

This makes a wall lining that will last indefinitely. Cannot crack or crumble off. Cannot chip off or mar by banging furniture into it. It is moisture and cold proof and fire resisting. Warm in winter and cool in hot weather.

Beside being a wall lining, Compo-Board has many other uses around the house and in the yard, in the office and factory. For remodelling the house or finishing off an extra room in the attic or basement, it is ideal. Summer cottages can be made as warm as the city home. Use it for partitions or back plastering.

Compo-Board can be had in strips four feet wide and one to 18 feet long, in any length in even feet.

SEND FOR SAMPLE AND BOOKLET

Fully describes Como-Board and its many uses and advantages, and the sample will show you what it is.

NORTHWESTERN COMPO-BOARD CO.

5776 Lyndale Ave. No. **MINNEAPOLIS, MINN.**

(The border of this advertisement is a cross section view of Compo-Board.)

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

RED GUM

No longer an experiment in New York building operation.

Literally hundreds of fine buildings, apartment houses, etc., in New York are being trimmed in ***RED GUM.***



1—Cor. 177th St. and Audubon Ave., New York, Heightstown Const. Co., owners.
2—165th St. and Edgecombe Ave., New York, Sun Const. Co., owners. Benj. Nieberg, Archt.
3—169th St. and Amsterdam Ave., New York, Groesberg & Young, Archts.
4—Chester Hall Apts., Southern Blvd. and Westchester Ave., New York, American Real Estate Co., owners (and archts.)
5—The Gramont, Broadway and 98th St., T. J. McLaughlin Sons. (Geo. & Edw. Blum, Archts.)
6—Wilton Apts. & Hamlet Court, 164-165th Sts. and Broadway, New York.
7—Usona Apartments, Lowell-Bancroft-Longfellow Ave., Bronx, New York.
8—Heights Metropole Rlty. & Const. Co., South Side 164th St., East of Broadway, New York.
9—"Stratford Avons," St. Nicholas Ave. and 174th St., New York.

These fine buildings, all in New York, are all trimmed with RED GUM. The appreciation for this beautiful American hardwood is spreading all over the country.

Write for samples and prices on RED and SAP GUM to any of the following:

BAKER LUMBER COMPANY, - - - - - - Turrell, Arkansas
ANDERSON-TULLY COMPANY, - - - - - Memphis, Tennessee
THREE STATES LUMBER COMPANY, - - - - Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., - St. Louis, Mo.
LAMB-FISH LUMBER COMPANY, - - - - Charleston, Mississippi
HIMMELBERGER-HARRISON LUMBER CO., - Cape Girardeau, Missouri
CARRIER LUMBER & MANUFACTURING COMPANY, - Sardis, Mississippi

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Antifriction Ball Tip Butts

(Patent Pending)

Strongest, Best and Cheapest Antifriction Butts Made

GUARANTEE OF QUALITY STAMPED ON EVERY BUTT

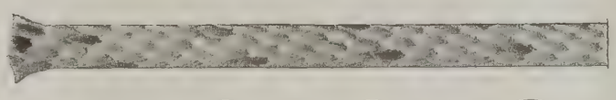
FURNISHED IN ALL STANDARD FINISHES

Makers of Strap and T Hinges, Barn Door Hangers and Track

McKINNEY MFG. COMPANY

WRITE FOR NEW 1911 CATALOGUE

Pittsburgh, Pa.



Samson Spot Sash Cord

IS made of extra quality fine yarn, and warranted free from imperfections of braid or finish. It can always be distinguished by our trade mark, the Colored Spot. Carried by all dealers. Send for samples and tests.

Samson Cordage Works

BOSTON, MASS.



Oak Flooring

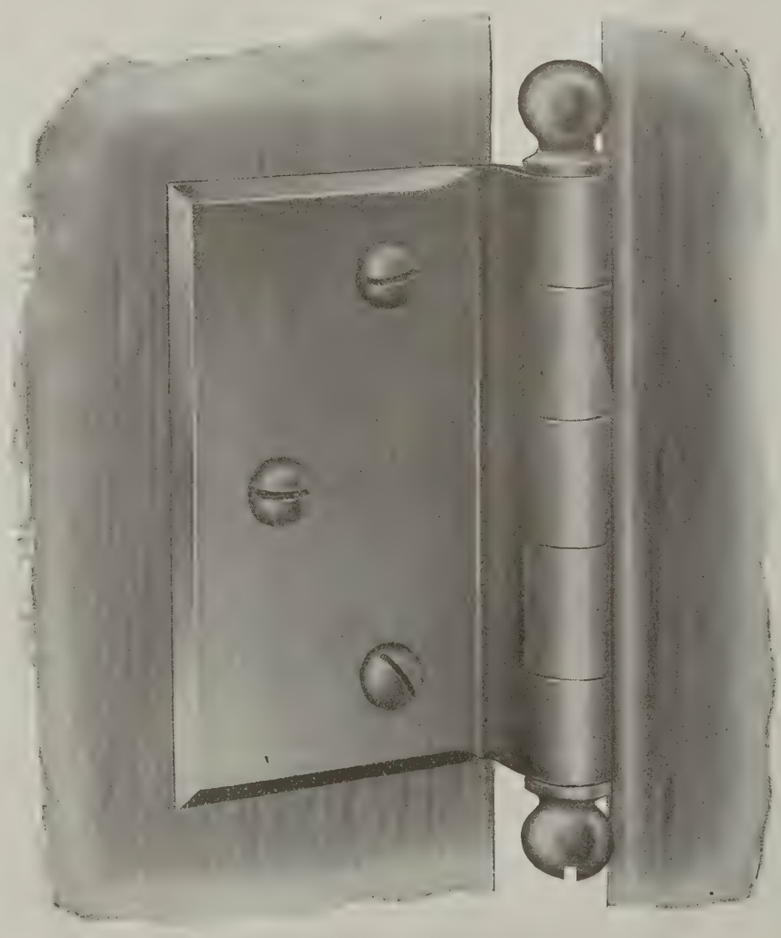
Every **builder, owner** and **investor** should insist on OAK FLOORING, because its natural, artistic beauty combined with its economical and durable qualities, makes it **King** of **Flooring.** Any truthful landlord will tell you that OAK FLOORING **increases** the **renting** and **selling values** of any building.

OAK FLOORING is **rich** and **cheerful** in color. It imparts an air of **refinement** and **elegance** to a home. OAK FLOORING ⅜" thickness can be laid over old floors at a very low cost. It is **cheaper** than carpets. OAK FLOORING is made in **four grades** and is adapted to the humblest of homes or a palace.

Write us for further information

The Oak Flooring Bureau

838 Hammond Building - Detroit, Michigan



No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

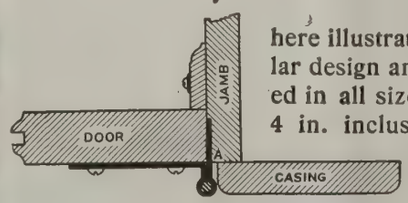
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

These are exclusive "NATIONAL" features.

Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BEFORE YOU BUY A FOOT OF LUMBER

FOR ANY PURPOSE, big or little, indoors or out, in city or country,

Write for the proper volume of The Cypress Pocket Library. (Free)



Backed by our "All-round Helps Dept.," it is the "guide, counselor and friend" of

ALL THE PEOPLE WHO CARE

WHAT *VALUES* THEY GET for their LUMBER MONEY.



Why not buy WOOD with the same discrimination you apply to other things?

We do not advise CYPRESS for *all* uses, but *only* where it can *prove* itself "the one best wood" for *your* use.



1 You don't tell your broker: "Buy $10,000 of Railway stocks!" Hardly! You tell him *what.*

2 You don't simply tell your Real Estate agent: "Buy me 'some land'!" You tell him *where.*

3 You don't tell the dry goods clerk: "I want 8 yards of *cloth*!" You say "silk," "wool," or "linen."

4 You don't merely order "200 head of live stock!" You specify Horses, Cattle, etc., *and the Breed.*

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WHY NOT BUY **LUMBER** WITH EQUAL CARE? INSIST on **CYPRESS**—"THE WOOD ETERNAL." **WRITE AT ONCE** for **VOL.** of **CYPRESS PKT. LIBR.** that fits your case. **WE'LL REPLY AT ONCE.**

THESE VOLUMES MAY BE HAD NOW:

5. How to Avoid Mistakes in Bungalows.
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17. Cypress for All "Odd Jobs" (of course.)

When Planning a Mansion, Bungalow, Pergola, Pasture-Fence or Sleeping Porch, remember—*With CYPRESS you BUILD BUT ONCE.*"

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with reliable counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS OF YOUR LOCAL LUMBER DEALER. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*

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$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

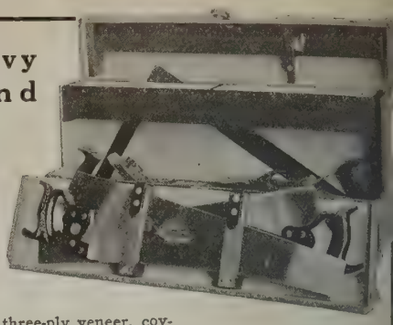
CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO CARPENTERS' TOOL CASE



It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges can not be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

Agents Wanted

WEDELL & BOERS, SOLE MFGRS., **157 Jefferson Ave., Detroit, Mich.**



BIG SAVING

Our new catalog mailed free

Will Convince

It contains a complete line of HIGH GRADE sash, doors, frames, blinds, mouldings, grilles, colonnades, stair and porch work, art glass, rolling partitions, etc., etc.



Special

Write today for booklet of GREATEST BARGAINS ever offered in HARDWOOD MANTELS AND FIREPLACE FIXTURES. Don't delay as these prices are for the purpose of reducing our IMMENSE STOCK.

THE HUBER BUILDERS MATERIAL CO.

39-43 Vine Street, Cincinnati, Ohio

Start the Job Right

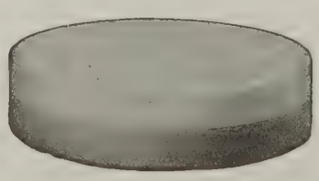
Have every chisel, plane bit and gouge with a keen, smooth edge. Perfectly sharpened tools mean a better day's work and less effort.



Carborundum Sharpening Stones

will put your tools in wording shape quickly and easily. You couldn't get a sharpening stone that will give such an edge with so little effort—no need of rubbing until the edge is worn on. ***Carborundum cuts and cuts clean*** after but a few strokes and leaves an edge that is an edge.

Ask for the Round Combination Bench Stone—Its shape gives full play for that rotary sharpening motion



No. 107	price each, $1.00
Quartered oak box holder	.50
Carborundum Rectangular Bench Stone, No. 108, combination	1.25
Carborundum Pocket Stone in neat case . . .	.35

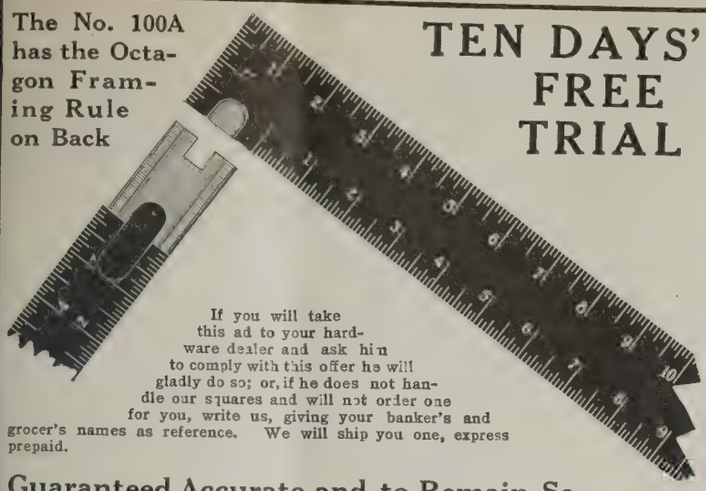
At any hardware dealer's or direct by mail

The Carborundum Company, Niagara Falls, New York

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The No. 100A has the Octagon Framing Rule on Back

TEN DAYS' FREE TRIAL



If you will take this ad to your hardware dealer and ask him to comply with this offer he will gladly do so; or, if he does not handle our squares and will not order one for you, write us, giving your banker's and grocer's names as reference. We will ship you one, express prepaid.

Guaranteed Accurate and to Remain So

The main feature of our new Take-Down Square is that it will always stay true. It is so constructed that the tongue is held down into beveled bearings by a spring, and these bearings are made so as to take up the constant wear which comes in taking square apart and putting it together, thereby producing constant accuracy. Rust-proof canvas case with each square.

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

Add ten cents to the price of the No. 100R and 100A if 1¾-inch tongue is desired.

Mr. Hardware Dealer—

Knowing that our new Take-Down Square is so constructed that it will remain true, we are willing to allow you the privilege of putting this square out on TEN days' trial. We will make good all squares returned to you, but all squares that come back to you must be returned to us through the jobber from whom you purchased these squares.

We are in no wise responsible for squares not returned or bad accounts herewith contracted.

NICHOLLS MFG. CO.

Ottumwa, Iowa

A roof is only as good as its waterproofing.

Knowing this, will you buy the covering for *your* roof on its "looks" alone, and not know what it is made of?

Genasco

the Trinidad-Lake-Asphalt Roofing

is waterproofed entirely with *natural* asphalt. In Trinidad Lake this asphalt has resisted blazing sun and terrific storms for hundreds of years. It has natural oils that give it lasting life in a roof despite the buffeting of rain, snow, sun, wind, heat, cold, and fire.

Man has tried to *make* lasting waterproofers—and always failed. Ordinary ready roofings show you what happens. They are made of mysterious "compositions" or coal tar; and they soon crack, break, leak, and go to pieces. Yet as for looks, they are mighty good imitations.

It pays to know about waterproofing when you buy roofing; it is a waste of money *not* to know.

The life and backbone of Genasco is Trinidad Lake Asphalt—the *natural* everlasting waterproofer—and that makes Genasco last. Genasco is made with mineral and smooth surfaces. Guaranteed, of course.

The Kant-leak Kleet waterproofs the seams of roofing thoroughly without the use of smeary unsightly cement, avoids nail-leaks, and gives the roof an attractive appearance.

Ask your dealer for Genasco Roofing, with Kant-leak Kleets packed in the roll. Write us for the Good Roof Guide Book and samples.

GENASCO — THE STANDARD OF EXCELLENCE — TRADE MARK REG. U.S. PAT. OFF.

THE BARBER ASPHALT PAVING COMPANY

Largest producers of asphalt, and largest manufacturers of ready roofing in the world.

PHILADELPHIA

New York San Francisco Chicago



IN AND OUT SCREW DRIVER No. 41

THIS is the kind of tests to which Millers Falls tools are subjected. This reversible screw driver was tested with a mechanical device against a resistance equal to driving in a 1½-inch screw. One hundred thousand movements were made, and there was **not a sign of wear** at the end. How long do you think such a tool is likely to last you? Its sensible construction is responsible for this remarkable wear, for in designing it, every effort was made to avoid the defects which other reversible screw drivers were known to possess. In this reversible screw driver **one of the grooves is cut deeper than the other,** and in that simple, sensible manner the tool is made without any intersecting points of grooves at all; hence the remarkable wear it gives. The operation, too, is simple and easy, and if desired, the spiral can be locked instantly and the tool used as an ordinary screw driver at different lengths. This tool has proven one of the popular tools that we make. With each tool we supply three bits, two of them double end.



Send for Free Book, "TOOL PRACTICE"

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$38.95 BUYS COMPLETE BATHROOM OUTFIT



MODERN PLUMBING AT ½ ORDINARY COST

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JOHN HARDIN & CO.

Established 1876

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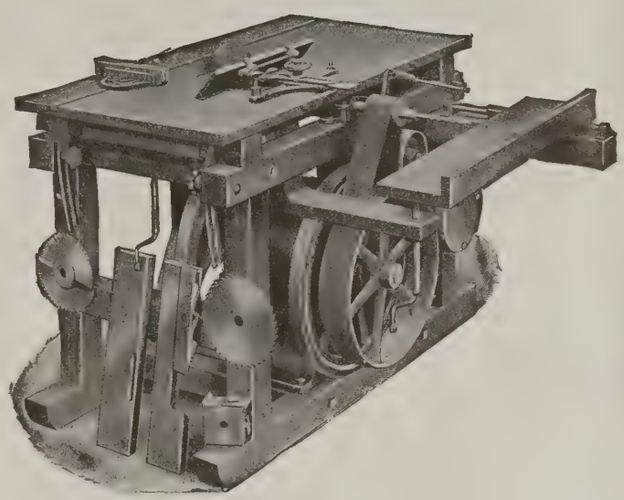
CHICAGO

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AN

"AMERICAN" SAW BENCH

MEANS MORE PROFIT ON THE JOB



The contractors making the most money today are those who are cutting out the little expenses on their jobs.

One of the greatest "Expense Cutters" ever put on the market is the "American" Portable Saw Bench—a machine for doing what has hitherto been done by costly hand labor, or else done at the mill, involving delay.

When you have an "American" Bench, you have, right on the job, the following:—

Rip Saw	Dado Machine	Boring Machine
Cut-off Saw		Rabbitting Machine
Gaining Machine	Mitre Saw	Jointer
Grooving Machine	Matcher	Moulder

They're all in the "American" Bench with self contained power, either gasoline or electric motor—ready at a moment's notice, always on the job.

Figure for yourself how much you could save on one contract by using "American" methods instead of hand labor.

AMERICAN SAW MILL MACHINERY CO.

Woodworking Machinery of All Kinds

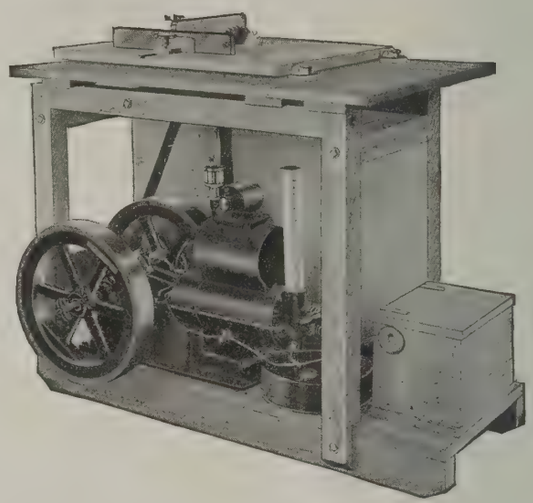
Solid and Inserted Tooth Circular Saws

80 Laight Street
HACKETTSTOWN,
NEW JERSEY

1650 Hudson Terminal
NEW YORK CITY
NEW YORK

$165.00

For this Portable Saw Rig Complete
9 Machines in One



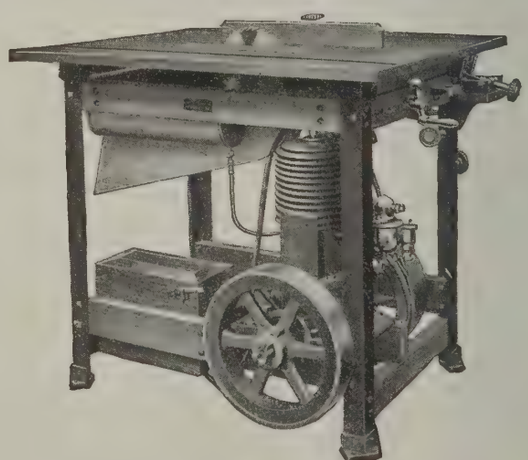
Will rip 2″ and cross cut 3″ lumber
Write for descriptive folder

C. H. & E. Manufacturing Co., Inc.

319 Mineral St. Milwaukee, Wis.

Have You Investigated

The Grimm Woodworker



Type "A" with 4 H.P. Gasoline Engine. Weight equipped for work 350 lbs.

Nine Machines in One

8-inch Rip Saw	Boring Machine (3 bits)	4-inch Jointer
8-inch Cross Cut Saw	Moulder (8 prs. knives)	Jig Saw (3 blades)
6-inch Dado Head	10-inch Sander	Two Emery Wheels

Progressive building contractors are fast coming to realize the importance of substituting practical machines for hand labor. The **Grimm Woodworker,** furnished either with gasoline engine or electric motor and combining so many important attachments in one machine, is undoubtedly one of the greatest time, labor and material savers yet brought out.

Write for descriptive booklet and our attractive selling plans.

Grimm Manufacturing Company

42 Erie Street, Buffalo, N. Y.

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ANNOUNCEMENT

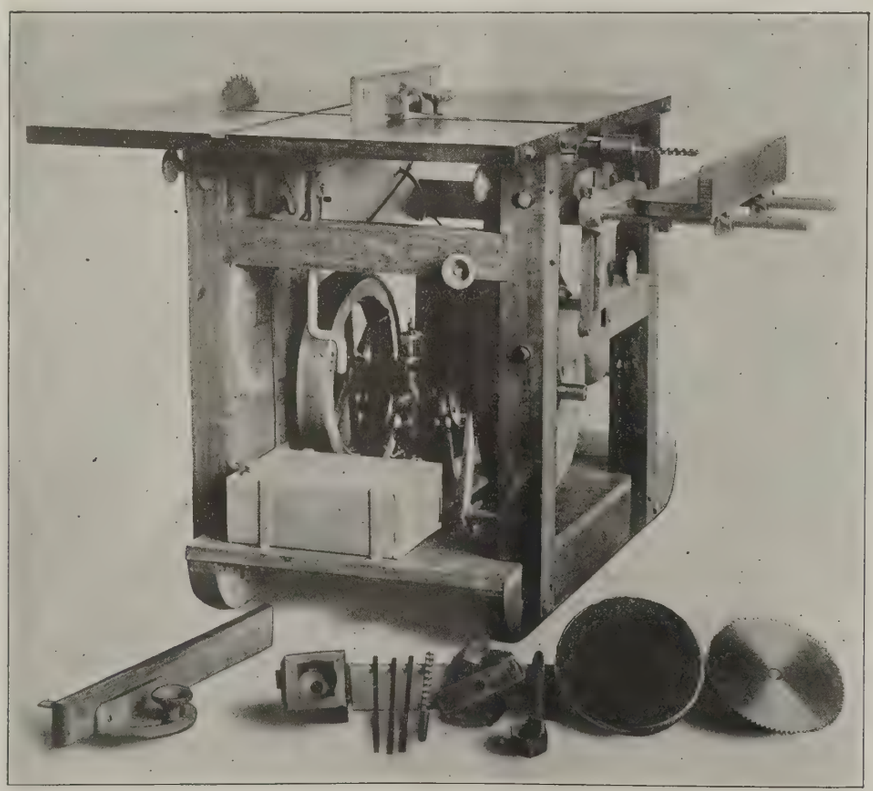
A year ago we commenced work on a portable saw rig, feeling sure, after talking with many contractors, both large and small, that this would fit the builders' work exactly—and overcome the drawbacks found in other portable rigs, such as lack of power, quality, attachments, service and ability to stand up under the most severe working conditions.

We have designed this superior rig with all the labor saving devices and none of the defects found in others. We are building them in the most modern and up-to-date factory, so well equipped in every way that it allows us to make an exceptionally low price on our rigs. We have so much confidence in them that we will sell you one on the following conditions:

IF NOT SATISFACTORY RETURN AT OUR EXPENSE

No charge for these attachments:

- 10-inch Ripsaw
- 10-inch Crosscut Saw
- 12-inch Jig Saw
- Boring Outfit
- 10-inch Sander
- 6-inch Dado Head
- 2½-inch Jointer Head
- Miter Device



THE OSHKOSH EVEREADY

GUARANTEED FOR LIFE

WRITE FOR ATTRACTIVE PRICE AND FOLDER

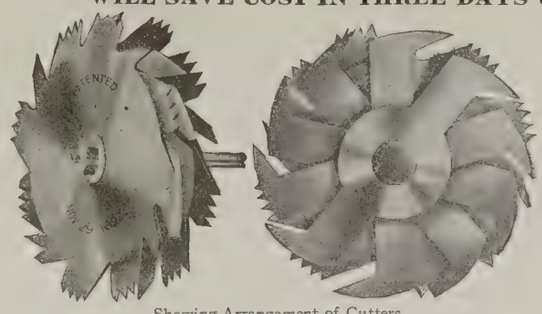
Established 1843 ═══ Capital $250,000

Oshkosh Manufacturing Company

414 S. Main Street, Oshkosh, Wis.

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HUTHER BROS. PATENT GROOVER OR DADO HEAD
WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

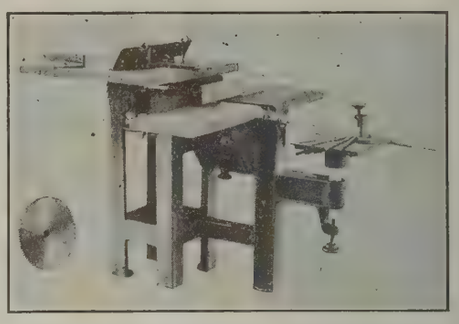
Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N.Y.**

$95.00 BUYS 3 Machines { A SAW BENCH / AN 8" JOINTER / A MORTISER AND BORER

This combination machine is the best value ever offered. It is made of solid cast iron and is furnished complete with necessary tools, belt, etc. Each machine is distinct from the others, and can be operated without interference with them.



You should send at once for literature. It tells all about this new machine.

THE TANNEWITZ WORKS, 41 S. Front St., Grand Rapids, Mich.
WE SELL GASOLINE ENGINES

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw ever placed on the market.

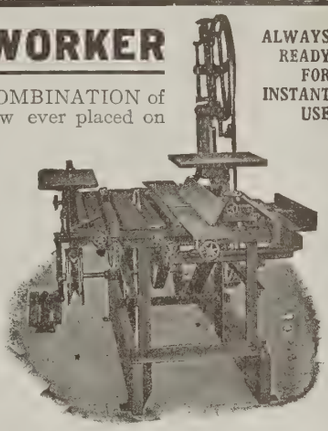
Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

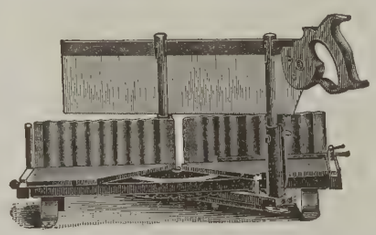
BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best.

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*



PARKS' BALL BEARING MACHINE COMPANY
KNOWLTON AND FERGUS STREETS **CINCINNATI, O.** Canadian Agts., Bournival & Co. St. Barnabe North, P. Q.

GOODELL MITREBOX
Made of STEEL - Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

KEES BEATRICE



Hanging Screen from inside the building

KEES-GOSSETT DETACHABLE SUSPENSION HINGES

Try a pair to hang one of your own window screens.

After that you'll always use and recommend them.

Ask on your letter-head and we'll send a sample set free if you mention your hardware dealer.

F.D. KEES MFG. CO. BEATRICE, NEB.
BOX 810



Screen swung out to wash windows

MATERIAL HOISTS

FOR DOUBLE PLATFORM ELEVATORS



SIMPLE • STRONG DURABLE

The most economical method for elevating building material. Two sizes, 4 and 6 horse power. Contractors, send for Bulletin No. 5 and get our proposition.

Also a full line of engines from 1 to 35 horse power.

Bates & Edmonds Motor Co.
1146 MILL ST., LANSING, MICH.

Barnes Hand and Foot Power Machinery



COMPLETE OUTFIT FOR
Carpenters and Builders

IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

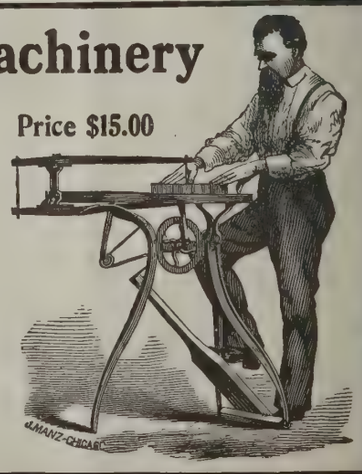
Warranted to be well made; will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

We Make Sixty Styles of Knives

SEND FOR NEW CATALOGUE

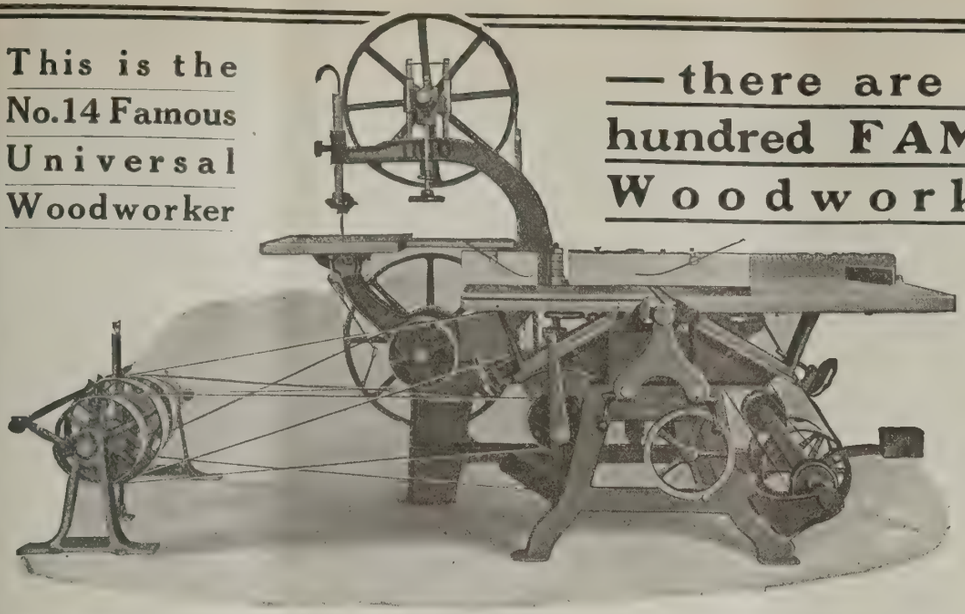
W. F. & JOHN BARNES CO.
436 Ruby Street, Rockford, Illinois

Price $15.00



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This is the No.14 Famous Universal Woodworker



—there are more than six hundred FAMOUS Universal Woodworkers in use

There's no experimenting—no fear of taking chances. The FAMOUS Universal Woodworker has the endorsement of over six hundred carpenters, builders and contractors—*and is guaranteed for life.*

A Real Woodworker—*not a "make-shift"*

If you want more proof than our statements write to FAMOUS users—they'll give you all the proof you require. Their evidence is *indisputable.* The experience of six hundred men in your own line of business should aid you in making your choice.

Every one of these six hundred users has convinced himself that the FAMOUS is a *real* woodworker—not a makeshift piece of machinery, made to sell. Every FAMOUS user is thoroughly satisfied—every one is getting the services of sixteen machines—every one is getting cheaper and better "millwork service" than ever before.

Write today for literature and copies of letters written us by FAMOUS users.

The Sidney Tool Company, Sidney, Ohio

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Taylor Portable Steel Derrick, 2000 pounds capacity. Adjustable capacity and speed to three ways. One man operates both cranks and can hoist with ease 700 pounds. Weight 160 lbs. Made in two sections. A man can climb a ladder with either section. Beam section connects to post by tipping in a vertrcal position. Consider the durability of a derrick constructed of malleable iron and steel and that of wood, *more compact, more powerful.* Roller bearing circle swing. Clears side wall of building three feet. With special platform attachable to side of railroad gondola car for unloading water-pipe, etc. Price of derrick with three way block, brackets, and bolts for attaching to building, $40.00 f. o. b. Chicago.



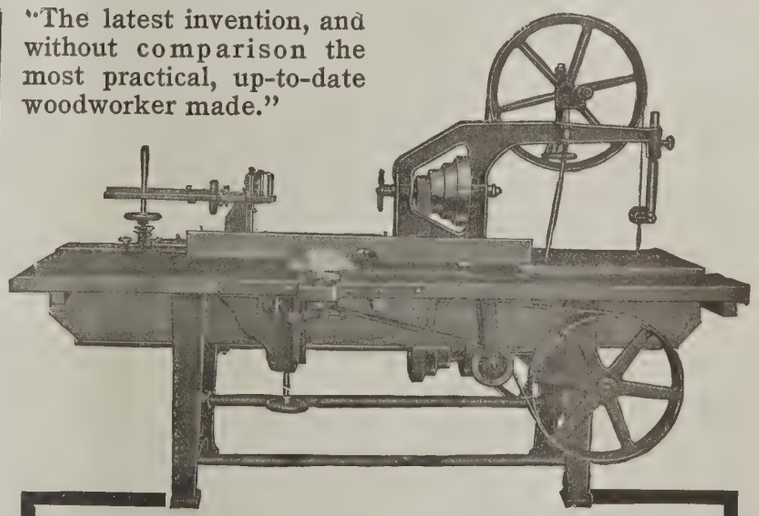
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John L. Taylor
1034 W. Lake St. - - Chicago
Telephone Monroe 3066





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Note the ample size and capacity of the parts which perform the four vital operations in your shop: **1. Lathe**—40″ between centers; **2. Band Saw**—taking 12″ under the guide; **3. Saw Mandrel**—taking saw sup to 12″ dia.; **4. Planer Head**—taking 5″ or 10″ bits. The convenient location, strength, simplicity and easy adjustment of these vital parts, are of the greatest advantage. Drilling, boring, sizing, jointing, moulding work, tenoning and, in short, practically every operation of daily occurrence in a woodworking shop, can be performed on it **without extra attachments.** As an investment, it is a true gold mine. **Three men can work at it at one time.** Lowest power cost. Ask for Booklet 1785.

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Wm. C. A. Stevenson }

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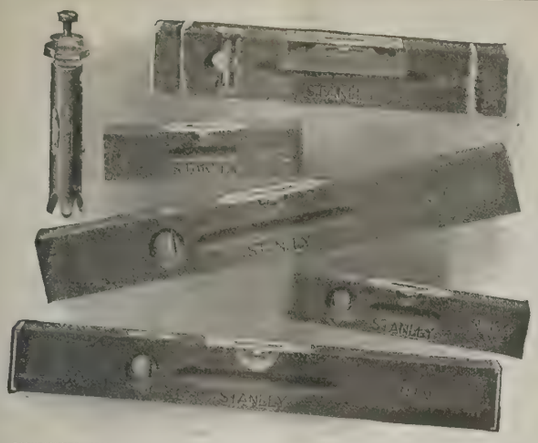
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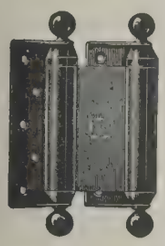
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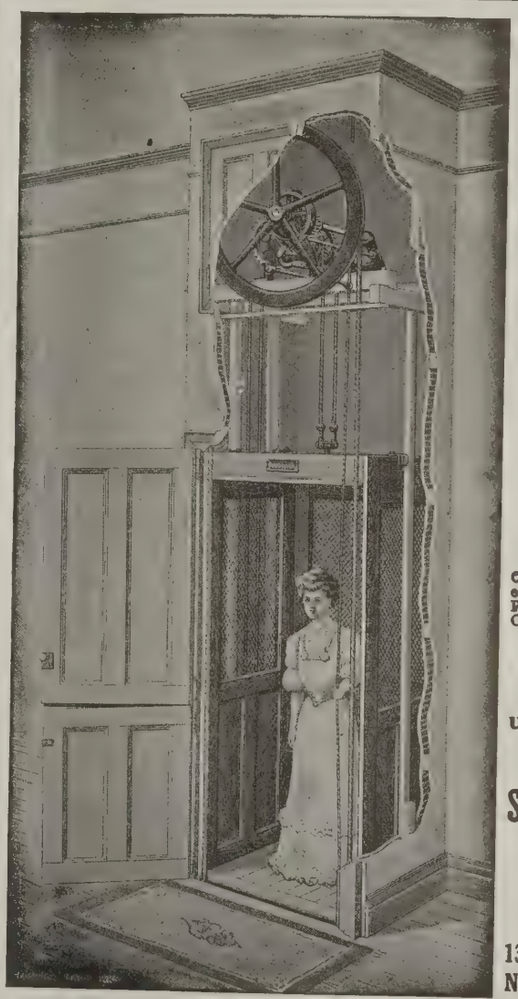
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Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

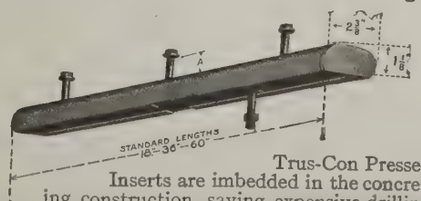
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Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are imbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots. Write for details and prices.

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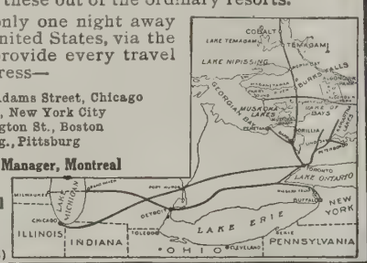
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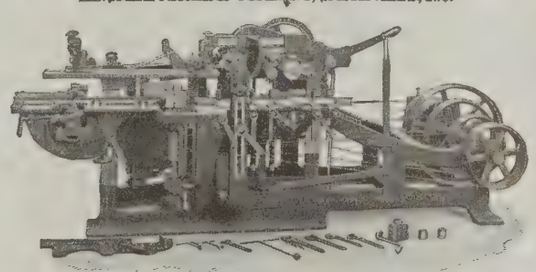
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(8)

Woodworking Machinery

H.B. SMITH MACHINE COMPANY, SMITHVILLE, N.J.



Molding Machines

A RECENT purchaser states, "I consider it the best machine on the market. **There is no question but that it stands in a class all by itself."**

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For durability of construction, ease of operation and simplicity of working parts, the Smith Molder stands supreme.

A complete description of this machine will be mailed immediately upon request. Correspondence invited.

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MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

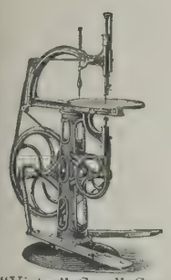
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FOOT, HAND AND LIGHT POWER

WOOD-WORKING MACHINES



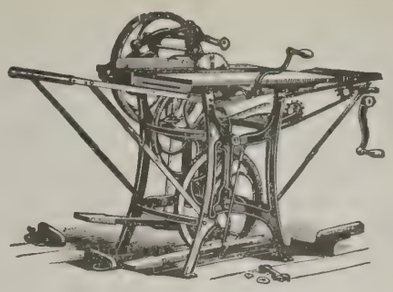
"Victor" Scroll Saw.



"Diamond" Mortiser

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor-saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.

Send for catalog "A" describing our complete line

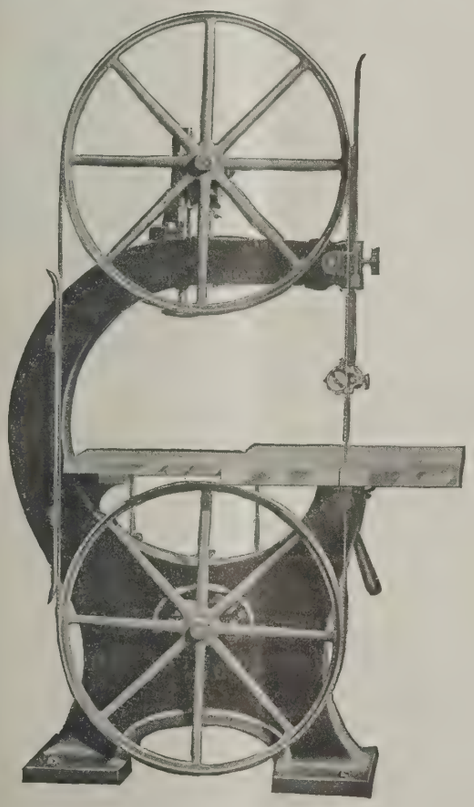


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THE SENECA FALLS MFG. CO.

629 Water Street SENECA FALLS, N. Y., U. S. A. (249)

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CRESCENT

Band Saws satisfy those practical, experienced mechanics who need strong, substantial tools.

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Send for a catalog telling all about these splendid machines, and our line of Saw Tables, Jointers, Borers, Swing Saws, Planers, Planers and Matchers, Wood-Workers, Disk Grinders.

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No. 10 Main Street

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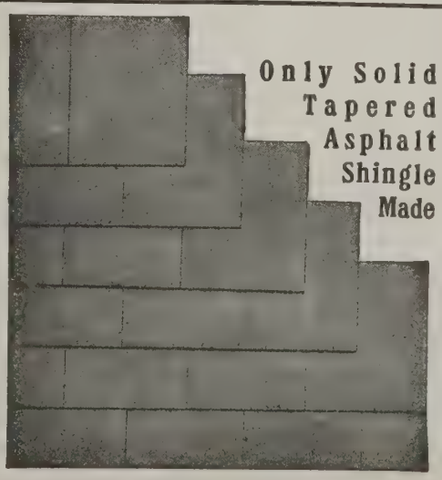
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And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

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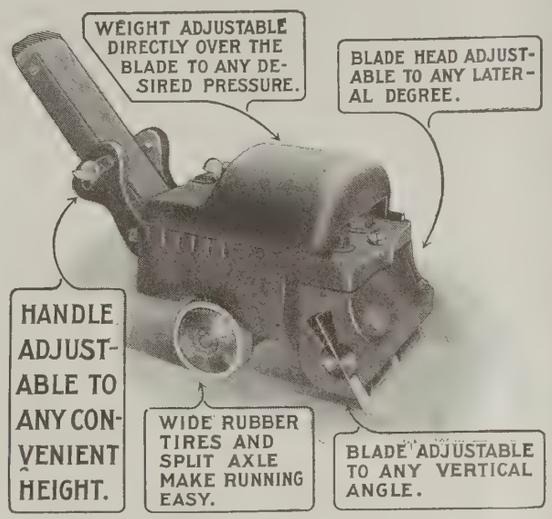
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YOU KNOW

from the picture that the

ADJUSTABLE

Is a Practical FLOOR SCRAPER



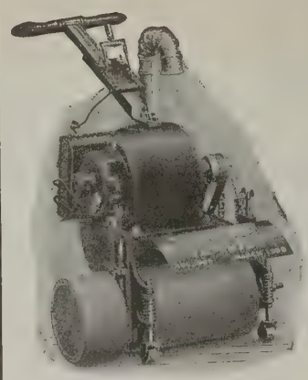
I will send you one **on approval** and let you give the machine a chance to speak for itself in your own hands.

If not more than pleased with its work, ship it back at my expense. If perfectly satisfied, remit **$40,00,** the price to everyone, payment in full.

I will make one profit the day the sale is made, but you will make a profit every day you use it.

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Made in three sizes: 8x18, 8x15, and 8x12 in. Roller Edge Roller easily adjusted to either side

Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

The **Schlueter** will remove all joints or warped edges, and oil, wax, lime stains, or the "muck" from skate wheels, in a most satisfactory manner.

Earning Capacity, $20.00 to $35.00 per Day

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M. L. SCHLUETER

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1001 Flatiron Bldg. NEW YORK.

Acme Floor Surfacing, Laying & Finishing Co. Not Inc.

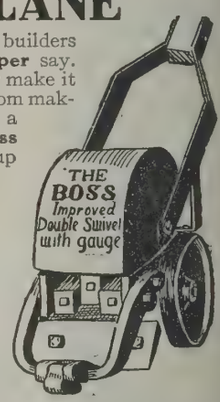
IT'S A SCRAPER BUT IT WORKS LIKE A PLANE

That is what the many satisfied contractors and builders who are using the **Boss Improved Floor Scraper** say.

The **gauge** on the front and wheels at the rear make it like a plane. This gauge, which keeps the knife from making a depression in the floor, gives the knife a double support. It can be set for **any thickness of shaving,** or **instantly removed** for working up into corners.

Deep Cutting is prevented by the pear shaped wheel in front, which lets the knife down gradually to make the cut.

Poor work is **impossible** as with the simple but positive adjustment of this gauge and wheel attachment the knife leaves no mark. The standing attachment cleans the wheel and takes off the rosin when working hard pine.



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BUY A GOOD ONE—IT PAYS!

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No wasted energy pulling a dead weight.

About half of all the Triple "A"s sold have been bought by owners of dead weight machines. What's the answer?

"Get the best first and save extra expense."



The Triple "A" to be appreciated needs only to be seen in operation.

For advertising purposes we will give a special discount on the first machine sold in each town.

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The WEBER DOUBLE ACTING Floor Scraper

The WEBER knives adjust to any desired slant for perfect work on all conditions of flooring. The WEBER is guaranteed not to chatter nor leave waves. The knife is held to its work—not by a dead weight—but by a flexible joint—similarly to action of human hand. The WEBER scrapes forward and backward. It has two knives, either of which can be brought into instant action. This rests you—saves your time—and enables you to scrape the centers of very small rooms. I guarantee perfect work in either direction. The saving in time and money in a year is a big item. The WEBER scrapes right up to the wall. By adjusting the handle to the right or left (see dotted lines), the extreme edge of the knife comes into direct draft with it. You can scrape right into the very angle of the floor without side draft, or marring the baseboard.

Try It Five Days FREE

Send for this scraper. Take it right out onto the job. Put it up against any other scraper made—on any kind of flooring. If its work isn't better in every way, return it.

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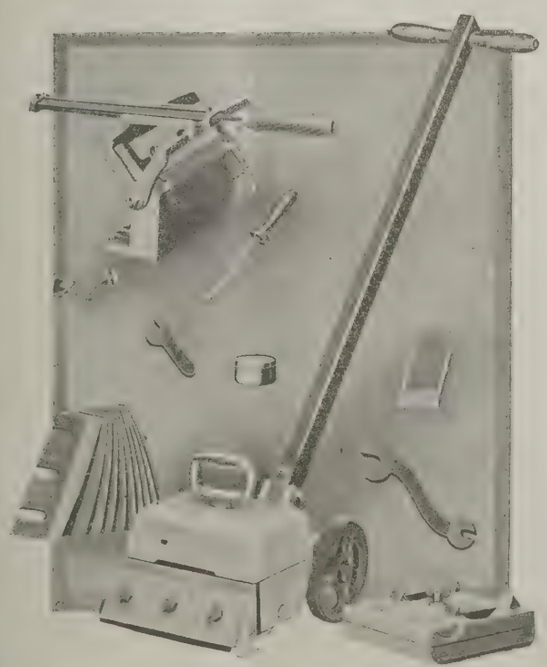
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This is my latest model. Note the handle adjustment, two knives, excellent balance, and workmanlike finish thruout. Made to save time and it *does* it.

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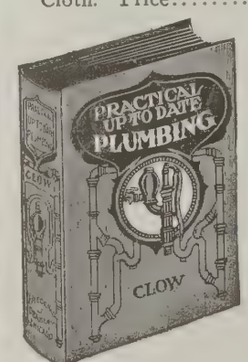
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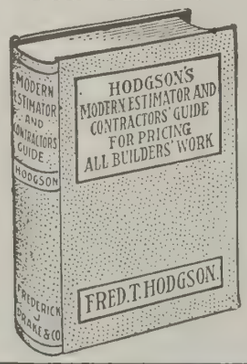
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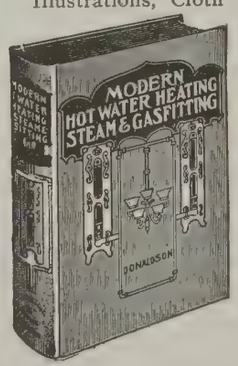
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One of the most desirable books for the general builder to have, is a good and reliable work on estimating; and we are certain the book we are now offering, if the large number of favorable testimonials and press notices we have received is any indication, is one of the best, and most reliable books on the subject that has ever been published on this continent—or any other for that matter. We have no hesitation whatever in recommending this book to our patrons who want a good work on estimating. The work gives a lengthy and clear explanation of the several methods employed in estimating, among which may be mentioned, "Estimating by comparison," "Estimating by the cubic foot," "Estimating by quantities," "Estimating in detail," and several other systems.

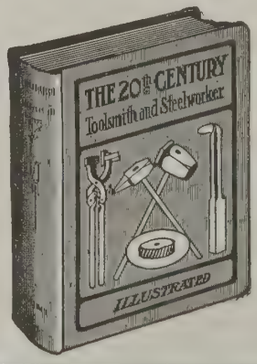
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It is not comprised of quack theories or foolish ideas, and is not written by a college student, who knows nothing except what he has been told or gathered up from papers and periodicals. But is written by a thorough expert mechanic who has spent the best part of his life over the anvil with the hammer and tongs.

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As to the Patent Situation on Asbestos Shingles

Some of our competitors have been misrepresenting a decision and injunction obtained from the United States Courts alleged to prevent us from selling Asbestos Shingles.

READ THE LATEST INJUNCTION ISSUED BY THE COURT

THE PRESIDENT OF THE UNITED STATES to
ASBESTOS SHINGLE, SLATE & SHEATHING COMPANY,
GREETING:

WHEREAS, it has been represented to us in our Circuit Court of the United States for the Southern District of New York that you, the said Asbestos Shingle, Slate & Sheathing Company, have misrepresented to the public the force and effect of a certain interlocutory decree entered by said court on the 16th day of February, 1911, in a certain suit brought by said Asbestos Shingle, Slate & Sheathing Company, and Ludwig Hatschek, against the H. W. Johns-Manville Company, and also the force and effect of our writ of injunction issued thereunder on the 18th day of February, 1911.

NOW, THEREFORE, we do strictly command and enjoin you, the said ASBESTOS SHINGLE, SLATE & SHEATHING COMPANY, from in any way advertising in words or in substance that this court has held that any cement shingles hitherto made and sold by the defendant H. W. Johns-Manville Company infringe on any of the claims of the patent in said suit, or from issuing any circulars or in any other way publishing abroad or saying, or writing, that this court has held that no cement shingles can be purchased except from the complainant, or that all the claims of the complainant were upheld by the interlocutory decree herein, or in any other way misstating the effect of the said decree, or of publishing the whole or any part thereof or the substance of the same, so that it shall mislead any reader as to its meaning or effect, and

We do further strictly command and enjoin you, the said ASBESTOS SHINGLE, SLATE & SHEATHING COMPANY, that whenever you shall advertise the interlocutory decree of this court entered in said suit, or any part thereof, or the substance of the same, in connection with the words "cement shingles," or "asbestos shingles" or the like, that in every such case the said advertisement or circular or other means of publication shall make equally salient to the eye the fact in substance that the said decree of this court forbade the making, vending or using of cement or asbestos shingles or the like, **made upon a paper-making machine,** and that said advertisement shall nowhere contain any statement that the decree of this court forbade the making, vending or using of any cement or asbestos shingles unless such statement be accompanied as aforesaid with the statement in substance that the said shingles so forbidden are those made upon a paper-making machine.

WITNESS THE HONORABLE EDWARD D. WHITE, Chief Justice of the Supreme Court of the United States, at the City of New York, on the first day of June, 1911, and in the hundred and thirty-fifth year of the Independence of the United States.

JOHN A. SHIELDS, Clerk of the Circuit Court.

We have been and are selling shingles which do not infringe our competitors' patents, because they are made by a new and better process, covered by letters patent which we control.

J-M Transite Asbestos Shingles
are not made like paper on a paper-making machine

The facts are that if you want Asbestos Shingles **made on a paper-making machine,** you must secure them elsewhere. We do not make that kind. But if you want the latest and best form of Asbestos Shingles made by the most improved methods, you can get them from us and no one can stop your using them.

Advise Us and We Will Protect You

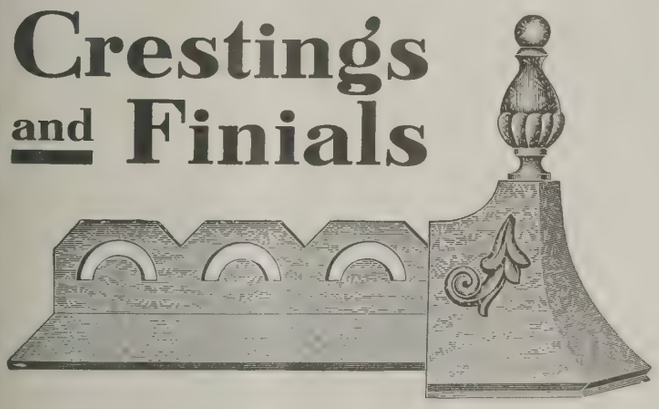
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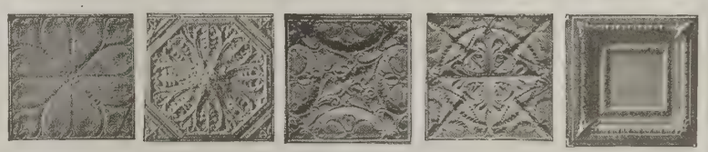
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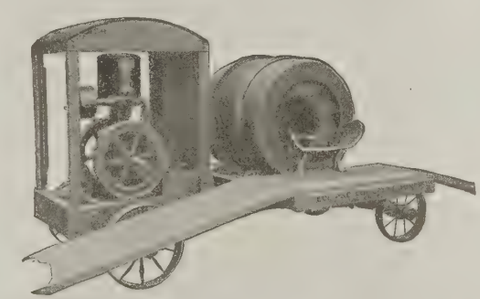
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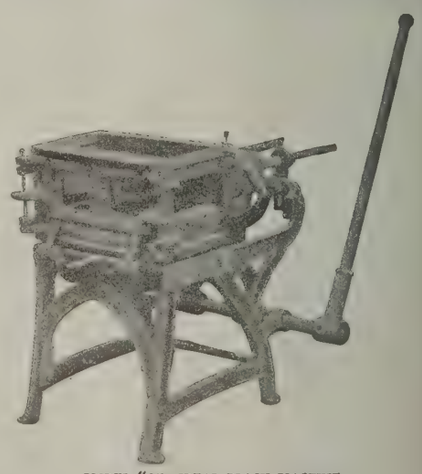
The man who looks ahead is the man who gets ahead.

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Architects are referred to Sweet's Index, pages 28 and 29

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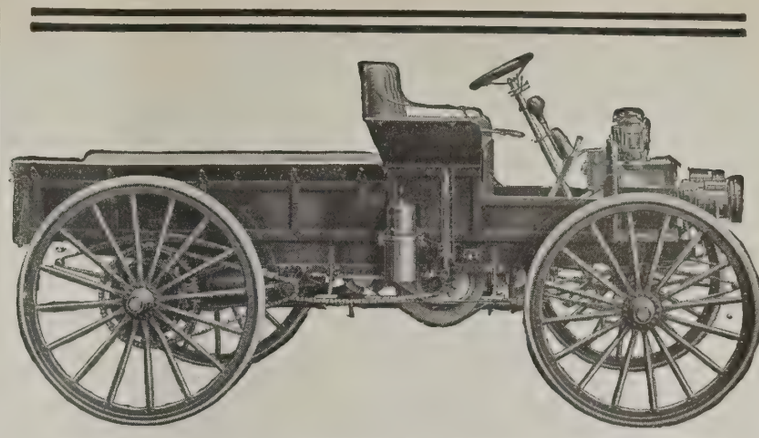
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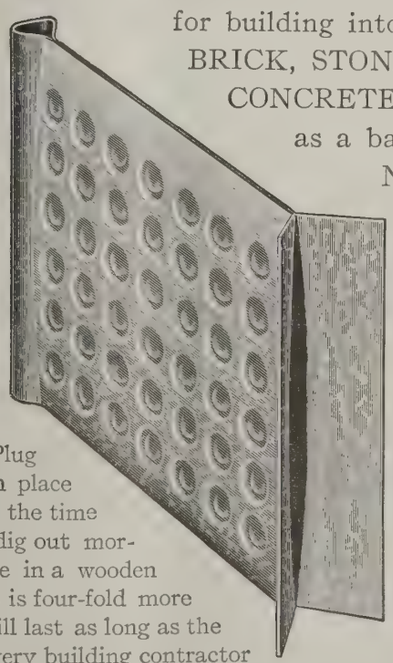
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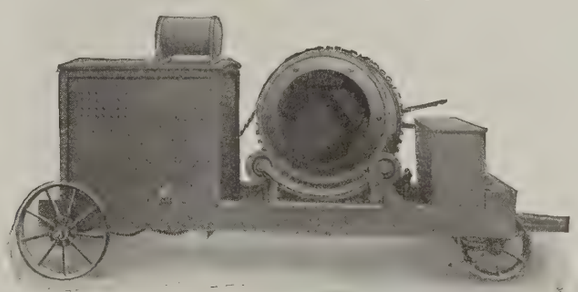
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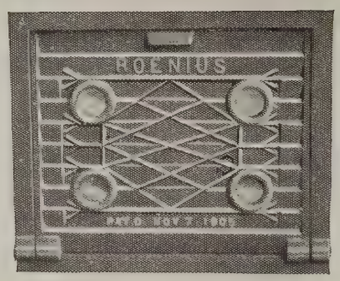
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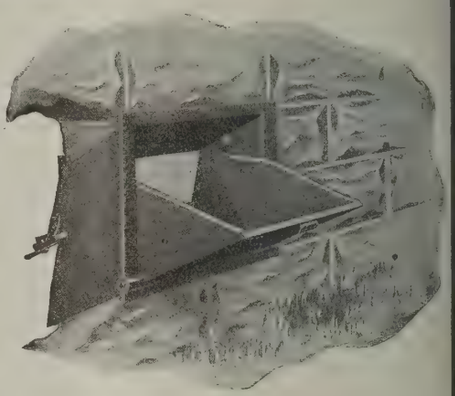


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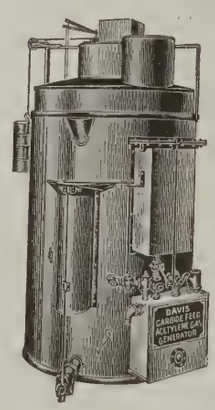
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Mr. Contractor and Builder



Why not equip the home or other building you are erecting with

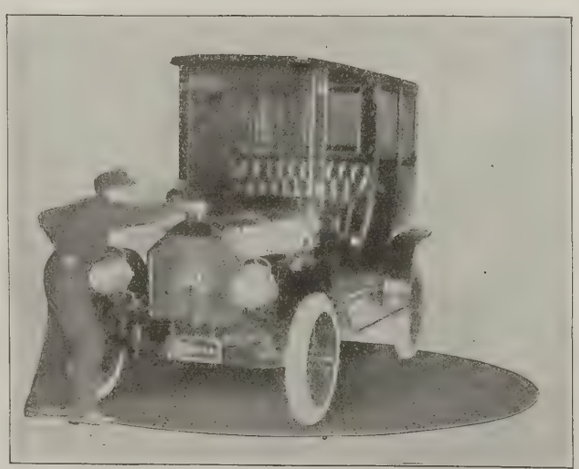
Acetylene Lighting?

You can greatly increase your income by selling Davis Acetylene Lighting Plants, for new buildings, and during dull seasons for buildings already erected.

Write us for cost of equipping a building and for our terms as salesmen.

Davis Acetylene Company

35 Prospect St., Elkhart, Indiana



You Need A Turntable

Wherever automobiles are handled in crowded quarters a turntable is indispensable. Don't get a poor one—get a good one at the same price

When the Lansing Wheelbarrow Company, with its large organization and large equipment, determined to make turntables, it undertook the task with the express intent of producing the very best **turntable** in the largest quantity, giving the user the favorable advantage of price. There are no other equally good **turntables** at any price, and if they approach it they certainly cost you more. Let us send you our elaborately and beautifully illustrated booklet on TURNTABLES.

WRITE FOR CATALOG N. T.

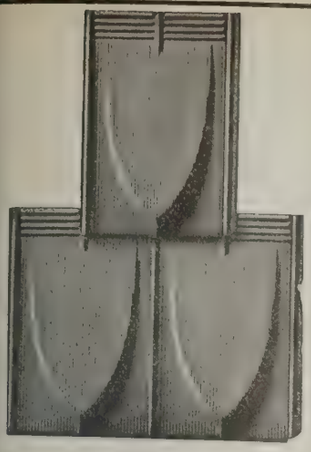
LANSING WHEELBARROW CO.

14 Grand Street, LANSING, MICH.

Branch Warehouses:

102 N. Moore Street, New York
330-4 N. 1st Street, Minneapolis,
American and Willow Streets, Philadelphia
169 W. Lake Street, Chicago
789 Folsom Street San Francisco
923 Mulberry Street, Kansas City

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Showing Method of Laying

"TITELOCK" METAL SHINGLES

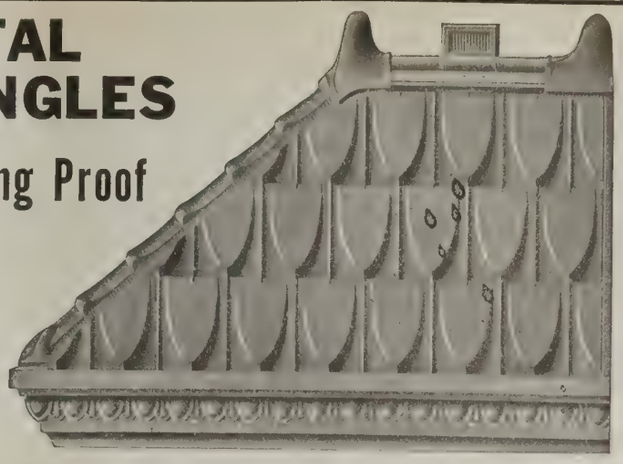
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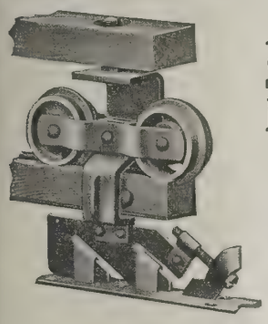
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MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.



Ask your Dealer to Show you a Le Roy House Door Hanger

Put one on your next job. You'll be pleased. Perhaps the very hanger you've been looking for. Remember the name

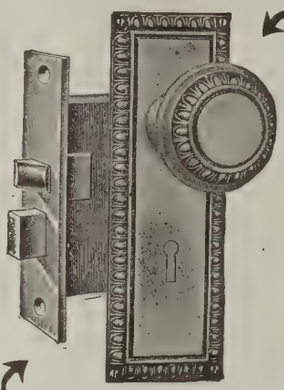
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Aurora, Illinois

RICHARDS AURORA TRADE MARK



No. 5311. Inside Lock Set
Steel, Old Copper Finish.
PRICE PER SET 37c.

—STOP—

And consider the price on this Lock Set, then send for our Illustrated Catalog of Builders, Hardware, it is full of prices that will save you money.

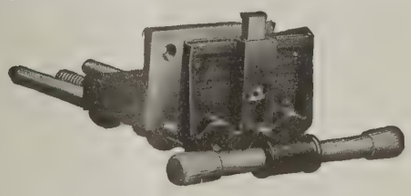
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We do not sell to Contractors or Carpenters in COOK COUNTY

REHM HDWE CO., 1503 Blue Island Ave., CHICAGO, ILL.

The Roller Nut Vise

Rapid Action Continuous Screw



Showing No. 70 D

WE recommend this vise as being the simplest, strongest and best Rapid Action Vise made. Of the most simple construction ever put on the market—the entire mechanism is in the Roller Nut which comprises only two pieces rolling on the screw. There are no parts to lose or get out of order. Made only in two sizes.

No. **70,** jaws 7 inch wide, 4 inch deep; opening 9 inch, for bench 3 inch thick or less. Each..... **$4.10**

No. **70 D,** same as No. 70 with adjustable dog as shown on above cut..... **4.50**

No. **80,** jaws 10 inch wide, 4 inch deep; opening 12 inch, for bench 3 inch thick or less. Each..... **4.90**

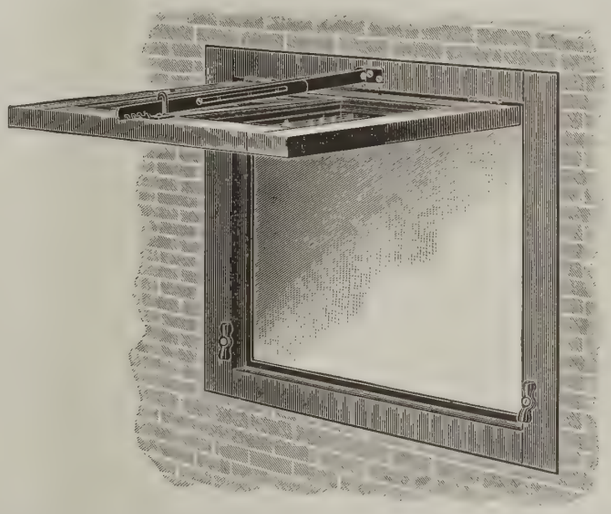
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ORR & LOCKETT HARDWARE CO.

Established 1872

14-16 W. Randolph Street - - - CHICAGO



Diehl's Adjustable Basement Window and Transom Lift, No. 24

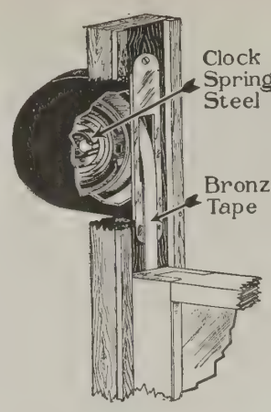
This lift is so coustructed that it can easily be adjusted by simply loosening a bolt and pushing it together or slipping it apart to fit any size of window frame from a 14 to a 20 inch sash. It works automatically and will hold the window open at three different angles. This lift is easily applied by engaging the first notch in the catch at bottom of window and screwing it fast on the casing at top.

Manufactured by

Diehl Novelty Company

Sheboygan, Wis.

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Unit Sash Balances

Patent Pending

Take the place of weights and cords in new buildings. Cost less than weights and cords. Weights and cords are always getting out of order, Unit Balances never are. Unit Balances have uniform face plates—All mortises cut at the mill.

UNIT BALANCES are Sold at a Flat Rate Per Window

Send for New Catalog with Detail Drawings and Prices

PULLMAN MFG. CO., 10 ALLEN STREET ROCHESTER, N. Y.

WHEN YOU GET TO **SASH CORD** USE **SILVER LAKE**

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.

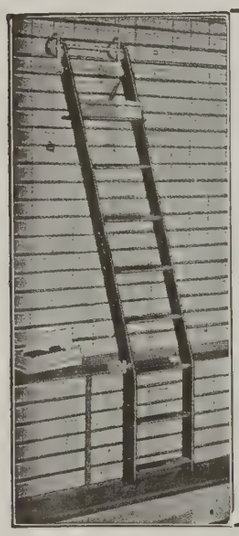


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Was originated by us, and for forty years has been recognized as—

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Mr. Carpenter and Builder

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by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

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Send no money—just mail to us your name and address. Your book will reach you by return mail. Keep it 5 days—use it—then either send One Dollar or return the book.

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ESTIMATING DATA

Every Man in the Building Trade needs it.

READ WHAT OTHERS SAY:

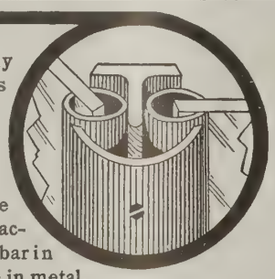
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Makes any angle, allows for settling of building—keeps windows from frosting. The most beautiful, practical and durable bar in the world. Made in metal.

"Holds with a grip of iron, yet with a touch of velvet." Glass set from the outside. More good features explained in our catalog—it's fine—send for a copy before you build or repair. Write today.

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Universally Recognized

As the leaders in Architectural Beauty and Quality.

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We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, **that's why** we are selling more columns today than ever before. Ask for Catalogue "T" -it's worth having for any **Home Builder.** Send for catalogue T 27 of pergolas, sun dials and garden furniture or T 40 of wood columns.

We manufacture a full line of porch material and Interior Hardwood Columns.

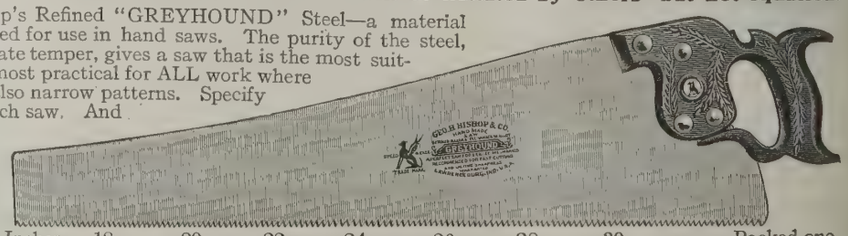
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SPEED & EASE TRADE MARK.

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They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers

Lawrenceburg, Indiana

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Brick Mantels AND Face Brick

"Bradford Reds"



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"Trade Mark Registered"

Brick Mantels Made of Really Red Red Pressed Brick from

BRADFORD'S

Peculiarly Warm Colored Shale. A1 Standards, Romans, Ornamentals in all shapes, Circle Brick, Pilasters, Panels, etc.

Directions for setting the Complete Mantel are so explicit that the assembling is simple, resulting in Fireplaces at once satisfying to good taste, everlasting in material and at a cost acceptable to the home builder.

BUILDERS AND CONTRACTORS

are invited to correspond with us. Get the facts and keep the round profits that are legitimately yours.

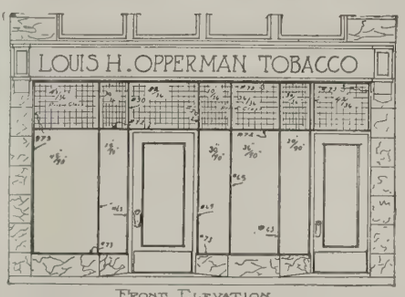
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The Petz Bar for modern store front construction has proved its superiority. You don't have to use it on our "say-so." It has "made good" in thousands of cases, and shows itself to be safe, strong and sure.

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Our Door Lock Mortiser

IS A PROFITABLE INVESTMENT

Our Proof:

To allow any reliable contractor ten days' trial.



Our Claim:

It will cut an opening for a mortise lock in three minutes in any kind of wood, plain or veneer.

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What can you do that any one of a million others could not do just as well? How much result-increasing or expense-decreasing knowledge can you bring to bear in your work? Have you any special ability? Is there any reason why an employer should single you out for more than average pay? Or are you just an average workman?

Look the facts in the face. "What can you do?" "How well can you do it?" "How much are you worth from your neck up?"—that's the line of talk Old Industry hands out to the candidate for prosperity. Are you ready with the answers?

If you knew the ins and outs of some trade or profession—if you knew the **why** as well as the **how**—you wouldn't have to ask for more pay. You'd just naturally get it. The **Help Wanted** columns of trade papers teem with appeals for trained men. Draftsmen are wanted; foremen are wanted; superintendents are wanted; machine designers are wanted; chemists are wanted; advertising men are wanted; electrical, civil, mechanical, and mining engineers are wanted; architects are wanted. Your salary will always be governed by the kind of work you are prepared to do. How much salary are you worth?

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Structural Engineer	Mechanical Draftsman	Commercial Illustrat'g
Structural Draftsman	Stationary Engineer	Bookkeeper
Concrete Construction	Electrical Engineer	Stenographer
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Name _____

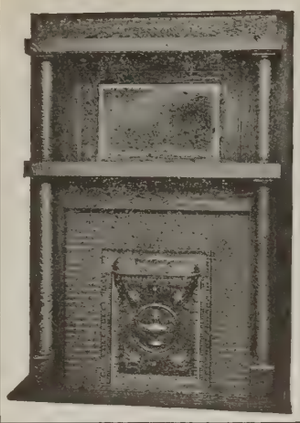
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Showing the best selection of mantels at the most
Reasonable Prices
If you are building a home, don't delay, write today for a catalog. It will be money saved for you.
Special Prices to CONTRACTORS and BUILDERS.
Moormann & Otten
611-613 Main, Cincinnati, O.

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CARPENTER'S SPECIAL

Try it at Our Expense

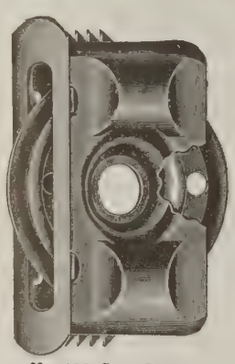
Until your dealer becomes stocked with this new combination India Oilstone we will send one on trial, express paid, for $1.00. Try it ten days. If not satisfactory return and receive your dollar back,
PIKE MFG. CO. .. PIKE, N. H.

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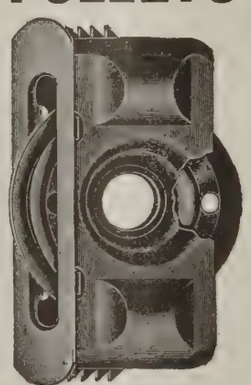
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A Book Showing How to Joint, Set, and File All Kinds of Saws

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CHAS. MORRILL, 275 Broadway, New York



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Sebco Expansion Bolts

As a matter of fact practically all the live mechanics of the country are users of Sebco Expansion Bolts. Every Carpenter who has work to do that entails the fastening of fixtures to walls where ordinary screws will not hold, should learn to use the Sebco Expansion Bolts for heavier work and the Sebco Screw Anchors for lighter work. These Expansion Shields are a patented device made of composition metal with two shields grooved inside and teethed outside. When the screw is inserted in the shield it expands with each turn, making it impossible to pull out. You should let us send you some working samples and our catalog—we illustrate and describe many uses for our Expansion Shields and other products that will interest you and show you a way to do better work at no additional cost for labor or material. Tell us the work you are doing; we will offer suggestions and send you working samples.

Star Expansion Bolt Co.

147-149 Cedar St. Cat. Dept. 30. New York City

STAIN AND PRESERVE YOUR ROOFS

A handsomely stained roof gives distinction to the commonest house, and the rich, velvety moss-green and tile-red shades of

CABOT'S Shingle Stains

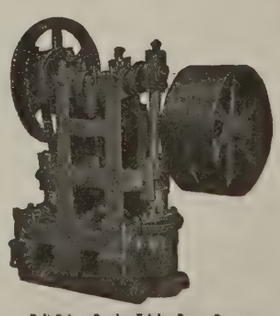
not only beautify the shingles, but thoroughly preserve them. They are made of Creosote, "the best wood Preservative known," and the finest and strongest colors, ground in linseed oil. They cost half as much as paint, can be applied at half the labor cost, and are suitable for shingles, siding, and other exterior woodwork. *You can get Cabot's Stains all over the country. Send for samples and name of nearest agent.*



Stained with Cabot's Shingle Stains
Train & Williams, Architects, Los Angeles, Cal.

SAMUEL CABOT, Inc., Manfg. Chemists, Boston, Mass. 350 Dearborn Av., Chicago

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Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our Power Pump Catalogue

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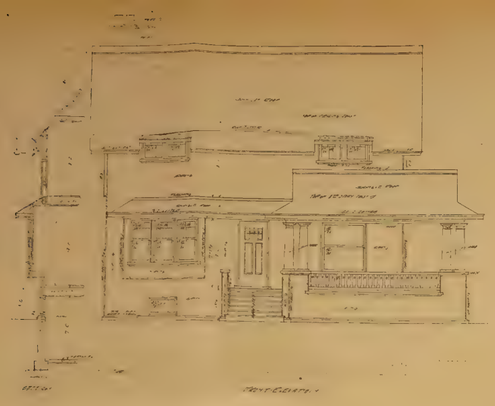
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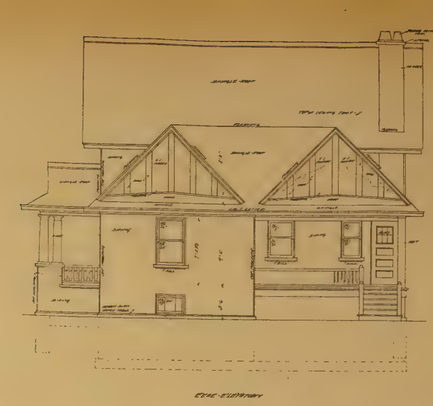
FRONT ELEVATION



SIDE ELEVATION



SIDE ELEVATION



REAR ELEVATION

SUPPLEMENT TO

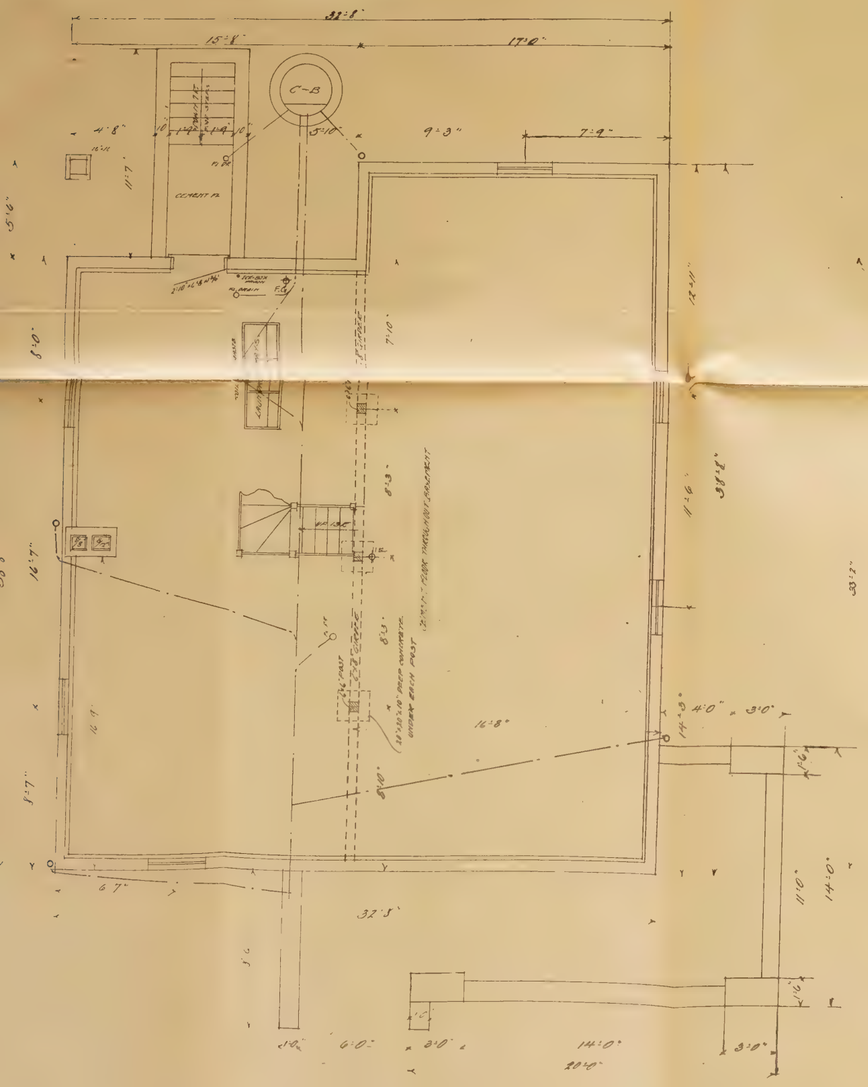
THE NATIONAL BUILDER

AUGUST, 1911

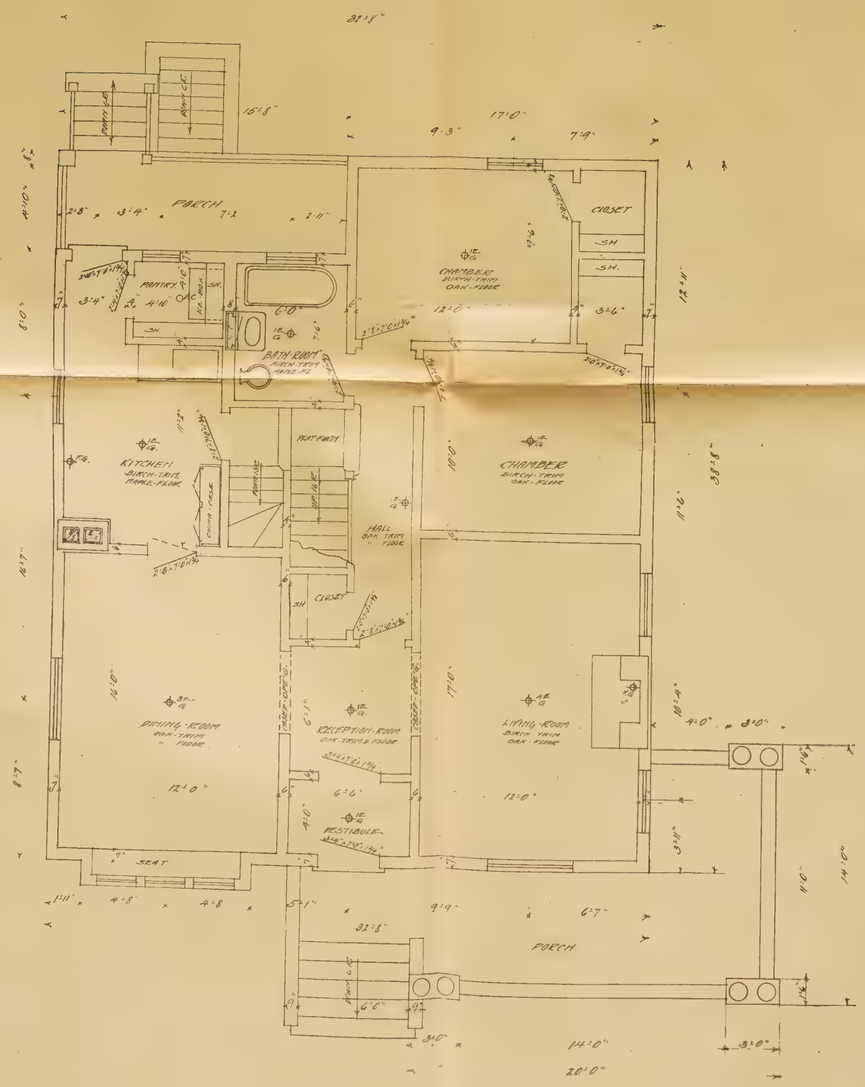
NATIONAL BUILDER DESIGN No. 344, THE WEBB HOUSE

SCALE FOR FLOOR PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 8 FEET.

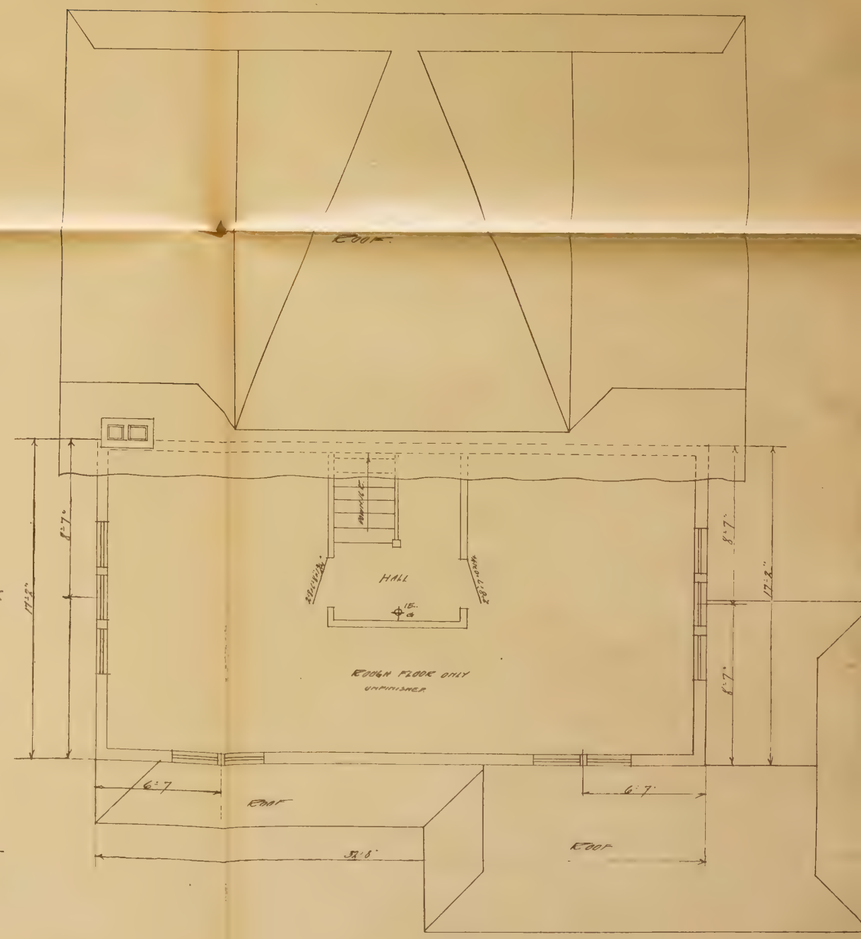
FOR ESTIMATE SEE PAGE 29



BASEMENT-PLAN



FIRST-FLOOR-PLAN



SECOND FLOOR PLAN

THE NATIONAL BUILDER

Vol. 52 CHICAGO, AUGUST, 1911 No. 8



THE WEBB HOUSE, built near Chicago, Ill.

NATIONAL BUILDER DESIGN No. 344

Perry and Thomas, Architects, Chicago

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $3,390.74

IN the house shown on this page, and in detail on the supplement sheet, we have the ideal home for a small family. Complete on the first floor, it takes the form of a five-room bungalow, while at slight additional expense the second floor may be finished into two good rooms. Possibly the only use of the second floor would be for storage or a rainy day playroom for the children, but in time it is probable that at least one room would be finished off for the use of the occasional guest.

ESTIMATE OF THE WEBB HOUSE

The estimated cubic feet within the walls of this building from bottom of cellar is 30,800, which makes the average cost very nearly 11 cents per cubic foot.

EXCAVATING AND MASONRY.

250	yards excavating, 35c	$ 87.50
136	yards cement floor, 40c	54.40
1,070	cu. ft. concrete walls, 25c	267.50
36	lineal ft. double flue, $2	72.00
	Cap	5.00
144	lineal ft. cement water table, 15c	21.60
25	yds. cement plaster, 75c	18.75
	Total excavating and masonry	$526.75

LUMBER BILL.

		Feet.
12,	2x6x16 ft. plates	168
12,	2x4x16 ft. plates	128
2,	6x6x14 ft. posts	84
1,	6x8x16 ft. girder	64
1,	6x8x18 ft. girder	72
32,	2x10x18 ft. first floor joists	960
28,	2x10x16 ft. first floor joists	747
50,	2x10x14 ft. second floor joists	1,167
10,	2x10x18 ft. second floor joists	300
12,	2x10x16 ft. second floor joists	296
18,	2x8x14 ft. porch joists	336
8,	2x8x16 ft. porch joists	171
30,	2x6x16 ft. collar beams	480
30,	2x4x16 ft. porch ceilings	320
28,	2x4x12 ft. porch rafters	224

60, 2x4x16 ft. main rafters	640
36, 2x4x12 ft. main rafters	288
8, 2x4x20 ft.	107
14, 2x4x14 ft.	131
60, 2x4x16 ft. plates	640
75, 2x4x18 ft. first story partitions	900
20, 2x4x16 ft. second story partitions	213
150, 2x4x18 ft. outside studding	1,800
40, 2x4x12 ft. gables	320
30, 1x6x12 ft., No. 1 com	180
20, 2x2x18 ft., No. 1 com	120
20, 1x4x12 ft. bridging, No. 1 com	80
Total feet framing lumber	10,936
10,936 ft. framing lumber at $27	$295.27
1,700 ft. No. 2, 8-inch boards, rough floors, $27	45.90
2,600 ft., No. 2, 10-inch boards, outside sheathing, $27	70.20
2,250 ft. 1x6, No. 2 sheathing, for roofs, $27	60.75
22 M. R. C. shingles, $4	88.00
3,000 ft. ½x4 inch siding, $30	90.00
1,080 ft. 2¼ face oak flooring, $90	97.20
220 ft. 2¼ face maple flooring, $60	13.20
136 ft. 1x4x12 ft. fir flooring, $45	6.12
270 ft. 1x4x14 ft. fir flooring, $45	12.15
130 ft. ⅝x4x12 ft., ceiling, $32	4.16
260 ft. ⅝x4x14 ft. ceiling, $32	8.32
160 ft. ⅝x4x12 to 16 ft. ceiling, for cornice, $32	30.72
4 2x8x16 ft. W. P. finish, $60	2.58
200 lineal ft. 1x6, fir finish, $45	4.50
140 lineal ft. 1x4, fir finish, $45	2.07
200 lineal ft. 1x8, fir finish, $45	5.98
64 ft. 1⅜x12x14 ft., fir finish, $45	2.88
54 ft. 1⅜x12x12 ft., fir finish, $45	2.43
Total lumber bill	$842.43

MILL WORK.

6 cellar window frames, 32x18, div., $1.75	$ 10.50
6 cellar sash, 32x18, div., $1.50	9.00
1 outside cellar door frame, 2 ft. 10 in. x 6 ft. 8 in.	2.25
1 cellar door, 2 ft. 10 in. x 6 ft. 8 in. x 1¾	3.50
1 outside door frame, 3 ft. 4 in. x 7 ft. 0 in.	2.50
1 outside door frame, 2 ft. 10 in. x 7 ft. 0 in.	2.50
1 set jambs, 3 ft. 4 in. x 7 ft. 0 in.	1.00
2 sets jambs, cased openings, $1.25	2.50
5 sets jambs, 2 ft. 8 in. x 7 ft. 0 in., 70c	3.50
2 sets jambs, 2 ft. 4 in. x 7 ft. 0 in., 70c	1.40
2 sets jambs, 2 ft. 0 in. x 7 ft. 0 in., 60c	1.20
2 sets jambs, 2 ft. 8 in. x 6 ft. 8 in., 60c	1.20
1 front door, 3 ft. 4 in. x 7 ft. 0 in. x 1¾ in.	12.00
1 vestibule door, 3 ft. 4 in. x 7 ft. 0 in. x 1¾ in.	12.00
5 doors, 2 ft. 8 in. x 7 ft. 0 in. x 1¾, $6	30.00
2 doors, 2 ft. 4 in. x 7 ft. 0 in. x 1¾, $5.50	11.00
2 doors, 2 ft. 0 in. x 7 ft. 0 in. x 1⅜, $4.50	9.00
2 doors, 2 ft. 8 in. x 6 ft. 8 in. x 1⅜, $2.50	5.00
1 mullion window frame, 3 windows, 22x26x22, top sash div.	7.50
2 window frames, 50x30x26, $3	6.00
3 window frames, 36x30x26, $2.50	7.50
1 window frame, 30x30x26	2.25
2 window frames, 26x22x18, $2.25	4.50
1 window frame, 20x22x18	2.00
2 mullion frames, 3 windows, 24x28x24, $6.75	13.50
2 mullion dormer frames, 2 windows, 24x24, $2	4.00
3 windows, 22x26x22, top sash div., $3	9.00
2 windows, 50x30x26, top sash, $4	8.00
3 windows, 36x30x26, $3	9.00
1 window, 30x30x26	2.50
2 windows, 26x22x18, $2	4.00
1 window, 20x22x18	1.75
3 windows, 24x28x24, top sash div., $2.50	7.50
3 windows, 24x28x24, plain, $2	6.00
4 dormer sashes, 24x24, div., $1.50	6.00
52 plinth blocks, 8c	4.16
436 ft. casings, 7 ft., for doors, 3c	13.08
264 ft. casings, 6 ft., for windows, 3c	7.92
240 ft. head casing, 3c	7.20
240 ft. cap mold, 2c	4.80
240 ft. fillet, ½c	1.20
96 ft. window stool, 3c	2.88
96 ft. apron, 2c	1.92
364 ft. door stops, 1½c	5.40
320 ft. window stops, 1c	3.20
400 ft. base, 5c	20.00
400 ft. floor mold, ½c	2.00
250 ft. picture mold, 1½c	3.75
Stairs	50.00
Cellar stairs	10.00
China closet	15.00
Mantel	48.00
Medicine case	7.00
6 porch col., $3.50	21.00
1 rear porch col.	3.00
3 porch newels, 60c	1.80
2 pieces porch rail, 14 ft.	1.96
2 pieces porch rail, 12 ft.	1.68
80 balusters, 8c	6.40
2 pieces porch rail, 5 ft.	.70
4 pieces porch rail, 14 ft.	2.80
72 balusters, 6c	4.32
340 ft. bed mold, 1½c	5.10
200 ft. crown mold, 2c	4.00
100 ft. cove mold, ½c	.50
100 ft. quarter round, ½c	.50
Total mill work	$481.72

CARPENTER LABOR.

10,936 ft framing lumber at $10	$109.36
6,500 ft. sheathing, $10	65.00
22 M. shingles, $2.25	49.50
3,000 ft. siding, $1.50	45.00
1,300 ft. flooring, $2	26.00
1,000 ft. smoothing	15.00
800 ft. porch floors and ceiling, $1.50	12.00
330 lineal ft. cornice, 12c	39.60
Setting porch col.	3.50
Porch newels	1.05
Porch rail and balusters	15.00
Porch steps	10.00
Setting frames	10.00
Finishing 6 cellar windows, $1.25	7.50
Finishing 1 cellar door	2.00
Finishing 1 front door	4.50
Finishing 1 vestibule door	4.50
Finishing 1 rear O. S. door	3.50
Finishing 1 double acting door	4.00
Finishing 11 inside doors, $3	33.00
Finishing 2 cased openings, $2	4.00
Finishing 22 windows, $2	44.00
Finishing 400 ft. base, 5c	20.00
Finishing 250 ft. picture mold, 1½c	3.75
Setting up stairs	25.00
Cellar stairs	6.00
Pantry work	8.00
China closet	10.00
3 closets, $1.50	4.50
Incidentals, 10%	58.52
Total carpenter labor	$643.78

RECAPITULATION.

Excavating and masonry	$526.75
Lumber bill	842.43
Mill work	481.72
Carpenter labor	643.78
Nails and hardware	56.00
Tin work	35.00
Plastering 580 yds., 27c	156.60
Plumbing	260.00
Electric wiring	43.00
Painting	184.00
Incidentals, 5%	161.46
Total estimate	$3,390.74

EDITORIAL NOTES AND COMMENTS

"Waste not, want not."

This motto is as correct philosophy today as it was when first coined.

* * *

How much better off would we of the United States today be if our forefathers of a hundred years ago had kept this motto in letter and spirit, with regard to our forest and other resources. The magnificent timber limits that suffered from the indiscriminate use of the axe, and the destructive ravages by fire and flood, that could have been avoided in a large measure, if proper steps had been taken to prevent or minimize the terrible waste, would have left things in a much better condition than they are now!

* * *

Many governments, besides our own, are taking strong measures to prevent these wholesale devastations, and stringent laws are being enacted in every civilized country to prevent fires and floods, so far as human foresight can reach. It is every man's duty to aid in the prevention of useless waste, wherever it is possible for him to do so, and every man should be imbued with this spirit, particularly if he is engaged in some occupation requiring his presence in or near a densely wooded district. The free and careless use of matches, and the lack of care by smokers, are accountable for the loss of millions of dollars worth of valuable timber, and hundreds of precious lives.

* * *

There are other sources of waste as well as those caused by fire or flood, that are in a measure unnecessary, and in many cases avoidable, and that are almost criminal. We refer to the tearing down and partial destruction of good healthy buildings in order to give place to larger and so-called more modern structures; a condition much to be deplored. Why should a good building, having no serious faults, either in construction or style, be eternally destroyed in order to make room for a more pretentious structure? We have in mind, at this writing, several buildings in Chicago, New York, and other cities, whose erection cost well up towards a million dollars each, being taken down in order to make room for larger and more modern structures whose cost each will, in most cases, be more than double—and in one instance we know of treble—the cost of the original buildings. How much better it would be to leave the older buildings standing, and build the new ones on sites near by, We are aware of all the objections that can be brought against a new site, but they do not suffice to convince those who will examine this question thoroughly. In the first place the municipality is a loser, inasmuch as one million is cut off the tax roll, and a two million figure is placed therein; but were the old building left with its one million assessed value, and the two million new building added, the municipality would assess three millions instead of one.

* * *

This, however, is not all. The consequent improvements growing out of the new erection would so increase the assessed value of the surrounding property that the body corporate would find itself very much enriched, and the disturbance of business during building operations would be avoided. The further extension of corporate limits, or the filling up of vacant spaces, would naturally follow, thus benefiting a whole neighborhood, without disturbing the even tenor of an established locality. If a structure is condemned as dangerous to life or property, or for some unsanitary reasons, by those in authority, it is proper to have it demolished, otherwise it seems to us a crime against society and economic law, to tear down a good building to make room for a larger or more modern one. We hear some one say, "There is no waste in tearing down a building these days." Well, let us see how this assertion pans out. Wreckers inform us that in taking down brick buildings, that if the workman can care for the bricks taken from the wall, so that 75 per cent may be used in other work after being cleaned and properly stacked, it will be a good showing, 50 per cent being much nearer the average. In stone buildings, much of the value of the old walls when removed, will depend on the character and style of the building, but rarely or ever can more than 80 per cent of the old material be used over. All lathing, plastering, painting, decorating, plumbing, roofing and a host of other things on the older buildings will, of course, be rendered useless—and lost—and generally the foundation walls can not be used again. The same may be said of cement work—unless in blocks—all of which makes a tremendous waste which is lost to the owner, the municipality, and the nation.

* * *

The waste, however, that will be worst of all, and that will affect the nation most, is the destruction of the woodwork that follows the dismantling of every building. It is quite true that most of the doors, sashes, frames and some fittings, can be carefully removed so that they may be used again in some situations, but the great bulk of them are unfit to place in where good stylish work is required. Door and window trim can sometimes be used to advantage, but not often where good work is required; under any circumstances, there will be much cutting, and chipping, and loss. Base, wainscot, mouldings, and such other work, may be sometimes used but is subject to a loss of some 50 per cent, unless the greatest of care and much time are expended upon them when taken down. Roof coverings, except rafters, or other timbers, are mostly useless and unfit for any purpose. Heavy timbers, beams, joists, trusses, posts, studs, girders or other timber work, loses at least 50 per cent of its quantity when cut and wrought for other purposes. Floors of all kinds in wood are almost worthless after taking up—not 25 per cent of it being available for future use. As a rule, stairs, handrailings and balusters may be made to answer in some situations, at a loss of from 20 to 25 per cent of material. Here then is a showing which exhibits complete loss of good material, of at least half the total. This is an extravagant waste, that is as unreasonable as it is uncalled for. People preaching conservation of our natural products should devise some scheme to prevent this useless waste and destruction of wood product now in actual use; and save to the country many thousands of dollars worth of timber that is now annually lost.

This country is not hemmed in by limits—it is a land of great areas and extended distances, and our towns and cities are not confined within moats and stone walls. There are plenty of vacant lots within corporate limits, and millions of them beyond, yet adjacent, that are available for building purposes, and it would seem to be more sensible to give our structures more base, and less altitude. If a system of building broader, with less height, was adopted, the habit of tearing down to make room for other buildings would soon cease and the country would be the better for it, and a great deal of waste in material and labor would be prevented.

* * *

We are gradually overhauling our liability laws and introducing semi-compulsory compensation for industrial injuries and fatalities. But the process is slow—painfully slow, owing to conflicts of authority, state rights and constitutional snags. Secretary Nagel is right in saying, as he did recently, at a convention of the National Electric Light Association, "That we must rely for years to come on the best motive power in any community—private initiative and enlightened interest."

The association just named, following largely the admirable example of the International Harvester Company, had announced the establishment for its 600,000 employes of a voluntary system of insurance against accidents, of old age pensions, and death benefits, as well as of savings and investments.

* * *

Private liability and compensation systems are always "compensational." They are the product of good will, and they in turn deepen and strengthen good will. Broad-minded, progressive employers know that such systems make for efficiency, peace and stability. Why wait for legislation and the litigation that legislation entails?

We are behind Europe in our industrial insurance and compensation arrangements. Manufacturers frequently oppose this or that liability or compensation bill as unfair, but they realize that the country is open to reproach and indorse the principle of proper compensation for accidents and injuries. Why not embody fair and sound ideas of compensation and liability in voluntary schemes? Why not blaze the way for legislators?

CALIFORNIA'S MODERN MISSION BUILDINGS

By HORACE F. STOLL



WINTER HOME OF A. C. BURRAGE AT REDLANDS, CAL.

It is wonderful what a fascination the crumbling walls, the tottering towers and the roofless arches of the California missions have for the sightseer and visitor.

Realizing this, the directors of the Panama-California Exposition, which is to be held at San Diego simultaneously with the great international fair at San Francisco in 1915, have decided to use as their main buildings careful reproductions of the missions reared by the padres. To carry out the illusion, the attaches will be dressed in Spanish costumes and although no attempt will be made to duplicate the interiors, since they are intended for exhibition purposes, they will doubtless prove a delight to visitors from all over the world. For instead of traveling two-thirds of the length of the state to steep themselves in mission lore and atmosphere, they will be able to saunter through Balboa Park and in a short time get a good idea of the general exterior appearance of all the notable missions, such as San Luis Rey, which is without doubt California's most poetically environed landmark; San Juan Capistrano, of most tragic memory; San Gabriel, the most imposing; San Diego, the oldest; Santa Barbara, the most perfectly preserved; and Mission Dolores, the cradle of Christianity and civilization in San Francisco.

From the first, the shrewd hotel men of Southern California have realized that the commercial value of the mission is nearly as great as their architectural worth, since they advertise the state as nothing else can. To satisfy the demand of tourists for something "different" from the conventional, they erected picturesque mission hotels. The railroads promptly sprinkled the southland with low, rambling mission depots and in their wake appeared mission country club houses, libraries, theaters, school houses, city residences and modest little homes. The result has been so pleasing and pronounced that California has come to be known as the only state in the Union that can boast of having evolved a distinctive type of architecture.

Of course, one encounters many "mission" buildings that are mission in name only. And as one architect, who has made this type of construction a specialty, remarks: "Sixteen inch walls will not give the effect of six-foot ones," nor do "milled woodwork, machine iron work and stock hardware surprise and charm as do their ancient hand wrought materials."

Of the thousands of mission buildings I have studied during my journey through California, I think the one most suggestive of the romances of the early history of the state is the New Glenwood Hotel, at Redlands, colloquially known as the Mission Inn. Here heavy doors with hinge and latch of wrought iron, close upon guests who are called at meals by the chimes of mission bells as the monks were summoned to matins. The roof of the old building is covered with moss-grown, century-old tiles from the old Palo rancheris at Temecula, known to all readers of Helen Hunt Jackson's "Ramona."

Within, the mission effect has been carried out in the highest artistry, with unobtrusive comfort, leaving the old design and enhancing the beauty of every room. About the house are semi-tropic gardens with colonnades of graceful arches, with paved walks and wells and bells and constant reminders of an old world atmosphere in which, it must be confessed, the intrusion of modern chefs and up-to-date hotel service does not destroy the illusion.



GLENWOOD MISSION INN, RIVERSIDE, CAL.

The crowning feature of the Mission Inn is the $200,000 cloister addition, recently completed. The exterior is a copy of Carmel and San Gabriel missions; within the massive walls are a music room seating 500, a great cathedral pipe organ; costly stained glass windows, an interior cloistered walk with statues and paintings commemorating the life and work of the old padres, a banquet room, and the private offices. "The Garden of Bells," where hangs the famous Glenwood collection, is used as a tea room. The San Juan Capistrano dome, rising above it, contains the echo organ. Surmounting the cloister roof is the Carmel tower, which contains camera obscura and telescope, affording views of the valley and mountains that one cannot soon forget.

When it comes to mission residences, I believe the winter home of A. C. Burrage, of Boston, at Redlands, easily takes first place. It is located on a hill, near Smiley Heights, and offers a remarkable panoramic outlook over the groves and Sierra Madre mountains from nearly every room in the unique building, which covers 136 by 141 feet. There are twenty-four outside rooms, nine bathrooms, a dreamy patio 28 by 32 feet, and nearly 6,000 square feet of piazza. Thatched summer houses and cosy arbors are scattered about amid orange trees. On either side of the principal drive through the extensive grounds in a bewildering variety of cactii, palms and pepper trees with a background of Ophir and Cherokee roses that are banked up from ten to twenty feet high.

For recreation, there is a swimming pool that cost $6,000, tennis courts, croquet and polo grounds. The latter overlooks San Timoteo Canyon 300 feet below and is said to be the finest in the state. An embankment eight feet high, covered with the midday flowering Mesembryanthemem, backed up by a row of more than 200 pepper trees, surrounds the grounds.

It would be difficult to picture a more beautiful spot than Mr. Burrage's mission home, which is becoming almost as famous as the historical mission ruins.

Los Angeles has many notable mission homes. One that is especially admired is "The Bivouac," the mission renaissance home of Harrison Gray Otis, soldier, litterateur, and owner of the Los Angeles Times. It is charmingly located on rising ground on Wilshire boulevard, Westlake, near the westerly margin of the lake and looks very attractive in its verdant setting of blossoming trees, shrubs and flowers. It was partially completed before General Otis sailed for the Philippines at the beginning of the Spanish War and was finished during his absence under the supervision of John P. Krepel.

The front entrance to "The Bivouac" is through a spacious peristyle. The wing on the north side is especially notable, the lower portion being built in the form of an open arcade, somewhat resembling an Italian garden, "half revealing, half disclosing," so to speak. In the upper story is the General's den containing an interesting collection of arms, armor, war relics, pictures, curios, etc., from various parts of the world. On the west side of the house is a large marque. An awning covers it and on pleasant evenings it is a most delightful place in which to idle an hour or so after dinner. Another feature is the solarium, bright with sunshine and flowers. The cost to date of General Otis' home has been a little over $60,000, of which about $35,000 has been expended for construction of the house proper. The remainder has been used for land, carriage house, and ornamentation of grounds and furnishings.

(To be continued.)



"THE BIVOUAC." RESIDENCE OF GENERAL HARRISON GRAY OTIS AT LOS ANGELES, CAL.

THE USE OF THE STEEL SQUARE—No. 3

By J. B. H.

THE span roof is so called because it spans the building from wall to wall, and although there is more in it than in the lean-to, it still follows that the ordinary span roof is an exceedingly simple one. As far as the present article is concerned, the roof consists of wall plates, rafters, and ridge only, as in Figs. 13 and 14; but in practice it needs ties of some kind to prevent spreading when the weight of the covering material is on. These ties in a house would take the form of ceiling joists, or in an open shed they would be simply timbers fixed across from one wall plate to another, or they might be iron rods with nuts screwed on at each



FIG. 11.—ADJUSTING THE GAUGE.

end. In either case they do not concern the matter in hand at present, therefore they do not appear in the drawings.

A section of the span roof is given in Fig. 15, drawn to what is usually termed "slate" pitch, this being equal to 30 degrees from the wall-plate level. Slates, when laid to the correct lap, will keep the wet out at this pitch, unless in very exposed situations, when it is best to have the pitch somewhat sharper. In any case, it is better to err on the side of steepness, rather than to make a roof too flat. The section has been shown divided into the theoretical



FIG. 12.—MARKING THE RAFTER.

parallelograms as in a previous article, and it will be seen that the height of these is far less in proportion to the width than in the lean-to roof dealt with before.

The width of the roof as shown to the outside of the wall plates is 15 feet and the height from the top of the wall plates to the top of the ridge is 4 feet 6 inches, so that for the purpose of setting out the length and bevels of the rafters there is a width of 7 feet 6 inches by a height of 4 feet 6 inches, or, when the portion

of the rafter above the backing line is taken off (as mentioned in Article I) 4 feet 4 inches only.

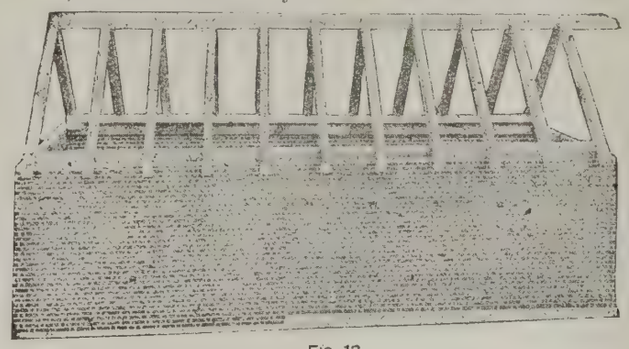


FIG. 13

These dimensions, when divided up into convenient sections, will give us eight spaces of 11¼ inches on the long part of the square, and the same number of spaces in height, each 6½ inches, as in Fig. 16, thus giving the points necessary to work to in setting out the length. Pass the square along the rafter from point to

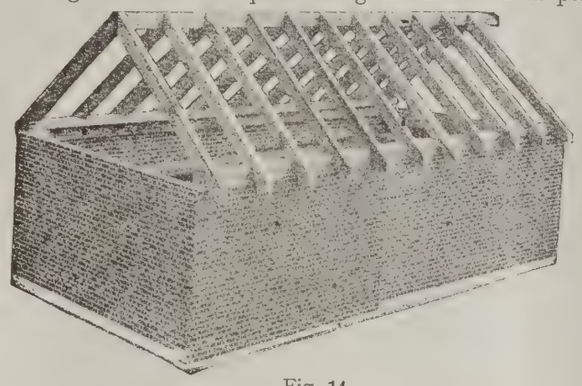


Fig. 14.

point until the eighth is reached, when the short arm of the square will give the upright cut at the ridge.

The vertical cut at the outside of the wall plate is obtained by squaring from the line made by the long part of the square in starting, and the cuts at the foot of the rafters are obtained in the same way, being simply vertical and horizontal, to the same angles as the others, according to the style of finish to be given to the roof at the eaves.

It will be noticed that the extreme middle of the building has been taken in setting out the rafter, entirely ignoring the thickness



FIG. 15

of the ridge. Although this is not correct theoretically, it is so in practice; the half thickness only of the ridge, which is all that is involved, is so little when it is divided up, that it makes no difference whatever in the fitting of the rafters.

It should be understood that it is not intended to set out every rafter in a roof with the square. One only is set out in the way described, and this one is used as a pattern for the others. It may

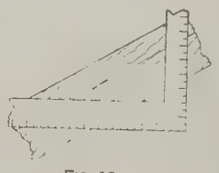


FIG. 16

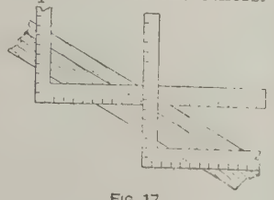


FIG. 17

be added that while the method given is a perfectly reliable one, it is much the better plan, until one gets accustomed to the use of the square, to cut one pair of rafters, and then to test them in position, so as to make sure that they are correct before cutting the whole number. This recommendation is made, not for the sake of testing the method of using the square, but to test the worker's ability in the application of the method. When the latter is thoroughly understood, not only in theory, but in practice, the above test may be omitted.

SCIENTIFIC COST RECORDS IN CONSTRUCTION WORK

IGNORANCE of real costs is a danger whose seriousness every contractor will appreciate. What is less clearly appreciated is the extent to which real costs are not known, and the degree to which construction estimates are based on gravely unreliable data. Discussing this matter, Sanford E. Thompson, consulting engineer, who has been associated for years with Frederick W. Taylor, the pioneer in scientific management says:

Besides of being of use as a preliminary step toward the introduction of scientific management, cost keeping, that is, cost determination of work in progress, is of value to the engineer for making up estimates and checking the work of the builder, and to the builder in bidding on subsequent contracts and keeping track of the cost of the work as it progresses from day to day. In construction work based on the principle of cost-plus-a-fixed sum, and other similar systems, the accurate recording of detail costs on different parts of the work is absolutely essential for submitting the accounts to the owners.

To accomplish any of these aims, the cost records must be accurate enough to serve:

(1) As records for estimating cost of subsequent jobs.
(2) For immediate use.
  (a) To determine whether the builder is making or losing money.
  (b) To fix any point of loss or of too small profit.
  (c) As an incentive to the foreman and workman.

As generally practiced, cost keeping is so approximate and inaccurate as to be of comparatively little value for any of these purposes.

The point just made may be illustrated simply by a comparison of the methods now usually employed in estimating materials and labor. In estimating materials the engineer or contractor notes every item, usually taking the schedule from the plans, and by adding a percentage for contingencies reaches a total which will check fairly well with the actual subsequent cost. Before he starts to do any work, he must order the required amount of each material separately, and the cost of each item is carefully looked into to see that the lowest figures are obtained consistent with the quality of the work required.

With labor, on the other hand, the plan heretofore adopted has been largely a system of guess work. Frequently one hundred or more carefully tabulated material items are set down while the estimate for labor is given in one lump sum, and yet the labor may amount to one-fourth or one-third the sum total of the materials. The variation in the actual cost of the labor from that given in the estimate almost always makes the difference between a profit and a loss to the contractor. These "guesses" at labor costs are commonly excused because it is claimed that the work done by different workmen varies to a great extent, or that it is impossible to provide for unforeseen contingencies. This, however, is merely dodging the whole responsibility. The real reason for such approximations is that the contractor usually does not know the time and cost of doing each kind of work with any degree of accuracy; and the fact is only just coming to be recognized that it is possible to determine in advance how fast each element of the work should be done nearly as accurately as the cost of supplies and materials are now determined, and that once having the fundamental data, it is possible to estimate labor nearly as accurately as material.

HOW TO CLEAN WINDOWS

Windows that show no streaks—that are clean and bright looking—are business pullers in every sense of the word. There is a right and a wrong way to wash windows. The work should be done on a dull day, for when the sun shines on windows, it causes them to dry streaky, no matter how much they may be rubbed.

Before washing the windows, dust them off well, both inside and out, then wash all the inside woodwork. The windows should be washed carefully with warm water, to which a little ammonia has been added. Soap should never be used. A small cloth on the end of a pointed stick is a very valuable instrument to get the dust out of the corners.

When the windows have been washed thoroughly, wipe them dry with a piece of cotton cloth. It is never good to use a linen cloth, as linen will leave a great amount of lint on the glass. When the windows are thoroughly dry, polish them with tissue paper or old newspaper.—Selling Power.

LEAVES FROM A STUDENT'S NOTEBOOK—No. 3

By GEO. METSON

DESIGNING PLATE OR BUILT UP GIRDERS.

THE simplest method is to design the flanges of the sectional area required to resist the compressional and tensional stresses, leaving the web of sufficient sectional area to resist the shear stress. This is not exactly true, but as a large factor of safety is employed, it is sufficiently true for all practical purposes, providing that every care has been taken in accurately calculating the stresses.

The "effective depth" and the "effective span" must be worked with. The "effective depth" can be taken as the height of the web, the horizontal areas of the angle being taken as part of the stress area of the flanges. The "effective span" is the clear span plus one length of bearing as shown in Fig. 1.

The usual depth of a built-up plate girder is 1-12 of its span, though it may vary from 1/8 to 1-16 of the span if circumstances require a deeper or a shallower girder. Its width may vary from 1-20 to 1-40 the span.

EXAMPLE: Let it be required to design a plate girder to carry a distributed load of two tons per lineal foot over a clear span of 22 ft., and assuming that this load includes the weight of the girder itself.

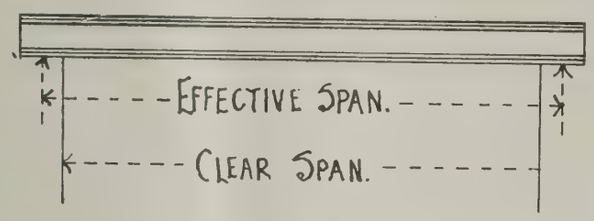


FIG. 1.

SOLUTION: The load on one abutment is approximately $\frac{1}{2} \times 22$ ft. $\times 2$ tons $= 22$ tons, but to this must be added the load on that portion of the girder that is actually on the one abutment (clear span plus one bearing equal effective span). It is first then necessary to approximately arrive at what length of bearing is required. The stone template will safely carry 12 tons per foot super if of good hard stone (the best stone will take as much as 15 tons to the sq. ft.) so that the actual girder bearing must be:

$$\frac{22 \text{ tons} + \text{load on actual bearing}}{12 \text{ tons.}} = \text{say 2 sq. ft. in area.}$$

Assume the width of the girder to be 1-24 of the effective span; it will then be 1-24 of (22 ft. plus one bearing) equal, say 12 in. From this, then, the actual length of girder bearing will be:

$$\frac{2 \text{ sq. ft.}}{12 \text{ in.}} = 24 \text{ in.}$$

The "effective span" will therefore be 22 ft. + 24 in. = 24 ft. The designing can now be proceeded with.

It is first necessary to find the maximum stress resulting from the loading. For a distributed load the formula $\frac{WL}{8}$ will give the maximum bending moment (M. B. M.), and this divided by the effective depth will give the maximum stress.

In the example under consideration the M. B. M. or

$$\frac{WL}{8} = \frac{48 \text{ tons} \times 24 \text{ ft.}}{8} = 144 \text{ tons feet.}$$

Taking the effective depth as 1-12 span, the depth will be 24 in. The maximum stress will then be

$$\frac{144 \times 12 \text{ in.}}{24 \text{ in.}} = 72 \text{ tons.}$$

Taking the design of the compressional flange first and using the safe resistance to compression of 6½ tons per square inch for mild steel, we shall require a sectional area of $\frac{72 \text{ tons}}{6\frac{1}{2} \text{ tons}}$ or 11 1-13 square inches.

The horizontal area of the angles will yield some of this area. Assuming ½-inch plate is being used, the angles will be 3 in. x 3 in. x ½ in., allowing the width of these to be from six to ten times the thickness of the plates connected up. The stress area of the horizontal arms of these angles will be 2 x 3 in. x ½ in. = 3 square inches, leaving 11 1-13 or 8 1-13 square inches for the actual plates in the flange; but the width of the flange is to be 12 inches, therefore $8\ 1\text{-}13 - 12 = \frac{21}{31}$, say ¾-inch, must be the thickness of the metal in the top flange, which can be made up of one ½-inch plate next the angles, with one ¼-inch plate on top.

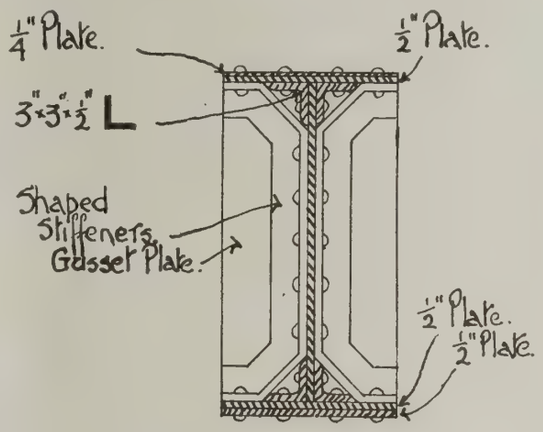


FIG. 2.

In the bottom or tensional flange we must deduct the rivet holes, so that of the 11 1-13 square inches required, the angles, using ¾-inch rivets to the drilled holes, will yield only $2 \times (3 \text{ in.} - \frac{13}{16}) \times \frac{1}{2}$ in. = 2 3-16 square inches, leaving $11\ 1\text{-}13 - 2\ 3\text{-}16$ or $8\frac{166}{208}$; say 8¾ square inches for the actual flange plates, but these, also owing to rivet holes, will only have an effective width of $12 - (4 \times 13/16) = 8\frac{3}{4}$ inches, so that the thickness of these plates must be $\frac{8\frac{3}{4}}{8\frac{3}{4}} = 1$ inch, which would be made up of two ½-inch plates.

Stiffeners at intervals would be required. The girder will then be as in Fig. 2.

In practice, however, it is usual to design, when dealing with steel, the bottom flange first and to make the top or compressional flange equal to it. When dealing with wrought iron plate girders, however, the compressional flange must of course be calculated for separately, but wrought iron for constructional metal work is now almost entirely superceded by mild steel.

The Commonwealth Government having selected Canberra, in New South Wales, as the site of the proposed Federal capital, it has been decided to invite competitive designs for laying it out from all parts of the British Empire. In anticipation of this an elaborate survey has been commenced. The boundaries of the new Federal territory will first be delimited, and then a contour survey of the city proper made. When this has been completed lithographic plans will be printed and sent to all parts of the Empire, with the fullest information for intending competitors, who will have to make provision for the location respectively of the viceregal residence, Parliamentary buildings, public offices, university, military barracks, and other groups of buildings. The site, which is one of the most beautiful in Australia, affords abundant facilities for the construction of one of the finest modern cities in the world.

PERFORMANCE OF BUILDING CONTRACTS

By W. J. STANTON

The work done under a building contract is generally of such a nature that it is beneficial to the owner of the land, even though it has not been done in strict conformity with the plans and specifications. An exception to the ordinary rule applicable to written contracts, that the parties must fully comply with the terms thereof, has been created with respect to building contracts by what is called the rule of substantial performance. Approximate justice is awarded in such cases by the application of the doctrine of substantial performance, under which the contractor is allowed to recover the contract price less a deduction for the damage caused by omissions or defects.

In respect to building contracts the rule is well established that where a contractor who has endeavored to perform his contract in good faith has done so except as to unimportant deviations, omissions, or defects which are not intentional or willful, but the result of mistake or inadvertence, he may recover as for a substantial performance. The reason for this construction of such contracts is in part the difficulty of obtaining perfection in the quality of the materials and workmanship, and of entirely correcting the effect of a slight inadvertence, and the injustice of allowing the owner to retain without compensation the benefit of a building upon his land, that is substantially, but not exactly, such as he agreed to pay for. Under this rule each party obtains what he is equitably entitled to—the contractor, payment for all that he did, and the owner, compensation for all that the contractor omitted to do.

The rule of substantial performance cannot be invoked where the omissions or defects from the requirements set forth in the building contract are intentional and not the result of an attempt in good faith to perform the contract. Where the defects or omissions are of such a character as to be capable of being remedied, the proper rule for measuring the amount recoverable by the contractor is the contract price less the reasonable cost of remedying the defects or omissions so as to make the building conform to the contract. The object of the rule is to give to the owner in substance as near as practicable the very thing contracted for, not merely in value, but in form and character. In a case before the supreme court of Wisconsin, the rule is stated as follows: "In case of entire neglect to furnish an item of labor or material, or in case of a defect which may be easily remedied without taking down and reconstructing a substantial portion of the building, this allowance should equal the reasonable expense of supplying or correcting the defect. In case of a defect which could only be remedied by taking down and reconstructing some substantial portion of the building, the allowance should be for the amount which the building is worth less, by reason of the defect, than the contract price."

Where the defect is one which cannot be remedied without depriving the contractor of adequate compensation for his labor and material, his measure of recovery is the difference between the value of the building as completed and the building as it ought to have been completed.

The defects occurring in the building must not run through the whole of it or be so essential that the object of the parties to have a specified amount of work done in a particular way is not accomplished. In a New York case the contract was held not substantially performed by reason of the substitution of material for various details of the house, such as sheathing, building paper, sash cords, plumbing supplies and the like. In another New York case the same rule was followed where earthen sewer pipes of a smaller size were used instead of iron pipes of a larger size as called for in the specifications. Where a contract calls for the furnishing of a particular kind of marble columns from a certain country, which can be procured, the substitution of columns which are substantially like them is not substantial performance.

Deviations from strict performance should be allowed with caution. The owner of the building has a right to choose for himself what he wishes constructed, and should not be compelled to receive something else. In the matter of the decoration of buildings mere taste or preference approaching almost to whim might be controlling with the owner, and therefore the substance of the contract. This is particularly true of contracts involving the painting of buildings. Thus where the subject matter of the contract involves questions of personal taste, the contract is construed so as to require strict performance to the satisfaction of the builder.

Where both the ceiling of a store building and the ceiling of the cellar thereunder are considerably lower than called for in the specifications, and stone foundations are omitted under the party walls, it cannot be said that there is a substantial performance of the contract. In a case before the supreme court of California, brought to recover on a building contract, the plans and specifications did not state where the windows of a basement story which was to be placed underneath a building after raising it were to be placed. It was held that the fact that they were not placed in alignment with those in the upper story did not prevent the contractor from recovering for a substantial performance, where the cost of remedying the defect was between seven and eight dollars, and they were so placed in order to afford more furniture space in the room. The fact that the roof of a rear addition was built five inches lower than called for in the plans was held not to be such a deviation as would prevent the contractor from recovering for a substantial performance, as the change did not affect the usefulness or symmetrical appearance of the house.

Where a contract required the construction of a sawmill fifty feet by one hundred and fifty feet, it was held that the construction of one which was seventy-eight feet by one hundred feet was not a substantial compliance, even though it cost more and was of greater value and better adapted to the purposes to be accomplished. Where a contract called for "No. 1 rustic and the best quality of joist studding," the use of No. 2 rustic and second quality of joist and studding was held not to be a substantial performance. Where a contract required the furnishing of only "⅝-inch beaded yellow pine first standard ceiling" and first and second grade "long leaf yellow pine flooring, not over 3¾ inches wide," the furnishings of a much less expensive and altogether different kind of pine ceiling and flooring was held not to be a substantial performance, even though the lumber furnished was as good and durable for that specific work, since the difference in finish and appearance between the two kinds of lumber may have been important. Where a contract required the putting in of parquet floorings in a first class manner, the placing of such flooring in such manner that spaces existed between the blocks by reason of the blocks shrinking through not being properly seasoned and exposed to the rain in being hauled to the house, was held not a substantial compliance with the contract. Where clapboards were used in the gables and boards which were wider than those specified in the contract, it was held to constitute a substantial performance where the usefulness and value of the house was not impaired and the difference in the cost of the material substituted did not exceed $50.

SUPREME COURT DECISIONS

A building contract made the architect the arbitrator between the parties on the question of performance. The Supreme Court of New Jersey holds that the burden was on the defendant in an action on the contract to show fraud of the architect, or mistake by him, relating to the matters certified. The case also holds that in the absence of fraud or palpable mistake on the part of the architect in giving the certificate required by a building contract, such certificate is conclusive on the owner.

A contractor for the construction of a building guaranteed that the workmanship should be first class, and a granolithic floor put in by a sub-contractor was soft and defective. The Supreme Court of Appeals of Virginia held that the term "Workmanship" as used in such guaranty was sufficient to protect the owner against bad or unsuitable materials by a sub-contractor, and the owner's measure of damages was such sum as it would reasonably take to make the floor conform to the contract.

The Court of Appeals of Georgia holds that under an act passed in 1906, the application on which an insurance policy is based is not to be considered as part of the policy or contract between the parties, unless a copy thereof is attached to or accompanies the policy. Statements made in the application are not to be treated as warranties or covenants, on account of the failure or falsity of which the policy may be avoided, unless a copy of the application is attached to the policy or accompanies it, though representations contained in the application, if fraudulently made, may give to the insurance company the right to avoid the policy.

THE MANSION OF A NATIVE NABOB

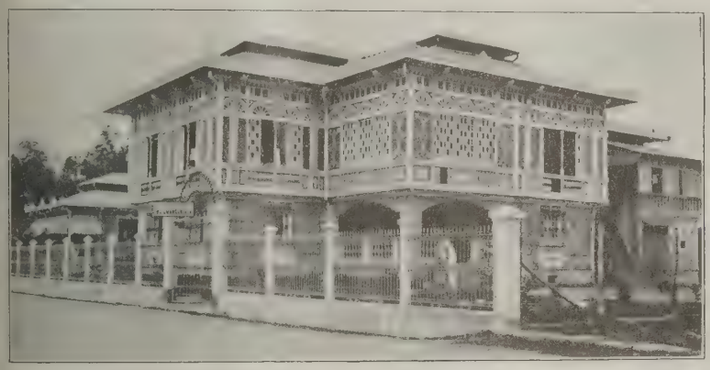
By MONROE WOOLLEY

In many ways the Filipinos show that all of them are not of the type of wild hill tribes usually shown in side-shows and expositions in this country. One of these is in his taste for architectural beauty. Few Americans can associate anything in the form of a Filipino dwelling with things other than the thatched hut shown in the native villages at St. Louis, Seattle, and the other places where they have appeared. Such huts are the domicile at home only of the peasant classes. They do not at all represent the costly, strongly, and handsomely built residences of the metropolii of the archipelago, most of which, if built in this country of the same material, could be afforded only by the well-to-do, if not merely by the wealthy.

Taught by the Spaniard to make home a place of refuge from the busy world as well as a hospitable retreat for friend and strangers, the Filipino spends a very liberal share of his means to this end, perhaps a much larger sum than our own people similarly situated spend for homes on the average. Hence, few Filipinos are renters, even among the poorer classes. In this respect they have one on us. The peasant, stripped of money, takes to the jungle with his bolo, bringing in, maybe in a single day, all he needs to build. The bill of material is not extensive—simply a few bamboo poles, some nipa palms, and not to exceed four hardwood posts. No nails, doors, windows, and the like, are needed. These can all be devised from the material in hand. In the case



THE SALA OR RECEPTION ROOM, WITH A FINE HARDWOOD FLOOR FOR DANCING.



RESIDENCE OF THE HON. MARIANO LINN AT SAN FERNANDO, P. I. THE FIRST FLOOR IS DEVOTED TO THE LAW OFFICES AND SERVANTS' QUARTERS, THE SECOND FLOOR BEING THE RESIDENCE APARTMENTS.

of the peasant's superior fellow-countryman, as before stated, the home generally comes before all else. A great deal of friendly rivalry exists among the middle and high-class citizens in their home building. In this they may be a trifle vain, but the town and the family profit by the fault, if such it may be termed.

Not infrequently the Spanish and native architects evolve some really tasty designs, never, of course, neglecting the details essential to a dwelling suited in all ways to the whims of a tropical climate and the customs of a tropical race.

What is no doubt the finest residence in the many outlying provinces of the archipelago, of which there are nearly as many as there are states in the Union, is that lately completed at a costly figure by the Honorable Mariano Lim, a native lawyer, at San Fernando, Pampanga, north of Manila.

Indeed there are few houses in the capital and possibly none whatever in the other large cities of the group which excel this palatial home. Not that the house cost so fancy a figure in dollars and cents compared to some of the homes of our millionaires, for it did not. Yet when the differences in construction are noted this native mansion might compare favorably in point of cost with many famous country seats in this country. In the Philippines even the fine houses are mere shells of finely polished hardwood. Lath, plaster, and costly decoration as we know it are not a part of the scheme, nor are these things necessary.

Mr. Lim's house, containing as many apartments as a small hotel, is constructed of concrete and highly polished, hand-carved native hardwoods of which the Philippines boast the finest in the world with an almost inexhaustible supply. The ground floor is of concrete, as common in most of the pretentious houses of the land. Molave, narra, and ipil, a triumvirate of the most beautiful hardwoods, figure in the upper construction. The house alone, for material and labor, cost twenty-one thousand dollars. As the Filipino carpenter gets about twenty-five cents per day it will be readily seen that in other climes this item alone would have been easily doubled or trebled. Again the material of which this house is made, imported into the United States, would cost about two or three times as much as it cost Mr. Lim. The first floor of the *casa de* Lim, besides containing quarters for a retinue of negrito servants, provides in addition spacious law and editorial offices for the owner and his associates in law and journalism. Mr. Lim has his printing establishment and newspaper next door. Fitted primarily for business, and with a very business look about them, these offices are at the same time exceedingly handsomely appointed and appropriately furnished. A feature is an electric call bell system between the different offices.

Upstairs in the residence apartments a long *sala* with its brilliantly polished hardwood floor invites the light fantastic and where from eighty to one hundred couples may trip to the strains of Mr. Lim's light fingered native orchestra. Something almost entirely novel in this elaborate mansion nestling far in the interior of Pampanga province, is running water, furnished for all purposes throughout, and the source of which is artesian.



THE SALON DE HONOR OR DRAWING ROOM.

When this splendid provincial home was first formally thrown open with great *éclat* not so long ago there were present some four or five hundred guests, including a number of leading Filipinos and Americans. Manila society was well represented, a special coach on the Manila & Dagupan Railroad having been placed by the generous host at the disposition of the visitors from town.

GYPSUM AS A BUILDING MATERIAL

By GEORGE E. WALSH

THE extent to which gypsum is used in modern building trades may be illustrated by the tremendous strides made in recent years in the mining and manufacturing of this material, and the fact that 90 per cent of the output is used directly or indirectly in the building of new and old structures. The annual output of gypsum approximates a value of $25,000,000, and the rate of increase each year is nearly 20 per cent. The discovery of new methods of utilizing gypsum, and the invention of new machinery and processes for manufacturing it into commercial forms, are responsible for its increased output.

In the modern building movement every effort is being made to minimize the danger from fire and to substitute so far as possible manufactured "lumber" for wood. The increasing cost of lumber, and our diminishing forests, make it essential that substitutes for wood be used to an ever increasing extent. In other words we are building faster than the supply of lumber increases, and to conserve our forests we must use materials other than wood for general construction purposes.

Gypsum in some of its manufactured forms serves a most important factor in both of these fields. It is sufficiently fire-resisting to make it of the utmost use in buildings, and cheap, abundant and serviceable enough to make it a good substitute for lumber in innumerable cases. Gypsum is light in weight, strong, and easily worked into any shape desired. Added to these qualities are others such as low conductivity of heat, and great resistance to water under fire conditions.

The most common ways of using gypsum for fireproofing is in the form of plaster boards, tiles, wall furring, partition blocks and for the covering of columns and beams. Plaster board made of gypsum is made in one-quarter to half an inch thickness, and from 32 to 36 inches in width and length. These boards designed at first to take the place of wood lath are today used extensively for partitions and for walls as well as for ceilings and the sides of furnace rooms. They are light in weight and very tough, and can be nailed directly to studding and joists.

There are two distinct varieties of gypsum or plaster of Paris used in the building industries. One is stucco plaster, which is quick-setting, and the other building or hydraulic plaster, which is slow setting. Stucco plaster is burned at a low temperature, and it still contains a good deal of the original water of crystallization. In the ceramic industries plaster of Paris is used extensively, but in the construction of temporary houses, such as those built for fairs and exhibitions, adulterants are employed to a large extent. Lime and sand together, or layers of mixture overcoated with pure gypsum, are commonly used, the plaster sometimes running as low as 20 per cent by weight. In working in quantities of sharp sand, the strength of the mass is often increased by the addition of glue to the water and by the mixing of cow's hair or other fibrous material.

In making stucco plaster and plaster board for partitions and even outside walls in recent years wire cloth with more or less open mesh is used as a reinforcement or core. The wire cloth is coated on one or both sides with the gypsum, and the board becomes firm and rigid for building purposes. Sand, lime, ashes, cocoa fibre, excelsior, hair, rushes, hoop iron and metal shavings have all been employed as binders for gypsum boards, and as a result great variations in the industry may be noted.

As in the employment of cement, the use of gypsum has sometimes given a bad account of itself through careless or ignorant manipulation. For instance, coal ashes and old plaster have sometimes been used so that the resultant material easily crumbled and disintegrated. This only gave a bad name to gypsum plaster work, but no more so than concrete has often received through the ignorant or careless mixing and adulterating. Where good materials are used, and good methods of mixing and pressing are employed, gypsum products in their various forms give good satisfaction.

In Europe gypsum flooring tiles have been used to some extent in buildings where the tramping is not hard or severe, such as in storage houses. Plaster tiles, even though reinforced with wire metal, have not received much attention in this country. But plaster lumber for partitions are popular and widely used. Millions of tons of gypsum enter into their manufacture every year.

Plaster boards of this nature are lighter than water, and they can be sawed, cut, planed, and fitted as easily as wood, and they hold screws and hooks well. They can be made and used at any season of the year, and when installed they are vermin proof and practically fireproof and almost sound proof.

With the exception of special patented forms of plaster boards, they do not have sufficient compressive strength to make them useful for holding up roofs and upper floors. They are strong enough to bear up their own weight, but cannot be used like bricks in wall for carrying loads. A partition made of plaster that must carry a special load is built up of stucco and hydraulic gypsum reinforced with metal or wire lath. A good deal of experiment has been carried on in recent years to make satisfactory reinforced plaster material for heavy duty work. But it is doubtful if this material will ever become popular for outer wall construction. In the first place it must be protected from weathering when used for outside wall work. A wash of cement is the most satisfactory protection, although asphalt is used where appearances do not count. The cement wash cannot be applied directly to the plaster, and a preparatory coat of lime wash is first used or a very thin coat of lime plaster.

Gypsum is largely used as an adulterant for asbestos, and frequently 80 per cent of asbestos pipe covering is composed of gypsum. This fact is good evidence that gypsum makes a good fire protection and a fine non-conductor of heat and cold. Gypsum plaster is also an excellent protection for both wood and iron beams and girders in many mills and factories. It keeps the wood from rotting and the iron from rusting. It is not easily affected by acids and dyes, and in a good many establishments, as tanneries, wash-houses and dyeing factories, it is freely used to protect all exposed wood and metal parts.

Probably in factory and mill construction gypsum plaster finds as great a use as anywhere. Appearances do not count so much here, and the rough plaster boards are nailed on to protect the building from fire, rust and decay. It is applied to the walls and ceilings of boiler and furnace rooms and wherever acids and dyes are used. When used for apartments and private houses, the plaster boards are first nailed on and then joints are finished off with a coat of plaster that can be worked to a smooth surface. Plaster boards are made generally with a smooth and rough surface. The latter is placed outside so as to receive a finishing coat when the walls and partitions are all up and the trim nailed on.

Where partitions are made entirely of plaster boards, they are usually nailed to the vertical studding, but often they are used without studding at all. In such cases they have to be reinforced in some way. For temporary structures there is no material so cheap or satisfactory as plaster boards. The trade is enormous for this work. The plaster boards are then stiffened by using rushes, twigs, straw and other material laid lengthwise. When twigs are used, they must be soaked in water first to prevent their cracking the stucco when exposed to wet weather after being embedded in the plaster. Small twigs are better than big ones.

Plaster boards of this nature are usually laid in double layers, one layer running vertically and the other horizontally. Sometimes an air space is left between to increase the non-conductivity of heat and cold. A certain amount of studding must be used to support the boards, but only sufficient to keep them in place. The saving in studding is thus quite considerable. Barns, garages, and similar small buildings are made with great success in this way.

The use of stucco plaster boards for roofs has increased in recent years, and all sorts of methods have been employed to make them satisfactory. If rightly used they prove very durable and useful. The stucco plaster boards are nailed to light rafters. Very thin boards are employed for this purpose, and on top of this a three-quarter-inch layer of gypsum beton is laid, consisting of stucco plaster with either sharp sand or good sharp, screened coal ashes. Finally a layer of asphalt roofing paper is placed on the roof, and strewed with sand or fine gravel while the paint is still wet. For comparatively flat roofs this makes an excellent covering. It is very light, durable and fireproof. It will also protect the inside to a remarkable extent from the heat of the sun. Contractors' buildings put up in the tropics with such a roof protection are very popular.

In Germany a good deal of plaster board is made at the factories with galvanized woven wire or expanded metal as the core or reinforcement. The wire cloth is stretched between standards, and a mixture of gypsum and lime is applied to both sides with

cow hair or other substance as a binder. Partitions with an air space between are also made in this way. Two layers of wire cloth are then used, with a space between, and then plastered on each side. Partitions of this nature are made ready for setting up in buildings.

Gypsum plaster is applied both to wooden lath and metal lath in many of our modern buildings. When plastered on wood lath about one-third of the material is worked through the interstices to form keys or clinches. On wire or expanded metal lath even a greater amount goes into the formation of the keys. There is a great saving of the material when manufactured in plaster boards, for there are no keys necessary, and nearly all of the material is formed in a compact mass outside. When plaster boards are put up, with a rough surface exposed, it requires comparatively little plaster to finish off a smooth surface. Usually a quarter of an inch of plaster on the boards makes a perfect finish that is less liable to break or crack than any other method of wall construction. Usually in nailing on the boards they are spaced a quarter to a third of an inch apart so that the gypsum mortar used as a finish will fill these spaces to act as a sort of key or anchor to the whole surface. The boards are thus all joined together in one homogeneous mass that cannot easily crack.

The increase in the manufacturing of "lumber" for general house construction is dependent to some extent upon the distribution of the materials used in the work. The cost of lumber in many parts of the country far removed from the vicinity of the forests is high because of the excessive transportation charges. This same cost would apply to all other building materials if they were not equitably distributed throughout the country.

In the case of clay products an advantage is obtained in having clay deposits in nearly every state. Consequently they can be made for each section of country without long shipments. The same holds true of gypsum. While our largest supplies of gypsum come from a few states, there are abundant deposits in New York, Ohio, Michigan, Iowa, Oklahoma, Kansas, Colorado, South Dakota, Montana, California and other states. This general distribution of the material permits of the manufacture of gypsum plaster boards in many parts of the country, and the industry of making artificial fireproof lumber of this character is growing rapidly. It is used today more and more in cities and the country, and builders are utilizing it in hundreds of different ways never dreamed of a few years ago. As a factor in the building trades of the future it must be reckoned with, and builders and contractors must familiarize themselves with its various uses and application to keep abreast of the developments of their profession.

A SAMPLE SPECIFICATION—By S. CHARLES, C. E.

The facing of all basement walls above grade line to be of Port Deposit granite, rock face broken range, with squared beds, builds, and 2-inch pitched points, securely bonded to backing and laid with neat raised joints. No stone to be less than 8 inches on the bed. Reveals, soffits and jambs to be fine axed.

The rock facing of ashlar must not exceed 1½ inches in projection and to be free from iron tool marks, drill holes and other defects.

All exterior walls, from concrete footings to finished grade line, must be plastered with Portland cement mortar ¾ of an inch thick.

The mason will assist the carpenter to set all door and window frames and see that they are kept well braced and are built solidly in the walls. All crevices to be filled with mortar.

Coping along sidewalls as shown on drawings shall be built in a manner as specified for walls, except the cap-stones shall be 4 inches wider than the thickness of the wall and shall generally extend entirely through the wall. Coping shall extend to a depth of 3 feet below the line of the finished wall.

Gate stones shall be built in the same manner as coping, except every alternate stone shall be of the size of the required post.

All basement piers shall be of the size noted on the drawings and every alternate stone course shall extend entirely through the pier; capstone shall be in one piece, set perfectly level and at the proper level to receive the girders.

All walls must be covered and protected from storms, braced and stayed during the progress of construction and thoroughly cleaned down at completion.

CUT STONE WORK.

All stone work above basement, as both water tables, bases and caps of pedestals, bases and caps of pilasters, rails, balusters and columns for porch, and all window sills, as indicated on plans, to be of Indiana limestone of first-class quality and fine texture, sound, strong and free from stains and discolorations.

All carving and moulding must be done in an artistic manner from detailed drawings furnished by the architect. Mouldings to be cut straight and true, and set perfectly straight at joints. All columns to be cut in one length as detailed. All the Indiana limestone work shall be uniformly tooled, in a manner known to the trade as square drove work—6 bats to the inch. No horizontal or vertical joint shall be more than 3/16 inch in thickness. Patching of stone work will not be allowed, except on very large stones, and then only at the approval of the architect.

All exterior door sills and all exterior steps and platforms to be of granite of the first quality and fine axed, cut as detailed with the required lugs and washes.

Basement window sills to be slip sills of Port Deposit granite, two brick courses in thickness, rock face, and surface fine axed.

All steps and platforms to be of the required thickness, as shown on plans, and in one length where possible.

All door sills to be 8 inches thickness, cut with wash and to extend the whole thickness of wall and 1½ inches outside of reveals.

Window sills to be two courses of brick in thickness, cut with wash, and to extend 1½ inches outside of reveals and at least 2 inches under outer edge of sub-sills. Sills to be bedded on ends only.

All chimneys to have cap of blue limestone, 6 inches thick in one piece, tooled to true surface, and flues cut through.

All area walls to be capped with blue limestone, covering the entire wall and extending 1 inch on each side of wall. Cut wash and drip as detailed.

Arrises to be squared and surfaces fine axed. Joints to be secured with galvanized iron clamps leaded into stone. All stone delivered on the job shall be protected both before and after erection and any defective stone shall be removed from the premises. Every stone must be carefully set and leveled in full bed of mortar of uniform thickness, not thicker than hereinbefore specified. Stone having a greater build than 12 inches shall be anchored every 3 feet with heavy galvanized iron anchors extending through the wall. All projecting stone work shall be securely anchored as detailed or as directed by the architect.

Upon the completion of the work, the entire stone work must be cleaned down with steel brushes, all joints raked out and pointed up with the best La Farge or Puzzolana cement and clean white sand, and everything finished in a first-class and thorough, workmanlike manner.

Mortar for stone work below water table to be of one part approved Portland cement, and three parts clean, sharp sand, free from loam or other impurities. Sufficient cement must be kept on the ground to permit the architect to test each barrel as to its strength before using. All outside walls, when coming in contact with the ground, to be plastered to grade line with a good coat of Portland cement mortar. Mortar for Indiana limestone to be two parts freshly burned lump lime and three parts sand, as hereinbefore specified.

BRICK WORK.

All walls from bottom of lower water table, piers for porches, partition walls as indicated on the drawings, and all chimneys, to be built of sound, hard, well-burned common brick, of a quality approved by the architect.

The contractor will be required to furnish samples of brick he proposes to use before commencing work, for the approval of the architect.

All brick to be moistened if laid in dry, warm weather. All joints to be thoroughly filled and slushed with mortar, leaving no empty spaces.

All walls and piers to be carefully built, perfectly straight and plumb and to true lines on all faces, leveled at proper point to receive all framing. All walls are to be properly bonded every fifth course with a row of headers around entire building. No walls to be carried more than 5 feet above those adjacent, during the progress of construction, and to be covered and protected from storms, braced and stayed. (To be Continued.)

DEVELOPMENT OF GASOLINE ENGINES

By JOSEPH C. RILEY

ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING, MASS. INST. TECH., BOSTON

Presented before the Congress of Technology at the Fiftieth Anniversary of the Granting of the Charter of the Massachusetts Institute of Technology.

* * *

The development of the gasoline engine has been more rapid than that of any other form of motor, not even excepting the steam turbine. We all recollect, not many years ago, with what curiosity we regarded the new horseless carriages upon our streets, and how we wondered whether the noisy little engines which left a smell of half-burned gasoline behind them, would ever become really desirable motors. As late as 1896, a prominent engineer wrote, in his work on the gas engine, that he had recently examined one of the strangely designed vehicles then attracting attention in France, and that in his opinion, ingenious as the carriage was, it would not come into general use unless the gasoline engine with which it was equipped were replaced by a heavy oil engine. That was only fifteen years ago.

The first part of this period of development saw radical changes in the design of these motors, but the use of light-oil had come to stay. Although dangerously inflammable and five times as dear as the heavier grades of petroleum burned in larger oil engines, the cleanliness of gasoline and the ease with which it can be prepared for combustion, are alone sufficient to dictate its use. The original methods of mixing, introducing and firing the explosive charge were soon changed in order to secure more reliable operation throughout a greater range in speed and load. Cylinders and valves were designed to give more power. Ball-bearings and gears of a degree of perfection previously unknown were introduced, to minimize friction. But the most noticeable changes in the last few years have been largely in the nature of improvements in material and processes of manufacture, tending toward a general improvement of the engine as a machine and a simplification of its construction. New alloys of aluminum and methods of cooling them locally in the mould have brought about light, yet rigid and durable castings for frames. New steels have provided stronger shafts and connecting rods. Machine moulding from wax or metal patterns has produced better castings of more uniform thickness and yet at lower cost than could have been produced by hand. The art of moulding the thin walls and coring the irregular jackets of cylinders, and then casting them in iron, has indeed been revolutionized. Castings which a few years ago would have attracted general attention as remarkable specimens of good workmanship are now so common that we pass them by without notice. The use of special jigs for holding work during cutting operations and the application of semi-automatic tools for machining or grinding to precise dimensions have not only produced better fitted surfaces and fully interchangeable parts, but have also reduced the time and cost of production.

The gasoline engine has profited by the general rapid advance in all branches of mechanical work. Its own special improvements have been, for the most part, such as would naturally come from the thousands of ingenious designers, skillful mechanics and experienced drivers, who have tested and tried it under all possible conditions of service, on the road, on the water, and in the air. As a result, advancing by process of trial and error, the engine has reached a fair degree of perfection in two points at least. It has been made to develop greater power per unit weight than any other form of prime mover; and in reliability it has been advanced to the stage which warrants its use even for such exacting service as propelling a life-boat or driving a fire-engine.

Little of this development, however, has been made possible by what may properly be called scientific study of the engine's performance. At first there was scarcely time for such work. The demand for engines was often greater than could be supplied, so the engineers' efforts were concentrated on increasing the factory output as fast as possible, consistent with a fair improvement in the product. It was easy to improve the engine year after year by applying such new inventions as very plainly made it a better machine. The time for refinement in design had not yet come. Thorough trials of an engine with all its accessories were usually carried out to make sure that everything was assembled and adjusted well before the product was sold, but measured tests for anything except the power output—under somewhat uncertain conditions—were not considered necessary. Only the most progressive manufacturers made anything like systematic investigations conducted with sufficient care and skill to discover the effect of change in some one feature of operation or design, and to get data reliable enough to be of real value. Mechanical arrangements were varied by placing the valve at the sides, or in the cylinder heads; pistons were made with short strokes and pistons with strokes of greater proportionate length, with exactly opposite claims of merit put forth by different builders.

Aside from differences in general excellence of mechanical construction caused by such variation in design, unquestionably there are inherent differences in the power developed and in the economy of fuel consumption. A study of the results of tests of automobile engines shows a wide variation in power of motors having similar dimensions and running at the same piston speed. When operated at the piston speed corresponding to maximum power (a speed usually between 1,100 and 1,500 feet per minute), the best engines give results nearly 50 per cent better than the poor ones. Knowing that the engines referred to are developing all that can be got out of them, we may well inquire the cause of this difference in output. But little of it can be charged to imperfection of the mechanism causing surface friction, for even the cheaper motors are well built in this respect. It is influenced by the quality and quantity of explosive mixture, the amount of compression, the time and rapidity of ignition and the timing and size of the valves.

The interrelations of these many factors are very complex, but they may be summarized by saying that the power depends upon the pressure in the cylinder. Gasoline motors like all other heat engines of the reciprocating type operate by expansion of a fluid under pressure. The variation in force as the piston moves in and out is what does the work; the time at which pressure is applied and the rate at which it changes consequently determine the amount of work realized. The more we know about just how the pressure varies the better able we are to devise means for controlling its rise and fall and thereby producing a greater net output. In the early days of steam engineering, information of the rate of pressure change in the cylinder was considered so necessary that Watt invented an instrument for recording it. A modified form of this steam engine indicator has played an important part in the study and improvement of steam engines ever since. With it, the cause of deficient power may readily be traced to its origin in faulty steam distribution, in wire drawing through too small a port, or in condensation; without it the very fact that the power is deficient may remain unsuspected. Any attempt to secure the last refinement in steam engine performance without using the indicator would be like deliberately working in the dark. For internal combustion engines of moderate speed the indicator has been of service, though it was not needed as much as for steam engines. But the full speed of gasoline engines of the classes here considered, namely the light weight motors adapted to automobiles, aeroplanes and small boats, is much too high for any of the ordinary commercial forms of indicators. In Germany and England, half-size indicators of the standard patterns are manufactured and sold for this work. It is said that they can be used up to 1,500 and 2,000 revolutions per minute—which should be understood to mean little more than that they can be operated at such speed without actually breaking. The natural cadence of vibration of their springs and moving parts is altogether too slow for anything like such high speeds; the waves introduced into the diagram by violent explosions would be too long and might be misleading. However, at speeds from 400 to perhaps 800 R. P. M. they are very useful. What is needed is a recording mechanism with a period of vibration of high frequency, more like that of the electrical oscillograph, say between 500 and 1,000 per second; and if incorrect deductions are to be avoided, great care should be taken to insure that the indicator diagram starts from its dead points exactly in phase with the engine piston. (To be Concluded.)

One can do a wide variety of work on a plain bench or table saw, but where there are a multitude of changes and shapes to cut, it generally pays to get one of the variety type of saws built especially for this kind of work.—Exchange.

ARCHITECTURAL CHANGES

By E. P. H.

Considerable change has been made in recent years in the styles of architecture.

Some fifteen years ago a great deal of ornamentation was shown in the way of scroll and spindle work, while now we seldom see any scroll work on any part of the exterior or interior. Turned work is losing favor even for columns and balusters, giving way to plain square materials.

The concrete house, whether solid block, or simply the plastered exterior seems to require the omission of the Colonial columns, which have been in favor for some years past. The porch piers are being built up to the cornice omitting wood columns entirely, while often we see a concrete, brick or stone pier running up balustrade height, and a square box shaft from there up to the box plate.

Strictly Colonial houses are being built in great numbers, some calling for the large plain or fluted columns, with composition caps in one or the other of the various orders. These large shafts being rather expensive are seldom used except in large and expensive residences.

The small Colonial houses show more or less turned work, and even some houses on a Colonial order are rather void of these features, commonly understood as Colonial.

The plain square house with peak or two gable end style seem to prevail, taking place of the former style that called for many gable ends.

The interior finish is plain indeed. The mouldings shown are principally flat to show the hardwood grain. Of course, the finishing of flat hardwoods is easier than if moulded, and the cost has had much to do with the present-day styles. Some years ago when white pine prevailed the interior wood finish on account of its being painted it was thought necessary to have the trim muchly moulded, and even when the hardwoods started to be used it seemed hard for the architects to get away from moulding the interior trim, but as time went on it was soon seen that the hardwoods required flat surfaces to bring out the richness of the grain and then, besides, it is cheaper to apply the filler, stains or varnish as the case may be.

Then, too, people have become mission crazed. This means plain, flat finish. Even broken corners are omitted, but more finish is required to make up the plaster panels and beam work, so the cost is some higher. Therefore, all the change comes about because of the increased cost.

The housewife must have hardwood finish, requires a sideboard, and plenty of pantry cases that were not seen in the old white pine finish home, but which was greatly decorated on the outside with every kind of embellishment.

ADAPTABILITY OF OAK FLOORING

Very often architects and contractors use the clear plain (first grade) of oak flooring in many rooms where the select plain (second grade) could be utilized equally as well, at a saving of about 25 per cent in the cost. Select plain (second grade) makes a floor just as serviceable as the clear plain and equally as durable, the principal defect in this grade being sap, which in oak is not considered as serious a defect as in other woods, on account of the tannic condition. The difference in the shading is easily lost sight of in the finishing, by application of a golden oak filler to blend the light and darker pieces. Such a finish would make it very difficult for even an expert to distinguish it from the clear (first grade).

The select plain (second grade) will fill every requirement where a medium priced floor is desired, whether it be in apartment houses and such character of buildings, residences, stores, public buildings, club houses and hotels. This class of buildings requires a high class and serviceable floor. Select plain is highly recommended, as it gives an artistic and durable floor at a very reasonable cost.

Some of the best homes, costing from $7,000 and up, are now using the select plain in the upper floors and very often the entire residence uses this grade throughout.

A little care on the part of the floor layer with this select plain (second grade) will insure a job almost as good as though the clear (first grade) was used. Badly discolored pieces should be utilized for places under the rugs, closets, and other out-of-the-way places.

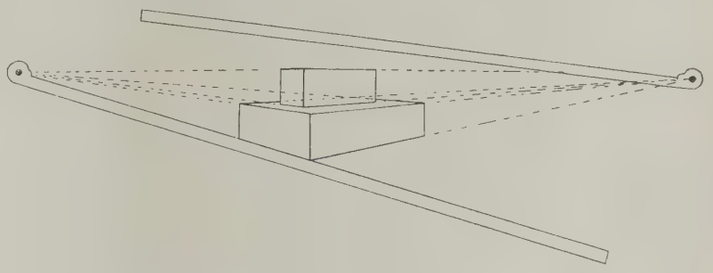
The select plain oak flooring is manufactured in the 13/16 inch thickness and 3/8 inch thickness. The 3/8 inch thickness select plain without a doubt makes the most economical floor that can be bought. It is tongued, grooved and end-matched. It can be secret nailed and when laid has the appearance of heavy flooring; 3/8 inch thickness should always be laid over a subfloor. In old homes it can be laid over the old floors and in new homes over a cheap subfloor. The 13/16 inch thickness makes the most substantial floor, but it is 30 per cent more expensive than the 3/8 inch thickness. Oak flooring can be had in two colors, white or red. The preference for either, simply resolves itself into a matter of taste, as both have about the same lasting qualities. The white is often preferred, because it runs more uniform in color.

A PERSPECTIVE DRAUGHTING BOARD

By CHAS. CLOUKEY

The use of linear perspective is often foregone on account of a convenient lack of means to accomplish it. It is a fact that in a great many cases workmen are not able to grasp the meaning of plans, elevations and sections, but once shown even a rough perspective sketch and the whole thing breaks upon them at once. But few people can make good offhand perspective drawings even when they thoroughly understand the art, and the device shown in the figure is for the purpose of making easy the drawing of simple objects in the perspective.

In the first place the board should be considerably wider than the required drawing, so that the vanishing points may be located far enough away to look well. The two straight edges are made



by gluing a little piece on the straight side at one end so that the hole can be made in line with the edge to be used. Brads are driven into the board at the vanishing points as shown, and a straight edge dropped over each one. Now with a vertical line to begin with, the four sides of the plan can be laid off without taking the rulers off of the pins. Indeed it is not intended to take them off at all until the drawing is completed. When using the T square or triangle the rulers may be flipped over out of the way and still be right at hand when needed, without the draftsman stopping to see that they are in the right place.

It is astonishing how quickly one can do an accurate perspective by the use of these straight-edges, and as it takes but a few minutes' time to rig up a set, no shop or drafting room should be without a set of them.

ADVANTAGES OF PLASTERED HOUSES

"What is the difference in the price of a plastered house and a shiplapped or ceiled one?" I have been asked this question many times, and for the benefit of those who do not know will say a plastered house is the cheapest.

Why? To begin with, it costs but very little more to plaster a house than to seal or shiplap and paper it. Say about five or six cents on the dollar more. Of course, this makes some difference to begin with, but the difference in insurance will offset this in a few years, and then in a shiplapped house that has been canvased and papered, which has to be done at least once a year, you are often annoyed by seeing the paper leave the wall in places—coming off when you are looking for company the next day, and in wet weather it will wrinkle all over the house and straighten out in dry weather. This does not occur in plastered houses.

Then again, any doctor will tell you that your health is safer in a plastered house than in one that is not.

Any fuel dealer will tell you that your coal bill will be cut in half in a plastered house. Your wife wil say: "Oh! Dear! It is so much more pleasant to live in a plastered house in the summer. I find it much cooler than the old hull we just moved out of."

Even the cook will notice the difference in living in a plastered house. There are no mice to be cutting holes in the flour bag—the rats have no place to hide, and she can't find any cockroaches to put in the pudding.—Exchange.

SOME HINTS ON BRICK CHIMNEY BUILDING WITH DEFINITIONS OF SOME TERMS

CHIMNEY STACKS.

Enclosed channels, formed usually in brick work, to discharge (1) smoke, are termed smoke flues; (2) vitiated atmosphere, are termed foul air flues; a construction containing one or more vertical flues being known as a chimney stack.

THEORY.

Air, upon being heated, ascends; its velocity being determined by the well-known kinematical formula $V^2 = 2gh$, and if the value of g be taken as 32, $V = 8\sqrt{h}$, and $h = Ht \times .002$, where H equals the height of column or heated air in feet, and t the excess in degrees Fahr., of the column of heated air over the temperature of the external air.

SMOKY FLUES.

Theory points out that an increased velocity may be obtained by increasing the height or raising the temperature, and the greater

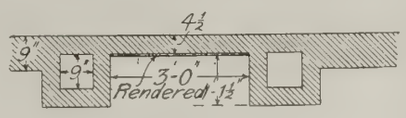


FIG. 1.

the upward velocity the less will be the probability of a down draught, the latter causing what is known as a smoky chimney, and it suggests that a flue with a small volume of air to rarify, with a comparatively great height, is more effective than an equal volume in a flue with a less height.

PREVENTION OF DOWN DRAUGHTS.

To prevent down draught no external chimney opening for the discharging of smoke should have a lower level than any other similar flue exit in close proximity, and it is in addition preferable for this opening to be about 3 feet above any adjacent ridges or walls.

Care taken in this matter would to a large extent render un-

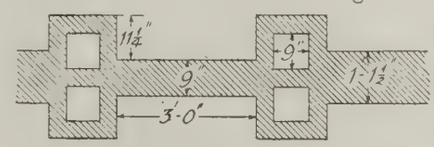


FIG. 2.

necessary cowls and other expedients for the so-called "cure for smoky chimneys."

FLUES.

The flues should be built with at least one bend with an internal angle of not less than 130 degrees. They must be gradual and easy, so as to offer a minimum resistance to the up current. Gusts of wind and down draughts are retarded by the bends in the flues; the same sectional area should be kept throughout till near the exit, when a small contraction in area is conducive to an increased velocity.

CLASSIFICATION OF SMOKE FLUES.

The plans of chimneys may be arranged in three ways, viz.: (*a*) back to back, as shown in Fig. 2; (*b*) side by side, or interlacing; (*c*) diagonally.

Figure 1 shows the first method, with 9 in. x 9 in. flues, with the backs made 4½ inches in thickness, when, to comply with some city by-laws, they must be rendered. This arrangement is mostly adopted to curtail expense.

Figures 5 and 6, the usual arrangement of fireplaces and flues in the external walls of houses.

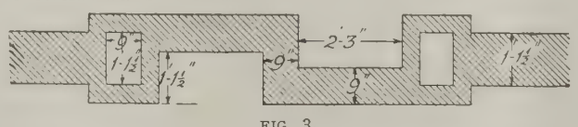


FIG. 3.

Figures 7 and 8 show an elevation and section of a system of flues back to back in a party wall. Figures 9 to 13 show the plan of the courses at each story of this system.

The interlacing system, as shown in figure 3, is sometimes used in order that the projection into the room may be as small as possible; but it could not be adopted in party walls, except where both houses belong to the same property, as the flues would project beyond the center line. The diagonal method, as shown in Fig. 4, is more particularly suitable for use in small rooms, where a fireplace near the center of the room would not be convenient. Angle fireplaces may be arranged with one or in groups of two, three or four at any one level.

GENERALLY.

Every fireplace should have a separate flue, and in a stack the partition walls or withes must be smoke-proof. Any connection between flues causes smoky chimneys.

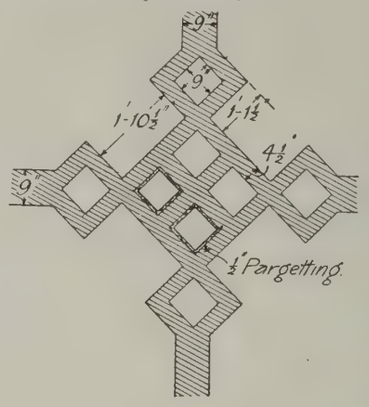


FIG. 4.

A grouping of flues in a building tends to economy and effectiveness.

The outer brickwork surrounding flues, to act effectively as a screen from the outer air, and as an efficient non-conductor of heat, is best when not less than 9 inches in thickness. The withes are

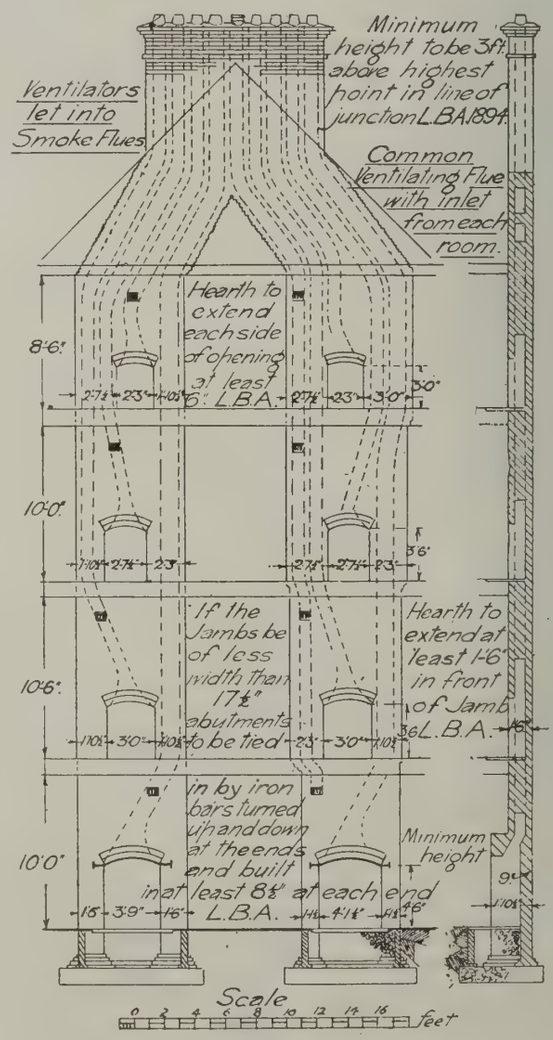


FIG. 5. FIG. 6.

usually half a brick thick, but great care must be exercised to have a thorough bond at the gathering over of the withes.

CHIMNEY BOND.

The bonding in chimneys with 4½ inch backs is most effectively accomplished by the use of Flemish bond; this method lends itself to the bricks of the withes of one course forming the face

headers, and bats only being used on face in the alternate courses. The use of English bond for 4½ inch backs necessitates a considerable amount of cutting, thus causing the work to be weak and expensive.

MATERIAL FOR FLUES.

The materials used for chimneys must be incombustible, durable, and sufficiently stable to resist external forces, such as wind

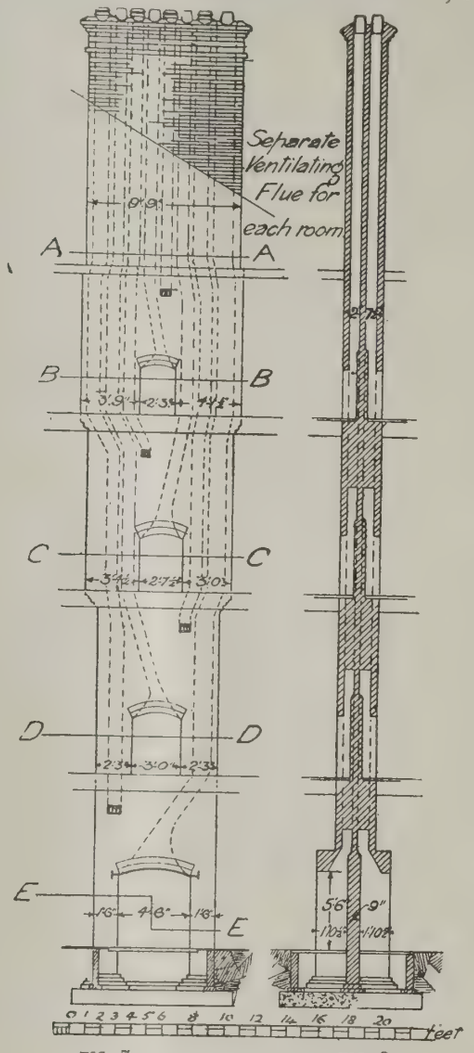
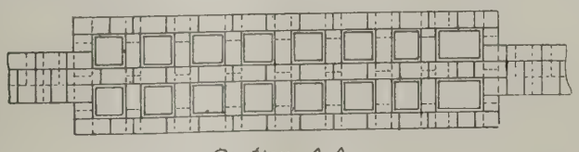


FIG. 7. FIG. 8.

pressure. Without the assistance of ties or any other special construction, brick-work best satisfies these conditions.

DIMENSIONS OF FLUES.

Flues might very well be made 9 inches square; but the use of 14 in. x 9 in., or circular 12 inches diameter is enforced in some cities. There is but little doubt, however, that the use of a flue 9 inches square would very often prevent smoky chimneys, as on account of the smaller sectional area, a greater draught is created. Of late years 9 in. x 9 in. flues have been generally used as the



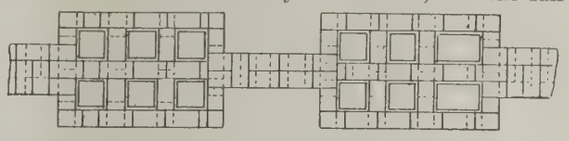
Section A.A

FIG. 9.

standard dimensions for flues for ordinary purposes, 9 in. x 9 in. rectangular and 10 inch circular fire-clay flues are largely used instead of the pargetted lining. These make a clean lining, and the liability of the withes becoming imperfect is very much reduced.

FOUNDATIONS FOR CHIMNEYS.

Some by-laws provide that all chimneys must be built upon solid foundations with footings similar to those of the wall in which the chimney is built, or upon sufficient corbels of bricks or stone, or other incombustible substances, as in the case of a chimney commencing above a shop. This corbelling must not project more than the thickness of the walls below the corbel. The corbelling must be done properly, otherwise the center of gravity of the mass will be brought dangerously near the face of the lower part of the wall, and there will be a tendency to overturn, and the fall of the



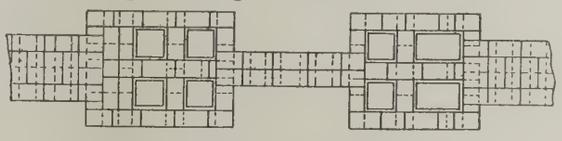
Section B.B

FIG. 10.

walls inwards at times suggests this as one reason among others for the direction of the fall.

PARGETTING.

All flues should be pargetted as they are carried up, unless lined with a fire-clay lining 1 inch thick, or the spandrel angles filled in with brick work, or other incombustible material. The back or outside of all flues must be rendered, if it be less than 9 in. thick, unless it forms part of the face of an external wall. Pargetting is a rendering on the inside of the flue with ordinary lime water. This is to provide against the accumulation of soot in the joints, or of fire penetrating them. The outside of flue breasts



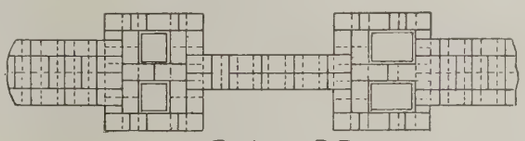
Section C C

FIG. 11.

should always be rendered, especially behind skirtings and beneath floors, where it is more necessary than elsewhere, owing to the close proximity of woodwork.

THICKNESS OF BACKS OF CHIMNEYS.

Every flue of a furnace, steam boiler, or close fire used for trade purposes, or of any cooking apparatus or range of an hotel, tavern or eating-house, must be surrounded with brickwork not less than 9 inches thick for 10 ft. above the floor level. The back of a chimney opening in a party wall used for a kitchen range must be 9 in. thick for 6 ft. above the chimney opening, and such thickness



Section D D.

FIG. 12.

must be continued at the back of the flue; the backs of all other chimneys from the hearth up to a height of 12 inches above the opening must be at least 4½ inches thick if in an external wall, and 9 inches thick elsewhere than in an external wall.

SUPPORT OF CHIMNEY BREASTS ABOVE OPENINGS.

A sufficient arch of brick or stone, or a bar of iron, must be built over the opening of every chimney, and, if the breast project more than 4½ inches and the jambs be less than 13½ inches, the abutments must be tied in with a wrought-iron chimney bar 18 inches longer than the opening. In most cases the breasts project 9 inches or more, and, therefore, if the jambs are less than 13½ inches, these chimney bars must be used, one for each brick in the horizontal thickness of the arch. The ends of chimney-bars should be caulked, i. e., cut and turned up and down.

WIDTH OF JAMBS.

Most by-laws require that the jambs must be at least 9 in. wide on each side of chimney opening, and the brick work surrounding any flue not less than 4½ inches thick.

THICKNESS OF BRICK WORK ON UPPER SIDE OF FLUES.

All chimneys must be carried up 4½ inches least thickness to a height of not less than 3 feet above the highest point in the line of junction with the adjoining roof, flat, or gutter. It is, however, generally advisable to carry the chimney 3 feet above the ridge-line to prevent down draught.

If any interior angle in a flue be less than 130 degrees, a soot door must be provided for cleaning. This is usually specified as 6 inches soot door and frame.

No pipe used for conveying smoke or the products of combustion may be fixed at a distance less than 9 inches from any woodwork.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

PLATE XVI.—PRELIMINARY SKETCHING.

An architectural draftsman is often called upon to make a sketch of the room arrangement of a building before he is ordered to proceed with the working drawings. He is given the data and it is advised that he make a number of sketches before submitting ones. He should study each sketch separately and decide upon the best arrangement. Or he may be given a sketch made by another, the architect or his client, and given instructions to get out a set of preliminary drawings or even the working drawings themselves from them. In any event he must be capable of producing and reading a good freehand sketch, so we shall take it up in Plate XVI.

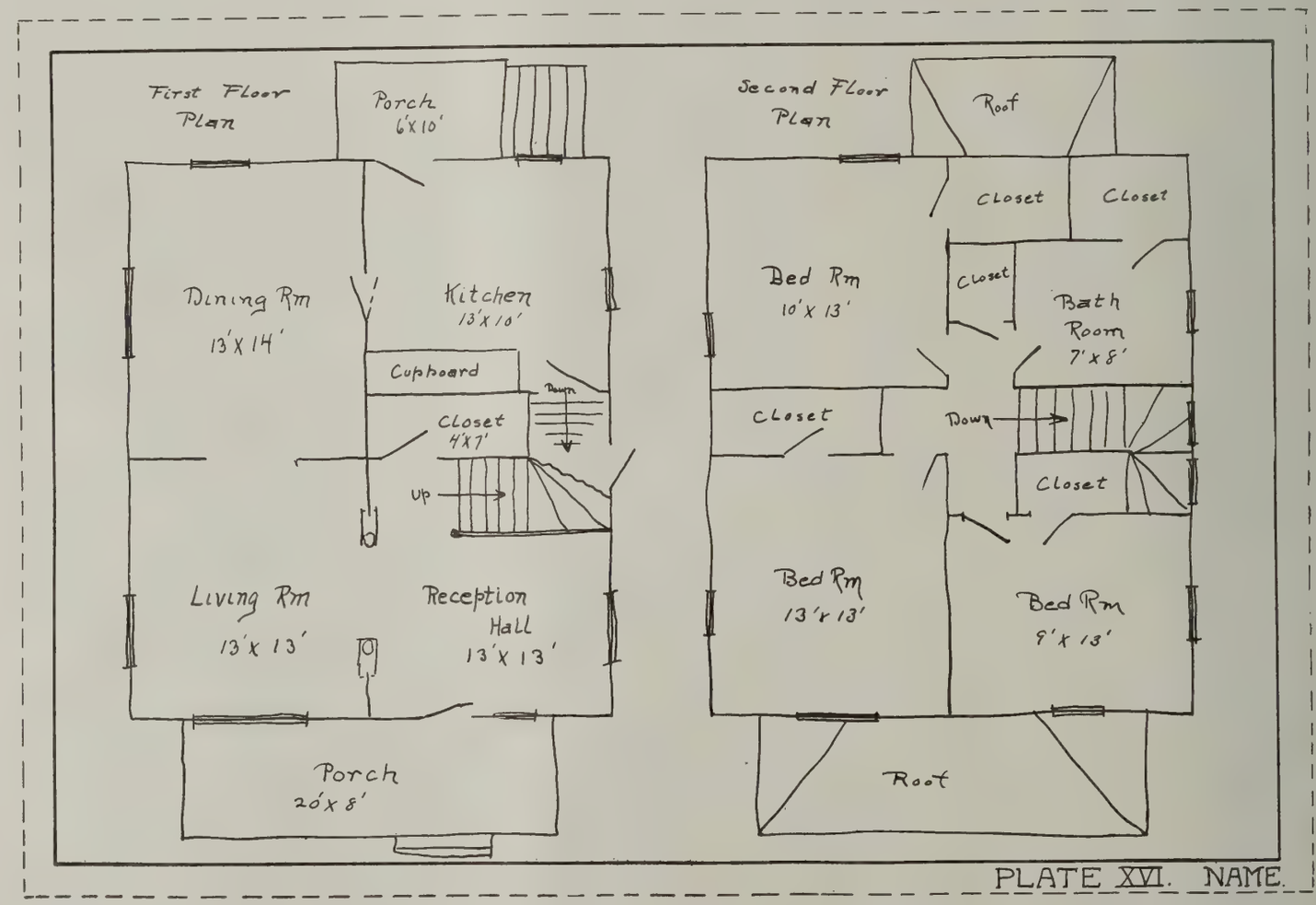


PLATE XVI. NAME.

Here the requirements were to sketch a medium sized frame dwelling containing a reception hall, living room, dining room, kitchen, three bedrooms, bathroom and sufficient closet space. The entire building should occupy ground space of about 26 ft. by 45 ft. Perhaps there was more data included but this is sufficient for a good draftsman to work upon.

He begins his labors by spreading a piece of tracing paper over a sheet of co-ordinate paper so that the lines will serve as a guide for his lines and each little square serve as a unit for his dimensions, as a foot. If he has no co-ordinate paper he can make some by ruling a number of lines horizontally and vertically on a piece of drawing paper about ¼ in. apart. Next he figures on his given dimensions. He knows that the 26 ft. represents the width and the 45 ft. the length, so he has to take porch and step space from the 45 ft. This leaves him about 26 ft. by 27 ft., nearly a square. This he draws on the paper with a single line, representing his outside walls. Now he figures that he has four rooms to get in on the ground floor, so he draws a line through the center each way, dividing it roughly into four squares. Next comes his stairways. They must run from the reception hall and kitchen so he knows that these rooms must be on the same side of the house. Then he plans his stairs. The main stairs will take up less room by running up half a flight and then continuing in a parallel line on the opposite side of the wall. This gives room for the cellar stairs under and allows for a platform there for a grade door. And not only that but he knows that two closets can be worked in with this kind of a stair. He starts in the reception hall with an open staircase and goes up nearly half the flight which he breaks off with a broken line. Then he plans his first floor closet which must be under the last part of the flight. The width and the length of this is governed by the width of the stairs. This gives him the location of the cellar stairs which terminate in the first floor plan with the broken line. Next he plans his cupboard, doors and windows, porches and puts in the lettering and dimensions.

Now he is ready for the second floor sketch. Of course, the outside wall line remains the same so he puts that in the same in size as the first floor. Now he has three bedrooms, a bath room and closets to plan; and he must not forget his staircase, so he puts that in first, carrying it around from where he left it off on the first floor plan. He knows that it is a good plan to have his second floor partitions come directly over the first floor if possible,

so he puts them in roughly and only erases them where he has to for his hall space. Then he starts in the corner over the living room and makes this bedroom the same size. Next he puts in a closet and makes it the same width as his staircase. He cuts it off to allow a doorway from this first bedroom into the hall. His other bedroom on the front is already provided with closet space so he puts it in and his hall door. Notice that he does not put this door out even with the door of the large bedroom as this would bring it directly at the head of the stairs, which is a great disadvantage. Then he allows more hall space at the other side of the stairs, which gives him room for doors into the third bedroom and into the bath. The bath does not need to be very large so he cuts off the back end of it and provides closets for it and the third bedroom. He is very economical and does not care to waste any space so he cuts off the back end of the hall with a partition and a door and provides another closet, also a scuttle entrance into the attic. With the addition of the windows, doors, roofs, lettering and dimensioning, his second floor sketch is complete.

Perhaps he is not satisfied entirely with this plan, so he makes two or three more with different arrangements, and, considering them all, finally returns to this one as the best. He has certainly lived up to the requirements of the case, provided closets for each bedroom and the bath, an extra closet upstairs, and a closet downstairs off from the reception hall where it is most needed.

This is a typical example and a very easy one to plan so it is advisable that the student do not copy this but to work up a problem of his own and try to solve it in all the phases here presented.

PLATE XVII.—CONVENTIONAL DRAWING.

After the sketches given on Plate XVI were approved by the architect and his client, the draftsman was instructed to prepare a set of conventional drawings of the house, drawn to scale and lettered. The result is shown on Plate XVII. His scale was 3/16 inch to the foot, and all of the drawing was done with a rather soft pencil, about a 4 H. He placed his paper upon the board and drew all of the lines with T-square and triangles in order to give the drawing as neat an appearance as possible. He left out a number of details and improved, architecturally, on the arrangement in the sketches. He drew all of his walls with a double line, representing six inches, and went over them with a pencil excepting where the windows and the doors came. He lengthened the rear porch and put railings on both porches. The front porch roof he also improved upon by allowing for a gable which threw the water away from the steps. He planned his stairways more accurately, allowed for a chimney which could carry the smoke from the furnace and the kitchen range and changed the size of some of the rooms.

When these have been approved the draftsman is instructed to get the working drawings out from them, so the more accurately these are made, the easier will be his task when the working drawings are drawn.

The student should make a close study of this plate and should attempt to make such plans from the best sketch that he completed.

(To be Continued.)

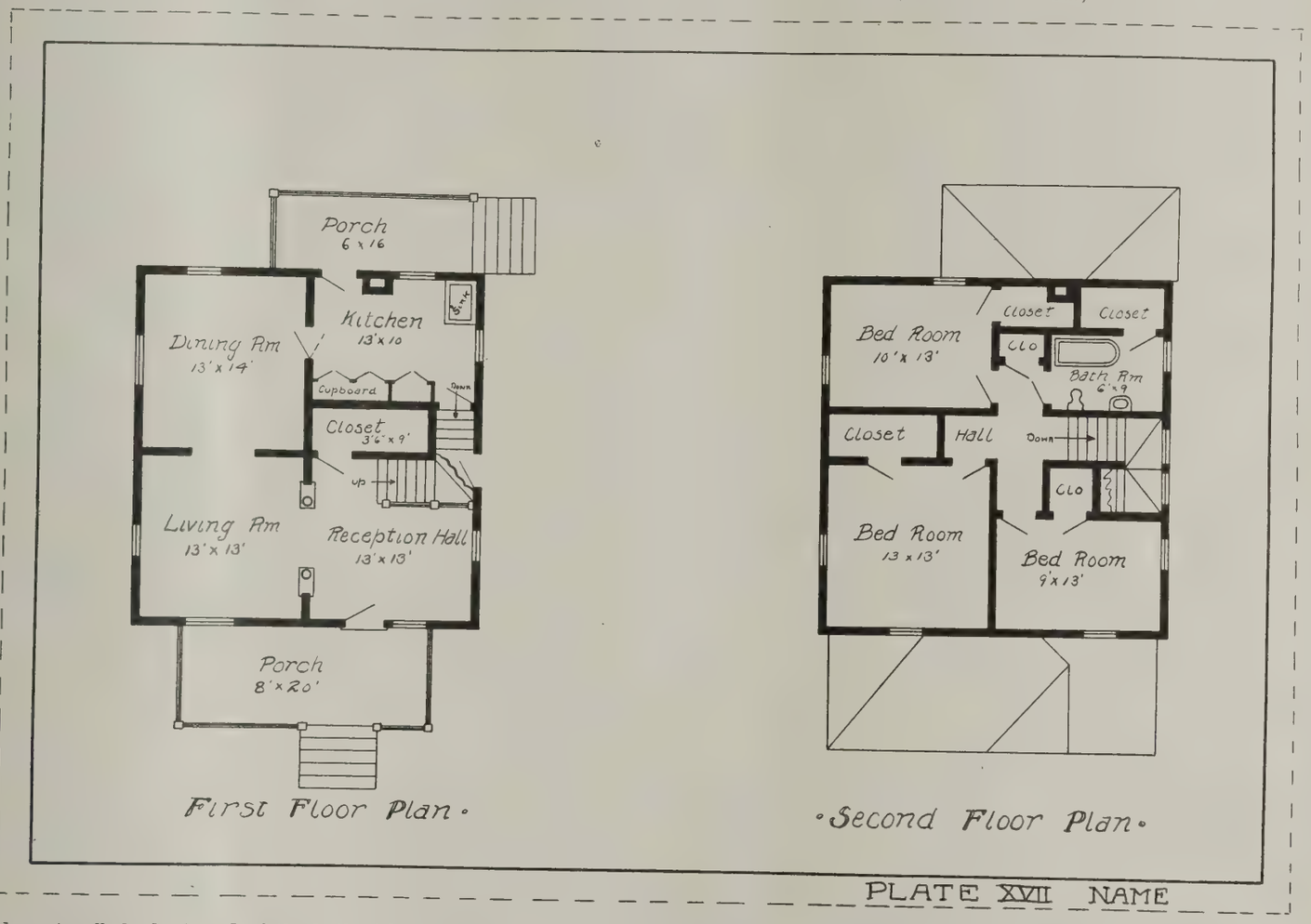


PLATE XVII NAME

DRYING OUT NEW BUILDINGS

Hitherto occupation of newly built houses has been delayed in order to allow them to dry, but with the use of this new apparatus freshly plastered rooms can be perfectly dried within three days, and the excessive moisture of the walls completely extracted.

The apparatus consists of a stove with a fire box, suitable for coke fuel, surrounded by a number of small-diameter tubes, similar to gas pipes. By means of the apparatus fresh, dry outside air enters constantly into the air-supply tubes, and is highly heated in the tubes surrounding the fireplace. It ascends in a dry-heated state in the room, passes along the ceiling and walls, and absorbs the dampness, sinking down after being saturated with the same and re-entering the apparatus. It then mixes with the coke gases in the outlet tube for the smoke, and eventually escapes into the chimney.

This constantly renewed fresh outside air furnishes an abundance of carbonic acid to the mortar, thus hardening it, and producing in a short time the same effect as if the mortar had dried naturally. It is claimed by this system that no moisture can possibly show later on.

A striking recommendation for the apparatus is that the German law prohibiting the habitation of any house until six months after construction is abrogated by the authorities where this system is used.



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

RAISING A FRAME BUILDING.

From "Old Builder," Syracuse, N. Y.

In answer to J. B. Golden, B. C.

See that there is a good sill all around before starting to raise. Place six or seven heavy timbers clear across building, bolting two together, if you cannot get them 36 ft. long. Under each end of these place a large jackscrew. Raise only a few inches at a time, keeping the sill level by giving each screw one or two turns at a time, or else turn them all an equal distance at a given signal. Provide plenty of cribbing—6x6x4 feet is a good size, and keep blocked up all the time so there will be no chance for the building to fall. Every night let the screws down a little so the building rests firmly on the cribbing. If a wall is to be built under the building, you can build up piers between the jacks. Remember to take short lifts on the jacks and keep sill level and blocked up. Never lift on one jack while others are loose. Raising buildings is such a particular job that in the large cities a license is required before one is allowed to start.

From "Joe B.," Winnipeg, Man.

Answering "J. B." of Golden, B. C.

The proper way to raise a frame building, or any other building for that matter, is by using screw-jacks under foundation. If the building is a heavy frame, well put together, it might be raised by using heavy levers, lifting one end of the building a little, then blocking it up, and using the levers at the other end, and lifting each end, a little at a time, and blocking up, until the right height is attained. This is a clumsy way and should not be used if the frame is scantling or balloon built. There is nothing like the screw-jack for raising a building.

SELECTING HAND SAWS.

From an "Old Hand," Trenton, N. J.

In answer to "Boy Apprentice" of Kansas City, if he has no particular love for any make of saws, it would be well for him to consult some of the men in his own shop, as they could give him some "pointers." It would be impossible for me to write out at length and they might loan him their saws so he could try them for himself and note their good qualities. I am now over twenty-five years in the business of woodworking and during that time I have worked with many different kinds of saws, English and American, and while I have found differences, I have noticed that the "differences" did not amount to much, only in exceptional cases, and in the advertisements. Sometimes you will get a poor saw, one that has passed the keen eyes of the man appointed by the makers to see no defective saws leave the factory. This may occur with any manufacturer of saws, but to their credit it may be said that any one of our American saw makers will gladly send another saw to replace the defective one—free of charge—or return the money paid, if the matter is brought to their notice. While I don't pretend to say that any one make of saws is better all round than any other make, there are certain differences which suit one class of men which another class of men will not tolerate for a minute, if they can avoid them. My own experience has been about as follows: My first set of saws consisted of a cut-off, a rip-saw, a panel, or siding saw, as we called it, and a back saw with a brass back, and which, by the way, I still have. The rip and the panel saw were American made, the cut-off and back saw were English, the one a Sorby, the back saw from Sheffield, name undistinguishable. All of these saws served me well and for many years I used no others. Fifteen years ago I lost my tools, with a few exceptions, by fire. I then supplied myself with a complete outfit of saws made by Disston & Sons of Philadelphia. They cut well and clean, but somehow I did not like them at first. They seemed to tire me out quicker than the old saws. In less than six months, however, when I got accustomed to the set of the handles and hang of the blades I got to like them, and I found they held their edge longer and required to be filed less often than the old saws I lost. One day I had an opportunity to dispose of my whole "kit" and handsome tool chest for a good price, to a man who was going to Honolulu on a short call and big pay. I let them go and set to work to buy a new outfit. Having two boys of my own, old enough to help me, I began contracting and procured enough tools to go all round, and this time I bought without reference to names of makers, using my own judgment in selecting. This time I bought twelve saws—3 Disstons, 5 Atkins Silver Steel, 3 Simonds, different styles, and one Greyhound saw made by Geo. H. Bishop & Co. Afterwards, I bought several other saws for the use of my boys and hired workmen. The workmen and my boys fell dead in love with the Greyhound, and I had to buy three more cross-cuts because of their quick-cutting qualities. Simonds saws are doing good service and seem to be made for use, not for ornament. The old Disston saws still hold up their end of the work all right, and are the ones I make the boys take out with them when they have work outside the "shop." The Silver Steel saws, however, seem to be the favorites with all my workmen, as they consider them easier to work. They do not tire the arm and they cut freely and seem less likely to buckle than most of the others. The boys claim for them, "lightness, quick cutting, easily kept from rusting and perfect hanging." "Boy Apprentice" will see from this "Actual Experience" that there is little choice to be made from the four makers of saws, but my own boys say to me, "Tell him, 'Dad,' to buy Atkins Silver Steel saws. We are sure he will like them best, because they cut so easily and always look nice." So there you are!

From "Tabbot," Dayton, Ohio.

"Boy Apprentice" ought to know, without telling, the kind and style of hand saws he should buy for his own use, if he uses saws at all. I don't think it makes much difference as to the manufacturer's name on the blade, so far as to the cutting qualities. As I take it, this depends more on the filer than on the maker. If he he is a good filer, he can make any old "brier" edged thing cut well for a while, but a poor filer will ruin the reputation of the best saw ever made, in two filings. Learn to be a good filer, or get your saws filed by a professional filer, and most any one of the saws made by an American firm will give good satisfaction. For myself, I scarcely think of the maker when I buy. I judge the saw on its merits. If it is hung to suit my hand, has the right number of teeth per inch, the proper ring and is elastic and not too heavy on the point, firm in the handle, well riveted, and stiff enough to be worked without buckling, I don't hesitate about buying. If "Boy Apprentice" will use his brains, mixed with a little judgment, when he buys his saws, he will likely get the best, for him, the market affords. Perhaps it would not be a bad idea for him to read over the various saw catalogues and saw advertisements. He will get some pointers from them, also some very useful knowledge.

From J. B., Lead, S. Dak.:

Boy apprentice wants to know what kind and make of hand saws are the best. It seems to me that an apprentice who has almost served his time ought to know the kind necessary for the different work he is to perform. A carpenter usually has a 28-inch rip saw, say 5 or 6 points to the inch, a 26-inch cut off saw, say 7 or 8 points, also a 26-inch cut off saw 10 or 11 points to the inch, a 20-inch siding saw 10 or 11 points to the inch. I would advise Henry Disston & Son. The first two cast steel and the others spring steel. This advice is from one who has had 40 years' experience.

SOUND PROOFING.

From "Rambler," Scranton, Pa.

Answering H. M. H., Leadmine, Wis.

The principle on which sound proofing is used is that a continuous layer must entirely cover the space from which the sound comes. In the case of a large room, the floor should be covered with a deadening felt, and on top of this 1x2 strips laid which are not fastened to the under floor. On these strips is nailed the top flooring, care being taken that no nails extend through the nail strips and into the floor below, as that would carry sound through the floor proofing. This, of course, requires that the finished floor is raised about two inches, and may necessitate sawing off the doors or making other provisions for taking care of them. There are several forms of deadening felt on the market and advertised in THE NATIONAL BUILDER, and any of them will be glad to send you further information.

From J. B. Lead., So. Dak.:

Replying to H. H. H., Leadmine, Wis., to deaden the floor of the lodge room on second floor, take up all the platforms, if any, and the base around the wall; then strip the present floor with 2-inch by 2-inch over every joist. Then spread lime mortar on the floor between the strips, about ¾ to 1 inch deep. Lay a floor on top of these strips and put back the platforms and base, and you will have a sound proof floor.

STRENGTH OF WOOD BEAMS.

The formula for finding the safe loads on wood beams are derived from the:

Width of beam in inches = b
Depth of beam in inches = d
Span of beam in feet = S

and a constant "A" which is the safe load for a piece of the material one inch square on a span of one foot.

For different woods "A" varies as shown in the following table:

Value of constant "A" for various woods.

Chestnut	60	Eastern White Pine	60
Hemlock	55	Western White Pine	65
White Oak	75	Texas Yellow Pine	90
Georgia Yellow Pine	100	Spruce	70
Oregon Yellow Pine	90	Poplar or Whitewood	65
Red or Norway Pine	70	California Redwood	60

To find the safe load for a given beam substitute the values in the formula:

$$\text{Safe Loads} = \frac{2\ b\ d^2\ A}{S}$$

Thus for a 6x8 Georgia Yellow Pine with 10-foot span we would have $\frac{2\times6\times64\times100}{10} = 7680$ lbs.

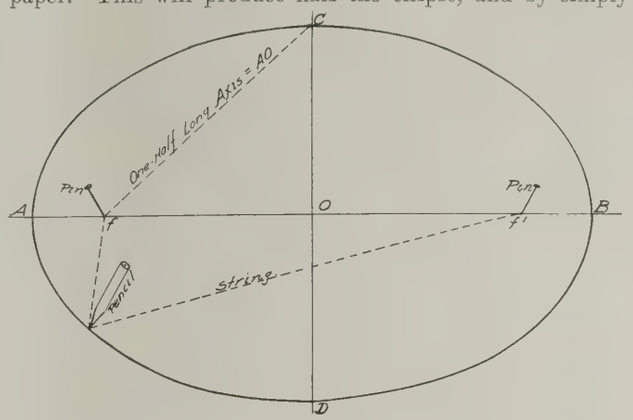
This is on the supposition that the load is evenly distributed over the entire length of the beam. For a concentrated load at the center take one-half this result, or use the formula:

$$\text{Safe Load} = \frac{b\ d^2\ A}{S}$$

For concentrated loads not on the center, the value is between these limits, being more than a central contentrated load, and less than evenly distributed load. The nearer the concentrated load approaches the support the greater it can be.

DRAWING AN ELLIPSE.

From "Angles and Curves," Santa Ana, Cal., in reply to J. E. I., Shenandoah, Iowa: The simplest, yet most accurate way, to draw an ellipse is by aid of two pins, a piece of firm string, and a pair of compasses; lay off the long axis AB, then the short axis, bisecting the long in the center, and exactly at right angles to the long axis; set the compass points as far apart as one-half the long axis measures, then with the compass so set, using one extreme of the short axis for a center, trace an arc across the long axis; the point where this arc crosses the long axis will be the location of one focus and the other focus can be located in the same manner. Set a pin firmly at each focus and tie an end of the string to one of these pins, then wrap the other end of the string around the other pin once or twice, drawing it in just far enough to that when stretched by the pencil, the pencil point will just reach the extreme of the short axis. Hold the loose end of the string down firmly with the finger, and trace a line according to the way the string guides the pencil, taking care to keep the string down on the paper. This will produce half the ellipse, and by simply re-



versing the string, the other half may be easily drawn in the same method. This method produces a true ellipse, whereas compasses alone cannot, because no part of an ellipse is any part of a circle. By using a wire in place of the string, I have drawn ellipses measuring more than ten feet in diameter.

QUESTIONS

PURLINE POSTS.

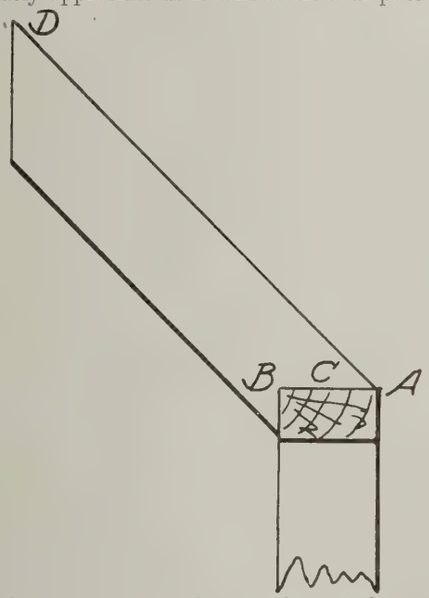
From D. S. S., Elwood, Oreg.:

Will some reader of the NATIONAL BUILDER give me the best and most practical method of finding the length of purline posts, without the use of diagrams?

RAFTER NAMES.

From L. M. H., San Jose, Calif.:

Will you kindly answer the following question which I assure you I will greatly appreciate as it will settle a dispute among some "chips" here.



What is the proper name for a rafter at the point where it comes in contact with the upper outside corner of the plate. Some call it the "heel" others the "toe" which is right or is there a more proper name than either?

REMOVING PAINT.

From A. M. B., St. Louis, Mo.:

I would like to know a way to get a coat of paint off a door without burning or scraping it off.

MAPLE FLOORING.

From M. A. V., St. Ignatius, Mont. I have been working at the carpenters' trade for several years but have never had much maple flooring to lay. Can you give me any pointers on this class of work?

A USEFUL BOOKCASE

By AETNA

For the reception of books, drawing instruments, photographic requisites, and periodicals, which accumulate surprisingly fast, there is nothing better than a large and commodious bookcase, as shown at Figs. 1 and 2. The writer, feeling the need of such accommodation for his numerous paraphernalia, contemplated making up in hard wood the design shown in Fig. 2, with upper and lower carcases to render its removal an easier matter. There is undeniably a great amount of work in the construction of such a bookcase when one has not the aid of machine tools, consequently this design never advanced further than the paper stage, but resolved itself into a less pretentious, but more readily constructed affair, illustrated at Figs. 1 and 3. Practically all the necessary material may be purchased machine finished, from stock sizes, at any builders' timber merchant, which considerably lessens the time and labor to be expended upon its construction. Due regard has been given to its portability, which has been effected in a simple, though perhaps a somewhat unorthodox manner. The cornice, the back and sides, etc., are all detachable by the removal of a number of brass screws; thus no difficulty whatever exists where easy transport is concerned.

The set of cupboard doors are 3 feet 6 inches by 1¼ inches thick, with leaded cathedral glass panels in top and wood panels

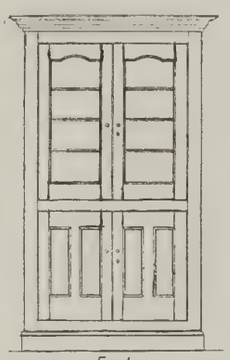

Fig. 1



Fig. 2.

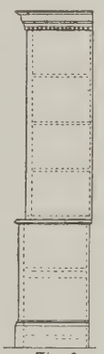

Fig 4.


Fig. 3.

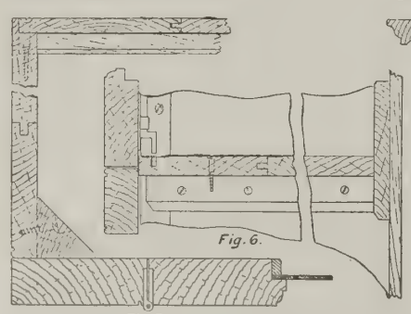

Fig. 6.

Fig. 5.

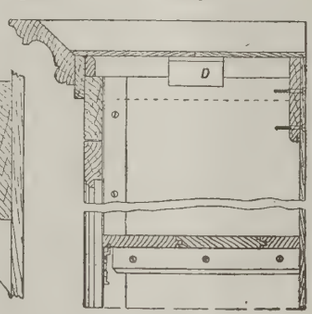
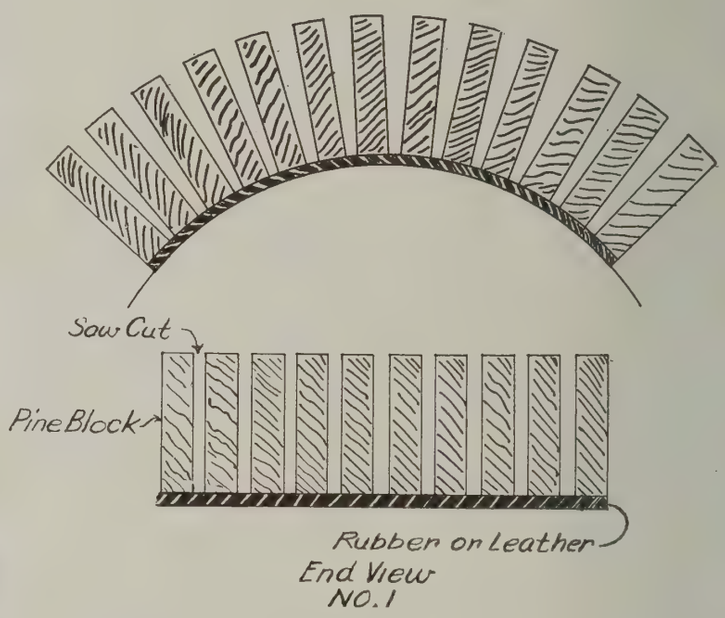


Fig. 7.

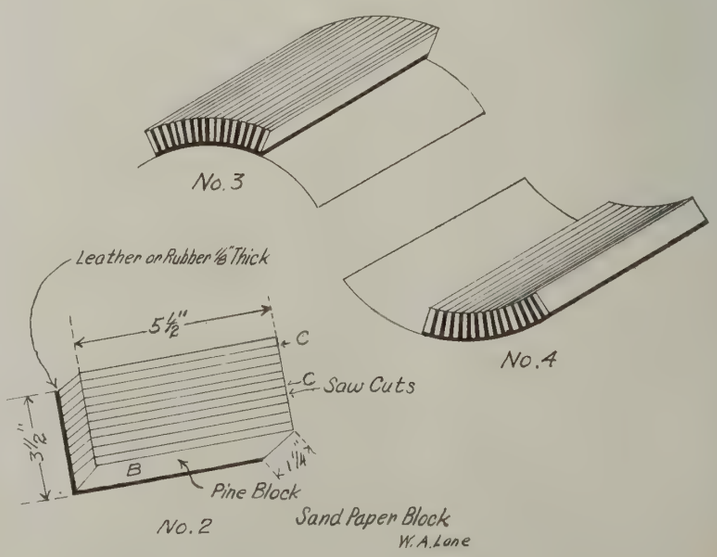
in bottom door; the frame is of the same gauge, 1¼ inches; the stiles being 3¼ inches wide and the top, middle and lower rails respectively 5½ inches, 2½ inches and 7 inches wide. The sides of carcase are made up from 7-inch by ¾-inch square edge, grooved and tongued, jointed boards, planed both sides, glued and clamped till set. In lieu of blocks, a continuous, triangular section fillet is glued and bradded to the inside of front framing, as shown at Fig. 5, to which the sides are attached by means of screws. The back is composed of 7-inch by ½-inch V-jointed, grooved and tongued stuff fixed to three ledges. The back edges of sides are rebated for the ½-inch backing and recessed for a dovetail formed on the ledges. Then screws pass through the whole lot for security. Now battens are screwed on the inner sides to support the shelves, and the second shelf up from the bottom is arrangd to form a stop for th bottom part of glass doors (see Fig. 6). The shelves are 7 inches by ⅞ inch, grooved and tongued boards cut to fit the case nicely. The bottom, middle and top ones are screwed to the battens, thus stiffening the carcase considerably. The top shelf also forms a stop (see Fig. 7), and a pair of small brass blind bolts are fitted which engage in these shelves, and are thereby readily accessible in these positions. The cornice is mitred and fixed to three fillets, which encase the front and sides of the carcase; on the inside of fillets glued blocks are fixed to support the cornice. The front blocks rest on the top rail, while the side blocks at D, Fig. 7, being notched to the top ends of side, prevent any movement of the cornice outwards. The dust boards on top are arranged to come flush with the backing, and also connect the side of cornice, preventing any tendency to springing outwards. The skirting is glued and lightly bradded to the carcase, but is free at the mitres. The doors are hung with 2½-inch brass butts, and furnished with good quality cupboard turns and locks. The whole exterior of carcase should be sand-papered and dusted down, knotted, primed, painted and finished in brush graining, giving a pleasing appearance and harmonizing with its surroundings. —Illustrated Carpenter and Builder.

AN ADJUSTABLE SAND PAPER BLOCK

By W. A. LANE



Upon a suitable sized block of wood glue a piece of rubber or leather about ⅛ of an inch thick. When dried well, lay out the saw cuts as shown in drawing No. 1 and No. 2. The saw cuts can be made by hand or on the band saw. Saw through the wooden block to the rubber (or leather); a block 1¼"x3½"x5½" makes a good sized block for either hollow or sound work, and will not cramp the hand—an important item when there is much work to be done.



A MISSION SIDEBOARD

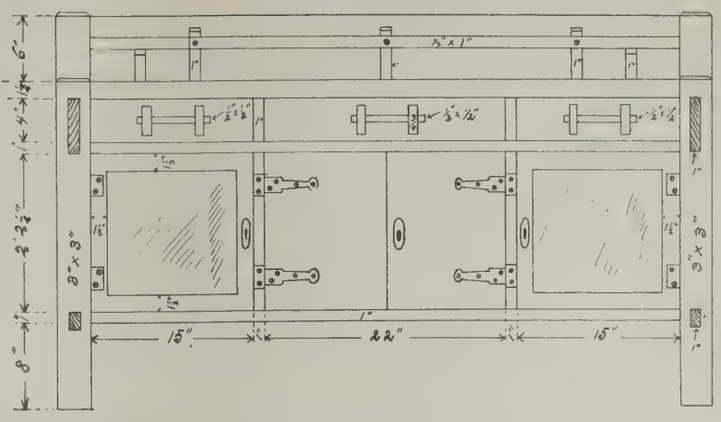
By E. C. LANE

I see no reason why "Mere Man" should do all the furniture designing when it is the woman who uses it most. As for myself, I greatly enjoy planning different pieces of furniture. The sideboard shown is of rather simple design, yet it would meet the requirements of the average family.

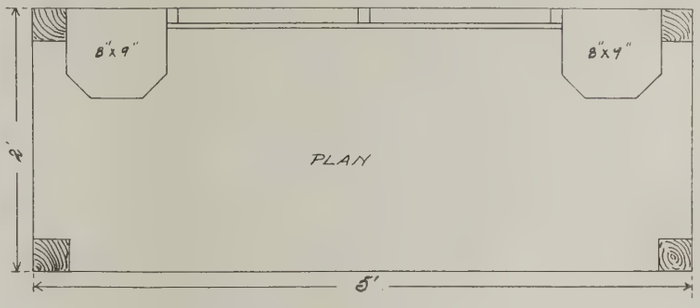
The top provides ample space for odd bits of silver and glass. There is a small rail for one's favorite plates, and at each end a stout little shelf to hold an old Dutch jug, a nut bowl, or any fancied dish. At the center front is a large drawer for the linen in every day use, with a drawer at either side for silver. Below is a deep compartment for extra linen or for china.



At the sides is a roomy receptacle for one's cherished bits of glass, china, copper, etc. Having glass sides as well as doors, one may enjoy the beauty of their best loved possessions at the same time having them shut away from dust and likelihood of being broken. Naturally, this should be of wood to harmonize with the furnishings of the dining room. Some good wood waxed is by far



the most artistic and satisfactory. For those who live in Mexico, there is the beautiful genuine mahogany—this would look well with hinges of dull copper. They also have real ebony whose soft blackness needs brass finishings. I strongly advise all to use the wood found in or near their locality. There are numerous woods of beautiful grain and tint lying idle, simply because so many have the idea that only a few well known varieties may be used.



Those who live near forests may explore and no doubt discover many charming specimens, while those fortunate ones who own large estates may utilize what is grown upon their own land.

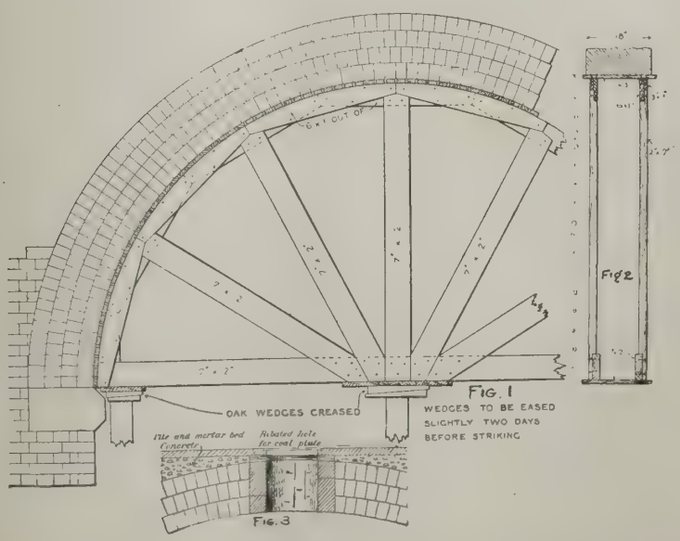
Think of the joy of having this or other pieces of furniture fashioned from one's own woods, the work on the premises, and if one has the desire and ability, from one's own design. There is surely far more pleasure in the ownership under these circumstances than when one purchases from the shops.

CENTERING AND BRICKWORK

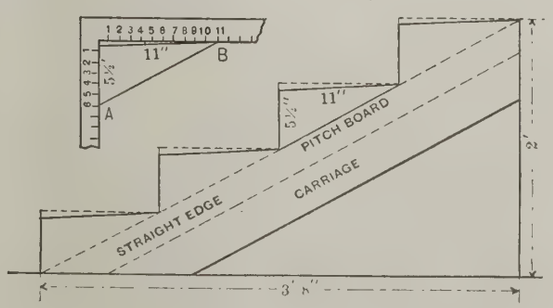
By F. T. H.

SOME time ago a subscriber requested us to send him a sketch showing a method of making a center for a brick arch having four rings, and a radius of fifteen feet. Fig. 1 exhibits a part elevation of the head of an opening of a brick-built structure. It is a semi-circular opening, and as shown, it rests on its centering, all the details of which are given. The springing stones, or imposts, are 21 in. x 12 in. on the face as shown. The manner in which the struts of the centering finish against the ribs is made clear by Fig. 2, which is a vertical section of Fig. 1.

Fig. 3 shows the manner in which a coal hole is formed in an arch having three rings. A circular center is made, being slightly tapered from the top down and is placed vertically with the small end resting on the crown of the center and should be provided with some device for withdrawing when the work is finished. A circular cast iron ring of the right size, and shape, having an iron cover, must finish off at the top of the hole. The cover is movable so that it may be taken off whenever required.



PITCH BOARD FOR STAIR WORK

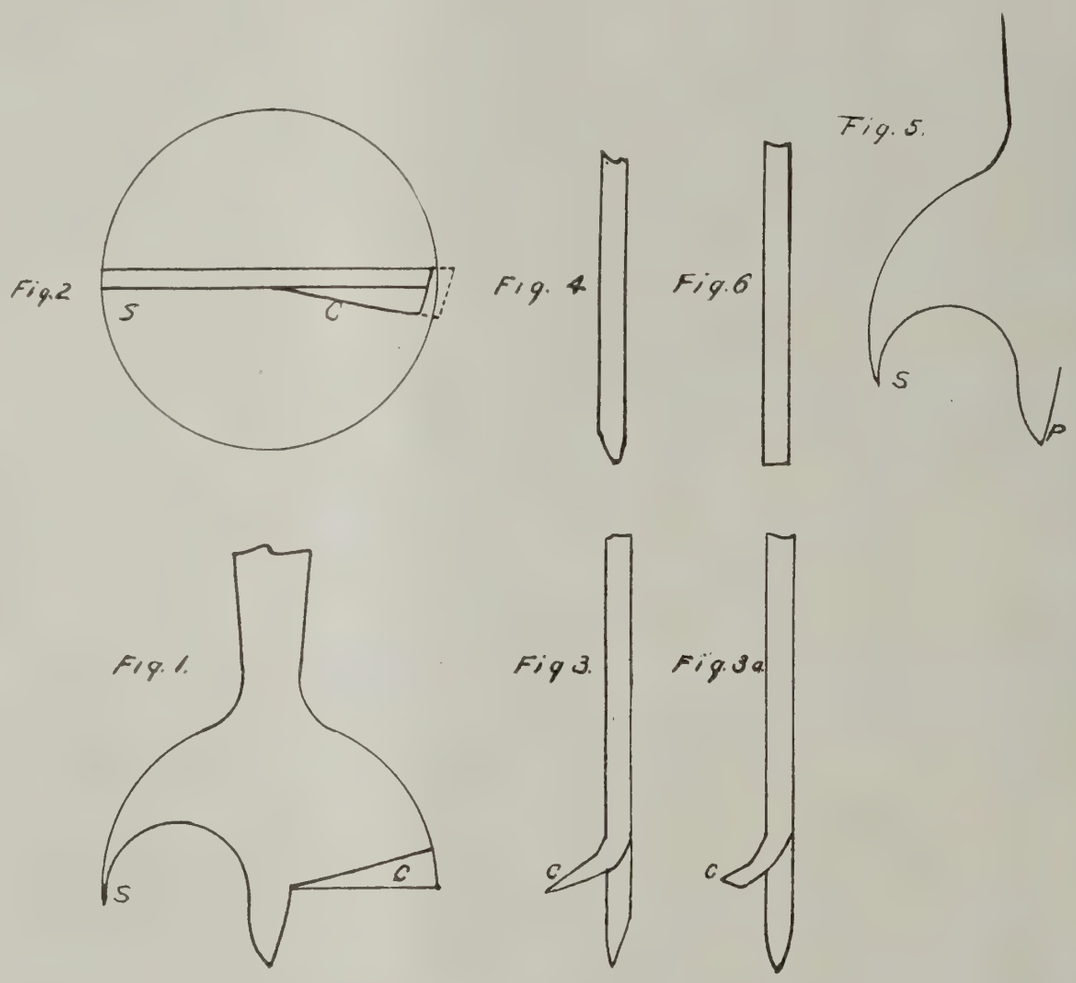


It will be seen that I cut ¼, ⅜, or ½ inch off the pitch board before laying out the carriages. I always use a straight edge in laying out carriages, a straight edge being spaced off equal to A B, and by keeping the pitch board to the lines on the straight edge, all carriages will be the same.

ADVANTAGES OF THE CENTER-BIT

By L. G.

ALTHOUGH regarded by many as old-fashioned, the center-bit possesses several advantages over the various twist bits which are so popular at present. These advantages appeal perhaps more particularly to the jobbing man than to one who is continually on new work, but even he will sometimes find the center-bit very useful. For instance, in boring a large hole in a hardwood floor, the twist bits generally feed too fast and become hard to turn, as well as acquiring a tendency to run out of plumb. The chief advantages of the center bit are:



1. They are easier to keep in order.
2. They are harder to put out of order.
3. With a certain limit their size may be altered to make either a light or a loose fit for pipe, dowels or anything circular.

To get a center bit into real good working condition several points must be watched closely, and the first is to see that when boring the spur S strike the wood ahead of the cutter C. The spur should not lead by too much, however, as that would throw too great a strain upon it, and possibly break it when going through a hard knot. Care should also be taken that the cutter C does not project (as indicated by dotted lines in Fig. 2) beyond the circle described by the spur when boring, in fact it is just as well to give it plenty of clearance. Now, attend to the spur and see that it has clearance as in Fig. 1 and is not binding, as in Fig. 5. This fault can be cured with a file in a center-bit, but if through running into a nail or any other cause, a twist bit gets this same trouble its days of usefulness are over. The next point and one which is equally important in twist bits is to see that the cutter is leading at its extreme edge, as in Fig. 3, and not binding behind it as at 3a, as although this does not always stop the bit boring at all, it will always make it considerably harder on the man behind the bit.

I have said nothing yet regarding keeping the cutting edges sharp, as that is of course apparent, both as regards the cutter, the spur and the center, but I'd like to point out that the spur will cut much sweeter when sharpened with a round edge as indicated on end view by Fig. 6, and not like Fig. 7, as those sharp corners will scratch rather than cut. The spur should always be sharpened on the inside, so that the trouble indicated in Fig. 5 is not likely to occur. The points that I have here emphasized apply equally, with the exception of the second one, to twist bits, but the principles involved are more easily seen in the center-bit owing to its simpler construction.

The third advantage that I claimed for the center-bit is one which is generally overlooked, but it may be pointed out that by filing the center on the side near the spur so as to increase the distance from the point P to S, it will bore a larger hole, as the spur S will describe a larger circle. Although the increase (or decrease, by filing on the side) thus obtained may appear small, it comes in very useful at times; if, for example, we want to get a fit for a dowel or a pipe and have a bit that comes near the size we want, a touch of the file enables us to bore the hole the exact size required.

REALISM IN ART

A local painter worked three months on a painting. He spent a good deal of money on models, but the finished product justified all his expenditures and all his time. Everybody told him so when his picture was exhibited.

Everybody but one. This lady, whose opinion he valued most, was the one he took to the exhibition with him. "I can hardly wait," she bubbled. "Which is your picture?"

"This one," he told her—and waited.

She studied it in detail.

"What is it called?" she wanted to know.

"Wood Nymphs."

"How silly of me to ask! They're so natural. Why, anybody would think they were really made of wood!"—Cleveland Plain Dealer.

THREE CONCRETE BUNGALOWS

The competition for designing a concrete bungalow recently held by the Cement Products Company brought out a great many designs of unusual excellence.

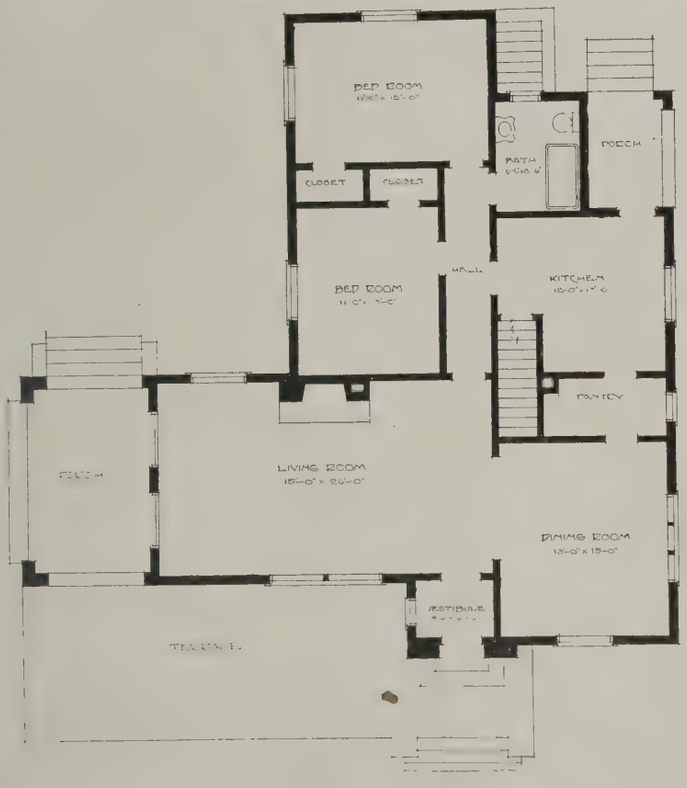
Through the courtesy of the Cement Products Company, we reproduce on this page three of the designs submitted.

In the design by Mr. H. P. Bartlett, we have walls of monolithic construction, with a flat roof. The exterior faces of outside walls are to be treated with acid to expose the aggregate.

Mr. Wm. Drummond secured favorable mention for his two story design, showing a delightful arrangement of the lot as well as the interior.



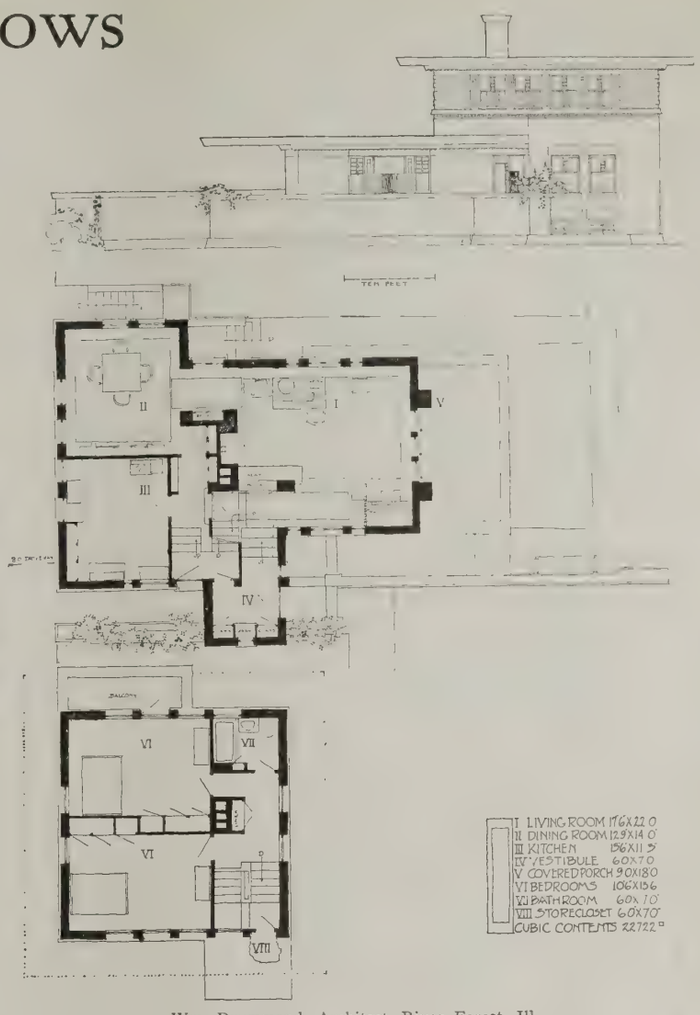
H. P. Bartlett, Architect, Indianapolis.



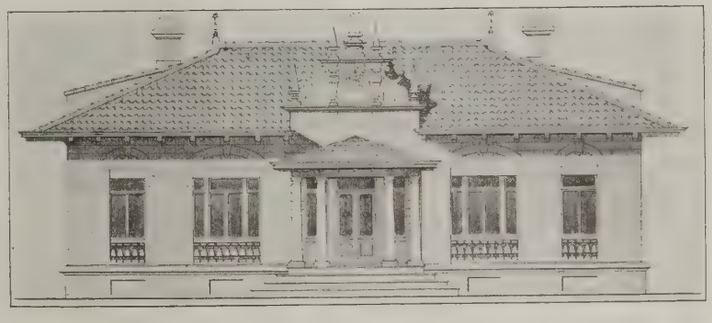
Mr. H. Maring suggests the use of white-faced cement blocks. The somewhat classic lines are well carried out and the red tile of the roof adds a pleasing touch of color.

It is to be noted that a limit of $4,000, not including heating apparatus, plumbing, electric wiring or fixtures, was fixed for the complete building, and it would seem that the designs submitted were well worth the limit.

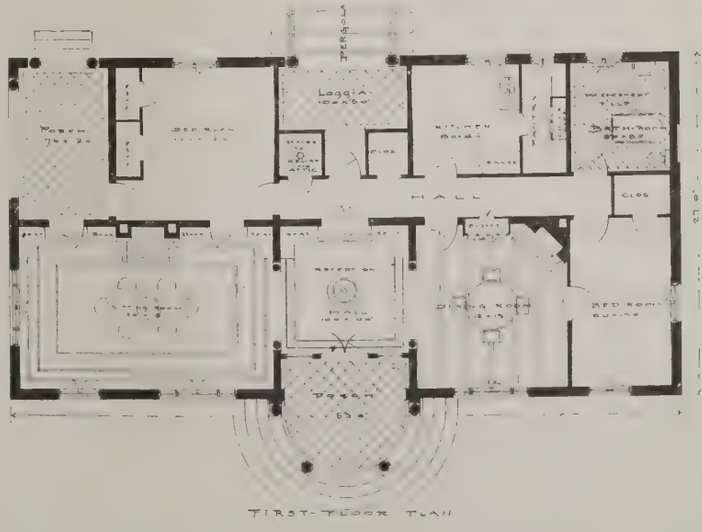
The interest shown in this competition indicates the trend of public opinion toward a house designed to be in a measure at least, fireproof. With incombustible walls, floors and roof, the risk of fire, both internal and external, is greatly diminished. The permanence of a building of this character, with freedom from repairs, does much to make it popular, but nothing does as much as the indication of sound and artistic construction from every architectural point. The people want good buildings, and are learning that good buildings may also be made artistic.

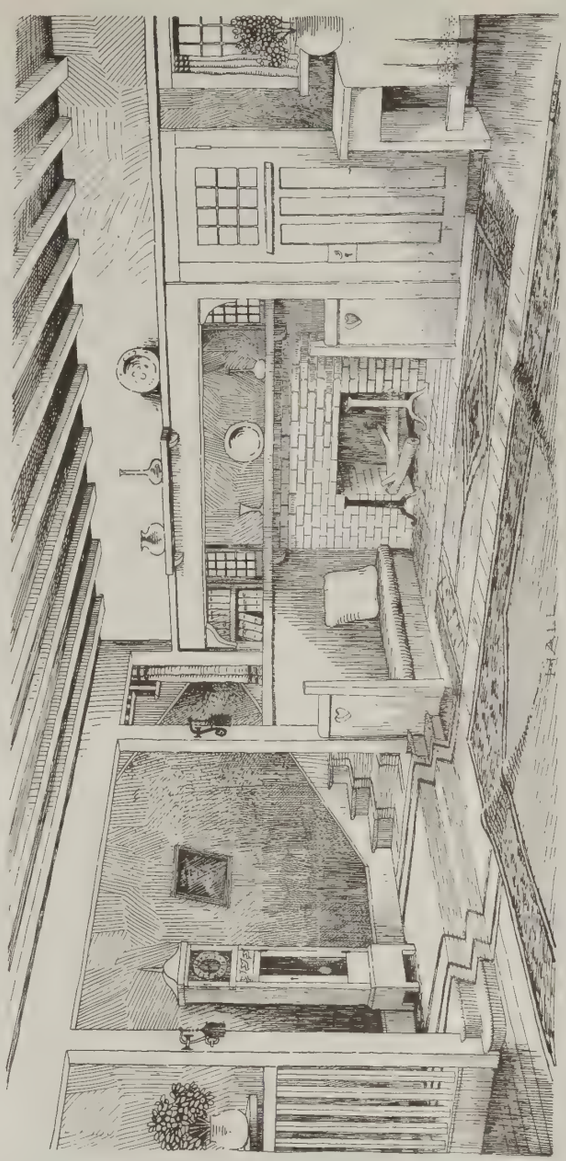


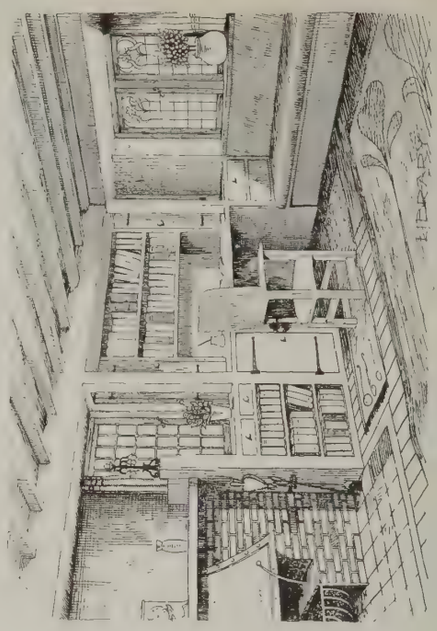
Wm. Drummond, Architect, River Forest, Ill.



H. Maring, Architect, New York.

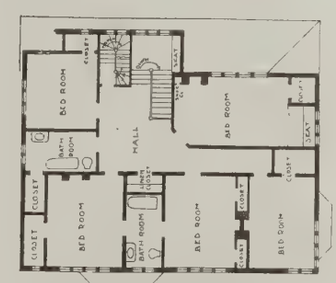








SKETCHES OF HOUSE FOR MR ADAM Z. ALT. F.G.W. DIETRICH. ARCHITECT. NEW YORK.





BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

WOODWORKING FOR AMATEUR CRAFTSMEN, by Ira S. Griffiths, A. B., Supervisor of Manual Training, Oak Park, Ill.; Instructor in woodworking and methods Bradley Polytechnic Institute Summer School, Editor Illinois Manual Arts Association, Chairman Editorial Board, Western Drawing and Manual Training Association. Popular Mechanics Handbooks. Price, cloth, 25c.

Every boy at an early age develops a taste for mechanics, and as the old Yankee whittler said, "Every boy should be able to make things. Knives are cheap and lumber plenty." With the idea of fostering the mechanical taste and producing things useful, the author has prepared this book treating on elementary woodworking, care and sharpening of tools, etc. The preparation of rough stock is shown and when the student student is sufficiently prepared, he is shown the correct methods of making small furniture, such as bird boxes, tabourets, umbrella and magazine stands, tables, cabinets, etc.

The book is written in simple, practical terms, readily understood by those for whom it is intended.

A MANUAL OF TECHNICAL PLUMBING AND SANITARY SCIENCE, by S. Barlow Bennett, Consulting Sanitary Engineer. Third Edition, Revised and Enlarged. Price, $2.00 net. Published by S. Barlow Bennett, Portland House, Jesmond Road, Newcastle-on-Tyne, England.

While one of the oldest trades, and one of the most necessary to our modern condensed civilization, plumbing and sanitation has not been given the attention it deserves. The apparatus and conveniences satisfactory for a village cottage becomes entirely inadequate when the village becomes, as it so often does, a busy village street.

The experience of Mr. Bennett as lecturer on sanitary engineering, instructor in practical plumbing, etc., enables him to treat intelligently the various lines under consideration.

The author takes the reader through the elements of practical science as connected with plumbing and sanitation, the manufacture of materials, physical properties of air and water, leading up to the installation of hot and cold water systems. Heating by hot water, etc., sanitary appliances and sanitary science are discussed in detail, showing the finished work under various conditions and arrangements, and closely allied to this is house drainage and sanitation.

The accuracy of plumbing work can only be indicated on proper tests. As various by-laws specify certain tests, the journeyman must be prepared to make them. Whether a test is required or not, the system should be in such shape that it would pass the most rigid inspection.

While there are many items on which English and American practices differ, the general principles are the same in both. An American reader would not recognize goods of English manufacture, but the essential points are the same. The plumber who understands his work here will recognize many points of excellence in English methods which can be utilized.

FIRE AND FIRE LOSSES.—Instruction Papers, prepared by F. W. Fitzpatrick, Consulting Architect, formerly of U. S. Service; executive officer International Society of State and Municipal Building Commissioners and Inspectors, etc.; American School of Correspondence, Chicago, Ill.

Few men are better qualified to speak or write on the subject of fire, fire losses, fire prevention, etc., than Mr. Fitzpatrick. For many years he has endeavored to point the way to fireproof construction, better construction and a reduction of fire losses. That there is need of active work on this subject is evidenced by the enormous annual loss of hundreds of millions of dollars and thousands of lives, and to the shame of our civilization, 999 out of every 1,000 fires are directly due to carelessness or inexcusable ignorance. It is not a nice thought that we have several times the fire loss of European countries, and it can only be explained that we use only one-quarter the common sense of Germany, France, Italy or Austria.

Mr. Fitzpatrick reviews at considerable length the great fires of the past eighty years and pays particular attention to the recent Baltimore, Toronto and San Francisco conflagrations. In many of our large cities there is today the same risk from fire, and only the slightest attempt to minimize the danger. No wonder Mr. Fitzpatrick says of a certain narrow canyon in New York: 'Think of the havoc fire could play in the very tall buildings both sides of these dismally narrow streets, unless all the windows are protected. Probably not over half a dozen buildings out of many hundreds are so protected, yet nearly all of them are expensively 'fireproofed' as far as the structures are concerned, though the finish is almost invariably of expensive wood and the exteriors are often of granite and marble. These buildings cost hundreds of millions; house thousands of humans, and contents to the value of other hundreds of millions, and offer them *absolutely* no protection from fire. Malignant, criminal, atrocious ignorance or carelessness."

We have only praise for any effort tending to decrease the fire loss through education as to cause and prevention of fires or through better construction. There is room for many efforts along these lines.

RECENT COURT DECISIONS

It is only when the statutory plea has been filed by the owner, setting up that the building is not liable to the plaintiff's debt, that it becomes necessary for the plaintiff to prove on the trial that the provisions of the mechanic's lien act had been complied with by him.—Fay v. Thornton, 76 A. (N. J.) 321.

A contractor's delay in delivering material may give rise to a cause of action for damages which the owner may counterclaim in an action to foreclose a lien therefor, but he cannot defeat the action merely on that ground.—Raymore Realty Co. v. Pfotenhauer-Nesbit Co., 123 N. Y., S. 875.

Under the Act of 1906, the owner in default is not bound personally as under Act No. 180 of 1894, as amended by Act No. 123 of 1896, but only "to the same extent as the surety would have been," and such surety is not bound except as to claims duly recorded within the legal delay. —Louisiana Glass & Mirror Works, v. Irwin, 52 So. (La.) 765.

Proof that a subcontractor furnished an unsafe scaffold, which fell, injuring an employe of the general contractor standing on such scaffold or on an adjoining scaffold, and that the employe was on the scaffold at the suggestion of the general superintendent of the subcontractor, raises the question of the subcontractor's negligence, and the issue must be submitted to the jury.—Huston v. Dobson, 123 N. Y. S. 892.

Under Labor Law (Laws 1897, c. 415) § 18, re-enacted in Consolidated Laws, c. 31, prohibiting any person erecting a building from furnishing any unsuitable scaffold, a building contractor is under the absolute duty of constructing a safe scaffold to afford proper protection to the persons employed to work thereon, and the fall of a scaffold, in the absence of evidence of other producing cause, points to the omission of the duty sufficient to justify a finding of negligence.—Huston v. Dobson, 123 N. Y. S. 892.

Where a building contractor furnishes a scaffold, those entitled to use it may rely on the performance by the contractor of the duty imposed by Labor Law (Laws 1897, c. 415), § 18, re-enacted in Consolidated Laws, c. 31, requiring him to furnish a safe scaffold, and where one lawfully using a scaffold is injured in consequence of the negligence of the contractor, a liability exists independent of the actual employment of the person injured.—Huston v. Dobson, 123 N. Y. S. 892.

Where a building contract provided that the owner might make alterations, subject to the architect's approval, without vitiating the contract, that the architect should issue a final certificate as to the balance due, which should be conclusive evidence of the performance of the contract, and that his decision should be final and binding on all parties, his final certificate is a conclusive determination that the contractors had properly performed their duties according to their contract.—Wiggins v. Columbian Fireproofing Co., 76 A. (Pa.) 742.

Where the person in charge of the work of a subcontractor in the erection of a building, and intrusted with the general superintendence of the work and of the construction of necessary scaffolds, suggested to employes of the general contractor to use scaffolds erected by him to facilitate the subcontractor's work, the employes were justified in using the scaffold because the arrangement was not outside of the authority conferred on such person and the subcontractor was liable for injuries to the employes caused by negligence in constructing the scaffold.—Huston v. Dobson, 123 N. Y. S. 892.

Under the provisions of Act No. 134, p. 223, of 1906, relative to building contracts in cities in this state of over 50,000 inhabitants, a furnisher of materials under a contract with the undertaker, who has not filed a sworn statement of his claim with the owner, and has not caused the same to be recorded, as required by the third paragraph of the first section of said act, within forty-five days after the date of the completion of the building, has not cause of action against the owner in default for not exacting bond and surety from the contractor.—Louisiana Glass & Mirror Works, v. Irwin, 52 So. (La.) 765.

A bill by subcontractors to foreclose a mechanic's lien alleged a contract between the owner and C. and K. as original contractors to build a house, and that one of the original contractors, K., employed complainants as materialmen and mechanics to work on the house. The proof showed that the contract was made between the owner and a lumber company, which was a corporation, and also that K. was not one of the original contractors, but a mechanic employed by C. to do the work, and that he in turn employed complainants to work for him. *Held,* that there was a fatal variance both as to the making of the original contract and as to complainants' employment.—J. C. McCrew & Sons v. Earnest, 52 So. (Ala.) 639.

An estate owning buildings which were destroyed by fire gave a lease to the then tenants for a building to be erected, employed an architect, and contracted with a builder to construct the building according to plans. After the work was commenced, the estate decided to change the floors, putting in a patent floor. The architect received two letters from the patent holders offering to put in the work, giving specifications and guaranty that the floors would carry a certain weight; but the architect did not accept the offer, but requested the builders to submit a proposition to change the floors, and the builders did so, giving an estimate, but making no reference to letters from the patent holders, and the architect authorized the builders to proceed as per the estimate, "said sum to cover the five floors in accordance with the accompanying letters" of the patent holders, and thereupon the builders contracted with the patent holders to put in the flooring to the "satisfaction, approval, and acceptance" of the architect. *Held,* that the contract between the estate and the builders did not include a guaranty that the floors would carry the weight contained in the offer of guaranty of the patent holders, and the builders could not be held liable for a subsequent settling of the floors, due to a smaller weight; the floors having been constructed according to the plans, and the architect's approval having been given after a test made in his presence.—Wiggins v. Columbian Fireproofing Co., 76 A. (Pa.) 742.

TRADE REVIEW

ENGINES FOR CONTRACTORS' USE.

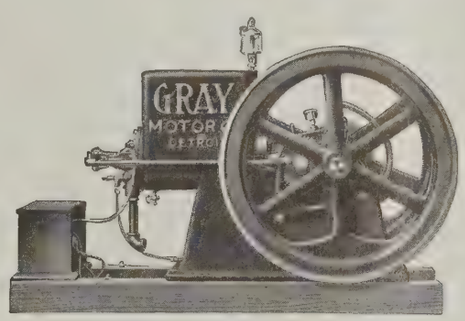
The Gray Motor Company, the well-known marine engine builders of Detroit, Michigan, are now putting on the market a complete line of 2 cycle and 4 cycle stationary engines.

Although they have been catering to this trade for some little time past, it is only recently that they began building 4 cycle engines.

They have been builders of 2 cycle engines exclusively for a number of years, but in supplying the trade with stationary engines it was found to be a better plan to have both 2 cycle and 4 cycle engines, as there are many cases where a 4 cycle is better adapted to the work than two 2 cycle, and vice versa.

Take the carpenter, for instance, who has a small work shop of his own, with some of the smaller wood working machines that are best adapted to the use of the carpenter; the gasoline engine has proved to be his one salvation, and a 4 cycle engine, such as the one manufactured by the Gray Motor Company, has been found to be particularly well adapted to this kind of work. They are reasonably low in first cost, the upkeep is very slight and the gasoline engine today is so perfected that if a reliable one is purchased there is very little danger of annoyances from unsatisfactory engines. In fact, it will be found that the purchaser really takes no chances at all, as a reliable firm guarantees their product, and as it is only a question of selecting your engine from a concern who is known to be well advertised and financially able to look after the needs of all its customers.

The 4 cycle engine, which we illustrate here, is one of the latest models of the Gray Motor Company and is particularly well adapted to carpenter shops, etc. The illustration is of a 4 H. P. size and is a very complete power plant. It is water cooled and mounted on substantial, well-seasoned wood skids with battery box attached to the skids. The gasoline tank is in the base of the engine and the cylinder and hopper are cast in one piece of the best gray iron, preventing any possibility of leaking joints. The engine is very simple and accessible, has a very sensitive automatic governor which takes care of any variation in the load very quickly and automatically, also cuts off the supply of gasoline and electric current when the engine is running on a light load, making the engine a very economical one to operate. Normal speed of the engine is 350 to 400 r. p. m. Can be instantly



4 H. P. 4 CYCLE GRAY, JR., ENGINE.

increased or decreased between 300 and 500 r. p. m. The starting handle is situated conveniently in the fly wheel, closing up automatically when the engine starts. The engine is painted a light green, skids and battery box a dark red, will operate on kerosene, alcohol, distillate or gas as well as gasoline.

Just to give you an approximate idea of how cheaply one of these engines will do your work, the following data may be interesting: Engine consumes about ½ pint of gasoline per h. p. per hour; 4 h. p. engine running all day under full load will consume approximately 20 pints or 2½ gallons of gasoline which, at 16 cents a gallon, would be 40 cents. Of course, a general user would undoubtedly average not more than four hours a day and the work would, therefore, be turned out for an expenditure of about 15 or 20 cents a day for fuel. These figures, of course, are only to give an idea of what a gasoline engine will accomplish under normal conditions; different conditions and different kinds of work naturally could be expected to increase or decrease the cost, depending entirely upon time and amount of work being accomplished. Any carpenter or builder desiring information regarding gasoline engines should write to the Gray Motor Co., 877 U. S. Motors Building, Detroit, Mich., for their catalogue, and we are also sure you will find them not only willing but well prepared to answer any questions of a technical nature that you may put to them.

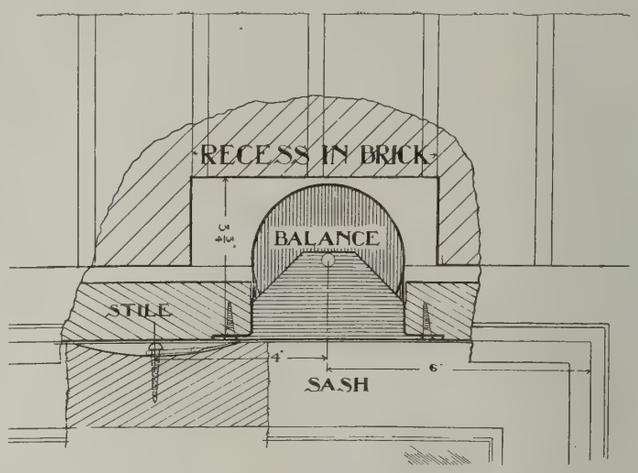
SASH BALANCES FOR NEW BUILDINGS.

Architects and Builders have for years been familiar with "Pullman" Sash Balancers. Their mechanical correctness is generally conceded; likewise their durability and efficiency. Their general use has been retarded because individual fitting was necessary, for the reason that each weight of window required a different size Balance. This made it necessary to cut the mortises by hand and made the cost of installation more than that of cords and weights.

The Pullman Mfg. Company of No. 10 Allen St., Rochester, N. Y., has overcome this objection entirely and is now supplying what they term a Unit System Sash Balance. The Unit Balance is made on exactly the same principle as the "Regular" Pullman Balance, of which there are upward of 5,000,000 in use today.

The Unit Balances have a uniform size face plate. This permits the mortises to be cut at the mill, just as mortises for sash pulleys are now cut.

Architects and Builders are welcoming this improvement, for the reason that cords and weights are a continual source of trouble. The weights are bulky and heavy to cart into a building and distribute. Furthermore, when brought to the place needed, they are rarely found



SHOWING INSTALLATION IN BRICK BUILDING. NOTE OMISSION OF BOX FRAME.

to be the exact weight marked on them, if indeed they are marked at all. The labor of stringing cords and getting the weights in place is very much greater than of attaching Unit Balances, which require only the insertion of two screws in the frame and one in the edge of the sash and the putting on of the tape.

The use of "Pullman" Unit Sash Balances is made still more easy by the fact that they are supplied at a flat price per window for all windows in a building. This makes it a simple matter to estimate the cost of Sash Balances, and the Architect or Contractor can see at a glance just what the saving is to be.

Sash Balances require no box frames nor pockets through which to get at the weights. This saving in woodwork, added to the cost of the cords, weights and pulleys in nearly every case will exceed the cost of Unit Balances. In brick, stone or concrete buildings, the saving is material and there still remains in favor of the Balances the less cost of putting in, the greater durability and better appearance of a Unit Sash Balancer.

The Pullman people have just issued a new catalogue with complete drawings showing the installation, which they will be glad to send upon request.

ELECTRIC LIGHTING OF COUNTRY HOMES.

One of the greatest drawbacks to life in the country has been the lack of lighting facilities. The bright lights of the city not only draw the countryman to the city, but hold him there. Dreading the dark rooms, and when the wind blows out the light of the lantern, the dark path, the dark barns with the danger of an overturned lantern, it is no wonder the city holds the country people. Under equal circumstances, the vast majority would live in the country, but the light question has been one of the hardest to overcome.

It is now possible to light the country house as well as the city house, and at much less cost. By means of the Johnson Mfg. Co.'s Lighting outfits, any number of electric lights or connections for motors, heaters, etc., may be installed. By a simple storage battery arrangement a few minutes' attention will insure light for several days. Each complete lighting plant consists of a gasoline engine, generator, storage battery, switchboard and wiring. As some owners already have the engine, this plant can be arranged to be run by it, thereby saving the cost of another engine. The work which can be done by an outfit of this character is practically limitless. The cream separator can be set up in the most available place and the current brought to it. Every part of the house, barn or grounds can be lighted without danger from fires.

As each location varies in its requirements, it is impossible to give any prices except for specific arrangements. The Johnson Mfg. Co., 408 Sharp Bldg., Kansas City, Mo., will be glad to advise anyone who is thinking of installing a lighting outfit, whether for a single house or for an entire farm project.

The fact that complete plants of this character can be obtained should be of great interest to architects, as they can then arrange them for proper lighting country houses, as well as provide the many electric comforts found now only where current from the large power plants are obtainable.

City laundries are discovering that it pays to install electric flat irons, hotels have electric curling irons, apartments have electric chafing dishes, cooking apparatus, etc., and all these are now possible on the farm.

Contractors and builders are deeply interested as the installation of these plants belongs to them. Where no other agents are placed, the contractor should apply and thus be in shape to make his buildings complete in every particular, as well as bring the older buildings up-to-date.

The NORTHWESTERN TERRA COTTA COMPANY

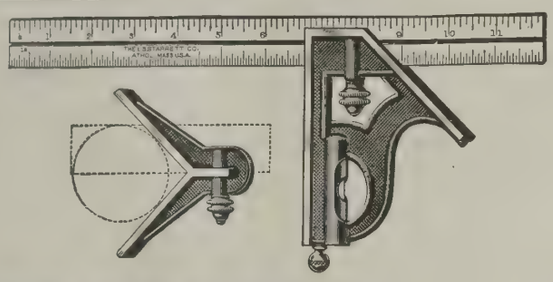
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Enameled Work a Specialty

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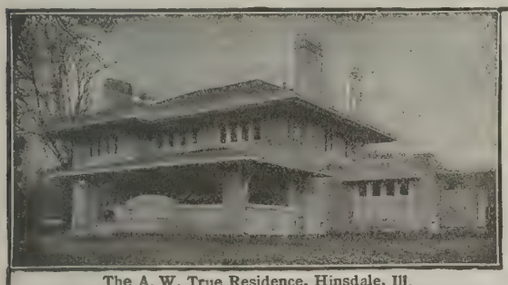
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Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be: Gray, Silver Gray, White, Buff, Red, Brown.

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The Only Modern, Sanitary STEEL Medicine Cabinet



The Recessed Steel Medicine Cabinet

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Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles—four sizes. To recess in wall or to hang outside.

Send for illustrated circular



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Makers of Steel Furnaces. *Free Booklet.*



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When you buy that new Mitre Box just take a look and see that the Simonds Saw is supplied with the box.

A pretty good sign that you are getting a high grade box is to find a Simonds Saw is furnished with it.

Look for the trademark; that's the way to be sure. You get a high quality manufacturer's own brand saw.

Made of Simonds Steel as are all Simonds Hand Saws. No. 95, illustrated above, has Apple handle, Polished Edges, Blued Steel Back, Set and Hand Filed, ready for use. Warranted. Toothed edge, 2 inches shorter than the full length of blade

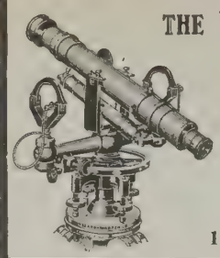
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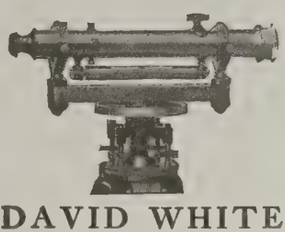
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combines Simplicity with Accuracy and Durability. Three features to be found only in the White's Level. We will ship this regular $45 Improved Level for the next 30 days at $40 prepaid to any address. Examine it upon receipt and if found other than we represent it return it to us and your money will be refunded.

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Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

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This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

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It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

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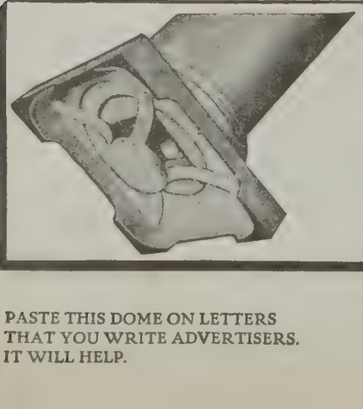
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THE **ZIMMERMAN**
IS THE ONLY
IRON COLUMN BASE

that has a center bearing which supports the required weight without causing the corner supports to sink into the floor and prevents the base of column and floor from rotting.

Send for circular J.

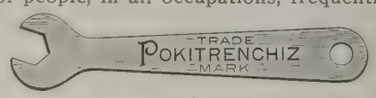
SYRACUSE CORNER BLOCK FACTORY
SYRACUSE, N. Y.

THE NIAGARA VEST POCKET WRENCH.

The accompanying illustration shows the Niagara Vest Pocket Wrench, manufactured by the Niagara Falls Metal Stamping Works, Manufacturers of Hardware Specialties, Niagara Falls, N. Y.

These neat little tools were first sold in May of this year. Their aptness and handiness (even the largest of 8 sizes is not cumbersome in the pocket) together with the very low prices at which they are sold at once created a demand that is evidence of their usefulness and convenience. They fit all nuts, square or hexagon, from 5/16 inch to ¾ inch, and practically last a lifetime.

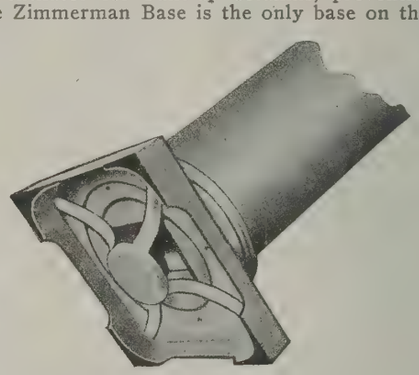
All classes of people, in all occupations, frequently need to use a



wrench, and in no other way can this need be so perfectly and cheaply supplied as with this handy tool. It will handle nuts on the sewing machine, coffee mill, lawn mower, hose reel, clothes line reel, heater, cook stove and range. The householder needs it to tighten the hose joint and stop the leak of the water tap. It is just the tool for the farmer for his corn sheller, threshing machine, mowing machine, harvester, seeder, plow and cultivator. The chauffeur, camper and sportsman will find the Niagara Vest Pocket Wrench just the thing wanted and pat on hand just when wanted. A postal to Dept. N, Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., will bring full particulars regarding sizes, prices, etc.

BASES FOR PORCH COLUMNS.

Our readers will be interested in a description of Zimmerman's Iron Column Base for wood porch columns. It separates the column from the floor, allowing water to run off the porch floor without wetting the bottom of the column, thereby preventing rot and also serves as a ventilator for built-up columns, preventing them from opening. The Zimmerman Base is the only base on the market having a center bearing which supports the required weight without causing the corner supports to sink into the floor.

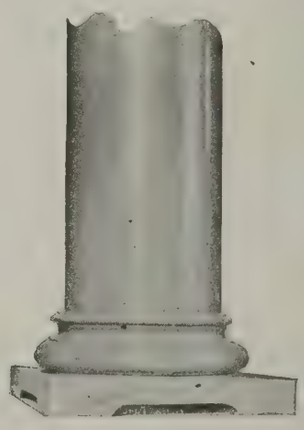


Anyone who is not fully convinced of the necessity of iron bases has only to take a glance at houses with wood porches that have been built only four or five years. With hardly an exception the columns and the floor have rotted at the junction. The reason is a simple one—there was no protection at the base so that the water could run off. The decay of this "keystone" means that it will soon be necessary to make extensive repairs to the whole structure.

Isn't it strange that while every other part of the house is protected against decay, the columns which first greet the caller should be neglected?

The whole problem is solved by the Zimmerman Iron Base. Its enthusiastic reception by builders and architects throughout the country proves that it is appreciated by them.

This base makes the life of the column equal to the life of the rest of the building. It lifts the column from 1⅞ to 6 inches off the floor and perfectly preserves the architectural effect. Air, instead of water, comes in contact with the column. It greatly enhances the appearance of the veranda, especially when it is painted to match the column. The bases are either round or square, in all sizes and are adapted to any style of column. They are also made in halves for pilasters.



Front view

The cost is insignificant in comparison to the saving they afford. Circular "J" will be mailed on request by the Syracuse Corner Block Factory, Syracuse, N. Y.

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Asbestos "Century" Shingles

"THE ROOF THAT OUTLIVES THE BUILDING"

The average property owner badly needs expert advice in choosing his roof.

He's too apt to assume that every roof is as good as it looks when it is first put on.

It's only when bills for repairs and painting pile up that he realizes his mistake.



Asbestos "Century" Shingle Roofs—Five Model Cottages, Esmond Co., Inc., Enfield, R. I. Architects, Hilton & Jackson, Providence, R. I. Contractor, P. Oscar Nordquist, Providence, R. I.

Asbestos "Century" Shingles are the only roofing in the market that combine architectural beauty with *absolute and permanent protection to the building.*

Asbestos "Century" Shingles are thin, tough and elastic shingles of *reinforced concrete.* They are the first and only practical light weight roofing ever made of this indestructible material.

They are proof against fire—against weather—against time. They need no painting or repairs.

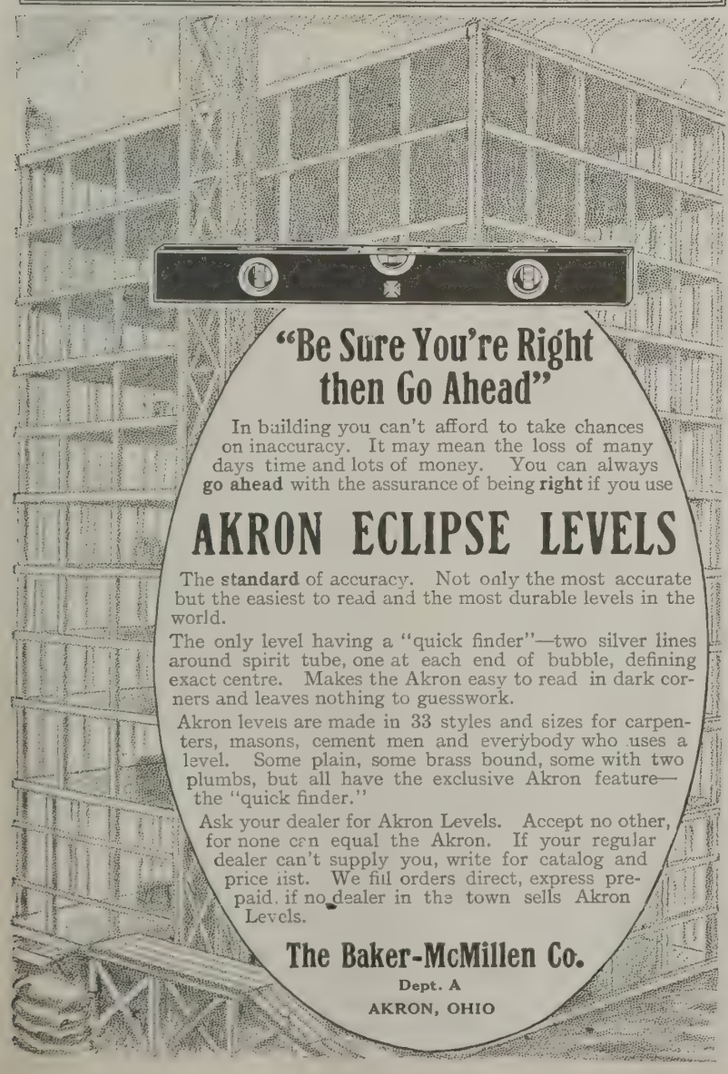
Asbestos "Century" Shingles are adapted to all architectural styles. They come in many shapes, several sizes and *three colors*—Newport Gray (silver gray), Slate (blue black) and Indian Red.

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The only level having a "quick finder"—two silver lines around spirit tube, one at each end of bubble, defining exact centre. Makes the Akron easy to read in dark corners and leaves nothing to guesswork.

Akron levels are made in 33 styles and sizes for carpenters, masons, cement men and everybody who uses a level. Some plain, some brass bound, some with two plumbs, but all have the exclusive Akron feature—the "quick finder."

Ask your dealer for Akron Levels. Accept no other, for none can equal the Akron. If your regular dealer can't supply you, write for catalog and price list. We fill orders direct, express prepaid, if no dealer in the town sells Akron Levels.

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—Be They New or Old

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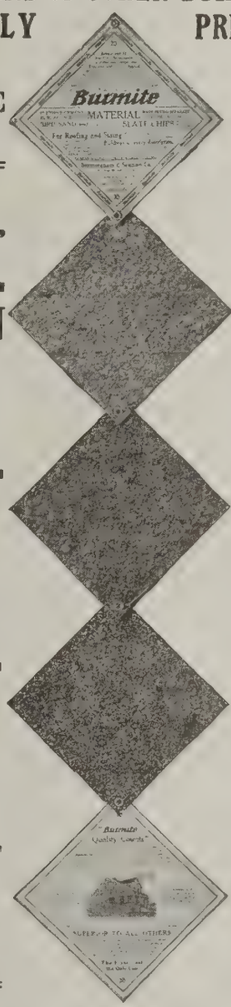
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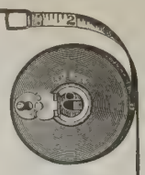
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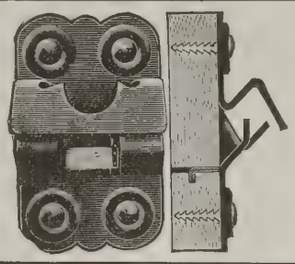
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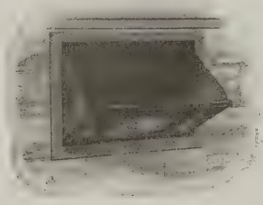
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EASIEST AND QUICKEST TO SET

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E. L. WATROUS MFG. CO., Des Moines, Iowa

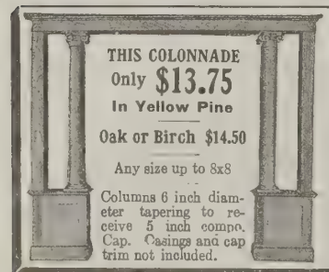
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State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.
SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

The Window Chute
FOR BUILDERS OF MODERN HOMES



Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

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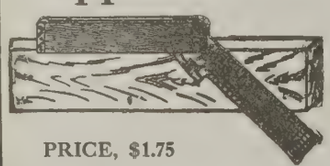


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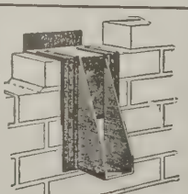
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IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
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Van Dorn's Steel Joist Hanger Has no Equal



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THE VAN DORN IRON WORKS CO.
CLEVELAND, : : OHIO
Structural Steel and Ornamental Iron Workers

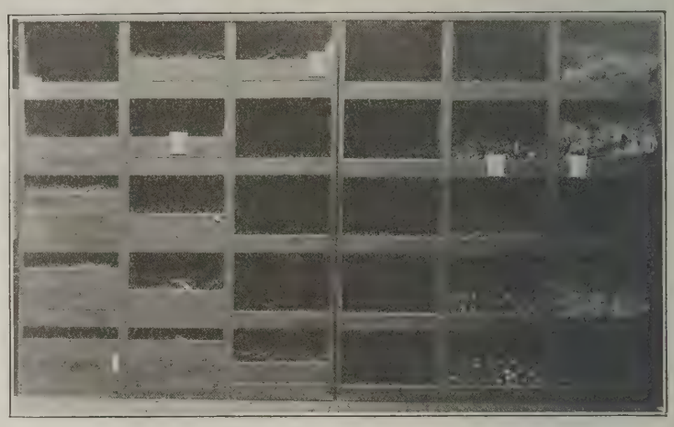
No. 1—Steel Joist Hanger for Wood Header.
No. 4.—Steel Joist Hanger for Brick Walls.

HOW STEEL BINS AID IN FIRE PROTECTION.

The matter of fire protection is of the utmost importance in every business, but it is a striking fact that thousands of merchants and manufacturers take no cognizance of the necessity of this protection. They are generally disposed to let well enough alone—inasmuch as they "haven't been burned out yet, so let everything take care of itself as it is."

These are the men who, after the disaster that comes unexpectedly upon them and overwhelms them, ruefully look back upon their old time optimistic complacency and condemn themselves for being too narrowminded to fortify and protect themselves against the fiery foe.

Such examples as these have opened many eyes and to the doctrine of forethought is due much of the success of steel. Business men, heeding the necessity of protection against every un-



VIEW OF TWO ASSEMBLIES OF BERGER'S SECTIONAL STEEL BINS AND SHELVING. NOTE BIN BOARDS TO RETAIN SMALL PARTS.

toward contingency, are building bulwarks of steel about them. They have discarded wood and others are following their example.

So, as the transition progresses, it reaches out into every office, store, factory, warehouse, jobbing house and so on down the list. The cry on every hand is "Fireproof—it must be fireproof!" Business men demand fireproof buildings because they want their property, their stock, their business thoroughly protected.

An essential in this all-around fireproofing is the discarding of everything that is a fire contributor. One of the latest and newest products of this kind placed on the market for store, factory and warehouse fixtures is the steel bin, manufactured by the Berger Manufacturing Company of Canton, Ohio.

Steel bins are coming into favor for storing small stock of every description in bulk. Hardware dealers and other merchants are using them, while they are being introduced into many factories



BERGER'S SECTIONAL STEEL BINS BEING SUBJECTED TO A SEVERE TEST.

where it is essential that small parts be kept conveniently at hand. They are constructed of steel and reinforce the other steel construction of the building, for they do not feed flames but do assist in the general plan of protection.

One of the biggest manufacturing companies in the great Pittsburg industrial district long ago adopted a plan something like this, of having steel compartments in a great room, protected on all sides with steel—like a gigantic vault—for the storage of valuable blue prints.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Gradc Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

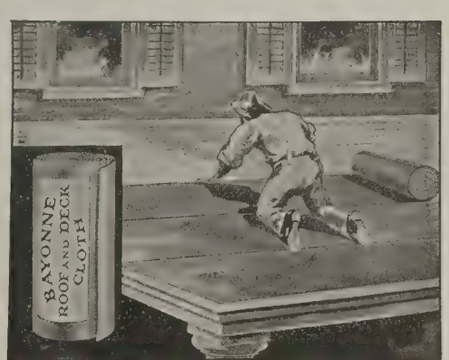
The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instruction for laying
BAYONNE OR GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years.



It Costs Less to Lay—

a Slate Roof and it's easier and less expensive to keep in perfect condition during the whole life of any building—than to get equal results with any other roofing material you can think of.

Furthermore—any roof structure strong enough for a roof of shingles, tin or iron, is fully strong enough to hold a roof of slate that never wears out.

Sea Green or Purple Roofing Slate

is the toughest and best roofing slate ever quarried. It is easy to handle—easy to lay—and outlasts any building. Its first cost is the only cost; there are no paint bills—no repair bills—no bother—no worry. Once laid it *never* wears out; is fireproof, lightning proof and absolutely impervious to climatic changes.

Tell us to send you the *proofs*—and tell you why it will pay you—how it will satisfy your trade; and send you our booklet "Roofs" giving specific and interesting facts on comparative roofing costs and values. Write for this information today. Address

American Sea Green Slate Co.

50 Clark St., Granville, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

METHOD OF TINTING CONCRETE.

Considerable interest is being shown in the tinting of concrete when it is used for residential purposes. Undoubtedly the work can be done successfullly with certain colors. Concrete can be tinted green, for instance, by the use of cromium oxide, in proportions of approximately 5 to 8 per cent of the weight of the cement used. A yellow or buff tint can be obtained by the use of French ocher in the percentage of 4 to 10, according to the shade desired. Red is obtained by the use of red oxide of iron, that manufactured in Germany or France preferred. A pure white concrete, says Contract Record, can be made by the use of 1 part white Portland cement and 2 parts marble screening, tough, hard marble preferred, the screenings to pass through a No. 8 screen and be collected on a No. 40 screen. It should be mixed fairly wet so that it will run into the molds. The molds should be slightly rocked and jarred, so as to expel the air bubbles. For some characters of work the concrete can be made not quite so wet, but of about the consistency used by brickmasons in laying brick, and pressed in the molds. As soon as the concrete is hard, say in three or four days, it should be rubbed well with a fine terrazzo polishing stone. This will give the appearance of a white polished surface. Although the cement itself will not have been polished, each particle of marble will present a polished surface.

PRIZE WINNERS.

In the April issue of THE NATIONAL BUILDER we published the terms of a competition in which S. C. Johnson & Son, Racine, Wis., offered prizes aggregating $150.00 for the best reasons for using Johnson's Wood Dye and Johnson's Under-Lac. The merits of these finishes



H. R. BRUNELL, WINNER OF FIRST PRIZE

were so generally known that the manufacturers received a very large number of replies, and have finally come to a decision as to the relative merits of the answers submitted.

Mr. H. R. Brunell, 916 Bloomfield street, Hoboken, N. J., was fortunate in securing the $25.00 prize.

Closely following Mr. Brunell in order of merit, with $10 each as an award, come:

Stanley Sivers, 606 Third street, Albany, N. Y.
F. B. Carter, General Delivery, Portland, Ore.
F. P. Connolly, 151 South Water street, York, Pa.
Albert Borchardt, Monticello, Ark.
H. W. Richards, 164 Oak street, Elgin, Ill.

The third prize winners, $5.00 each, were:

Christopher T. Sullivan, 46 Stewart street, Fall River, Mass.
Thomas A. Cooper, 308 McClellan street, Schenectady, N. Y.
Joseph Denno, Alpena, Michigan.
R. F. Flannery, 325 Poole avenue, Long Branch, N. J.
J. N. Humble, 816 E. Cachela Poudre st., Colorado Springs, Colo.
Elmer Rosengren, 404 Anson street, Marshalltown, Iowa.
J. White, 6121 Sangamon street, Chicago, Ill.
H. Edwards, Jupiter, Fla.
H. A. Baldwin, Box 589, Austin, Texas.
Jesse J. Jackson, Box 37, Teague, Texas.

The following were given the fourth place with $1.00 each:

J. P. Rowden, 313 E. 4th street, Texarkana, Ark.
George Voss, Benson, Nebr.
Charles F. Hoefer, 122 Mystic avenue, Medford, Mass.
C. Churchill, 148 W. 16th street, Erie, Pa.
R. T. Hill, 3117 Forest avenue, Chicago, Ill.
E. G. Myers, 41 Elm street, Plattsburgh, N. Y.
J. W. Rainsford, 3704 Park avenue, Nashville, Tenn.
Anton Hoffstadt, 3212 Addison avenue, Chicago, Ill.
H. A. Struebing, 2739 Lafayette avenue, St. Louis, Mo.
Richard Holle, Jr., 708 Eighth avenue, Clinton, Iowa.
J. H. Clark, 412 East Main street, Bradford, Pa.
Wm. Van Valkinburgh, 1221 Watt street, Schnectady, N. Y.
R. McEwartson, 6610 Hartwell avenue, Chicago, Ill.
Everett March, 217 Somerset street, Plainfield, N. J.
Richard Smith, 3 South Central avenue, Wollaston, Mass.
H. Laycock, 77 Southgate street, Worcester, Mass.
D. W. Edwards, Box 1140, Twin Falls, Idaho.
Frank Gordon, 127½ Stockton street, Brooklyn, N. Y.
E. C. Monroe, Berlin, N. J.
H. C. Faber, Monongah, W. Va.
Elmer Hahn, 71 Main street, Hudson Falls, N. Y.
Fred Bennis, 319 Spies avenue, Menominee, Mich.
A. S. Joynes, Fortress Monroe, Virginia.

To those unacquainted with the use of Johnson's Wood Dyes, their effects are a revelation. The ease with which they can be applied make them favorites with both the amateur and the professional painter. We understand that the manufacturers, S. C. Johnson & Son, Dept. N. B. 7, Racine, Wis., will be glad to send their color panels and samples of both the Dye and Under-Lac to readers of THE NATIONAL BUILDER.

WOOD MANTELS AND FIREPLACE FIXTURES.

The artistic effect of a mantel with its cheerful fireplace is frequently the keynote of the home atmosphere. There are few months in the year in which a fireplace cannot be used to advantage, and a greater part of the year a grate fire is necessary to bring the temperature of the room above the chill point. The beneficial effect of ventilation must also be considered, for pure air is more necessary than heat as a rule.

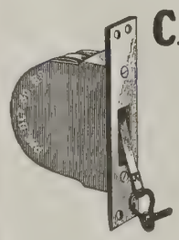
Many as the forms of fireplaces are, there are almost as many in which the construction is not perfect, the draft is not good, and the appearance does not add to the beauty of the room. For all these defects there is no excuse, for there are reputable firms manufacturing mantels and fireplaces in which the design, construction and action leaves nothing to be desired.

The Huber Builders Material Company, 39-43 Vine St., Cincinnati, have been manufacturing the highest grade of mantels and fireplaces for many years. In their latest catalogue are shown many pleasing designs in many styles, and in several woods suitable for almost any position. Aside from the high quality of their goods, the Huber Builders Material Company have an ideal method of transacting business, and it will be to the interest of the contractor or builder who anticipates installing a mantel to write to them. A postal will bring their catalogue and a prompt answer to inquiries.

Improved Quick and Easy Rising Steam
Electric and Hand Power Safety
ELEVATORS
and Dumb Waiters, Automatic Hatch Gates
SEND FOR CIRCULARS
KIMBALL BROS. CO., Council Bluffs, Iowa



CALDWELL SASH BALANCE



Does away with weights and cords and VASTLY more durable.
Makes sashes work perfectly.
Permits greater window space in new work, as box frames are not necessary.
May be applied to old windows without altering sashes or frames.
Write for circular to the
Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.

"Diamond N" Expansion Shields



Have increased holding power on account of the corrugated ribbed exterior surface.
Securely clamped together without the use of springs or wires.
A better shield at the same price.
DIAMOND EXPANSION BOLT COMPANY
90 West Street, corner Cedar, - - - NEW YORK

50 Cents
For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES
Write for Catalog of Sheldon's Clamps and Vises
E. H. SHELDON & CO.
321 N. May St., CHICAGO

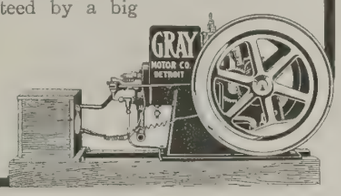
With Its Back to the Wind and the upward sloping opening in the back taking the full force of the wind, the Iwan Volcano Revolving Chimney Top makes a sure draft on the chimney.
Mountings can be bought separately and the hood and vane can be made in your shop according to patterns furnished free with all iron mountings. Sizes 6 to 12 inches.
Prices and catalog sent promptly.
Iwan Brothers, 1509 Prairie Avenue, South Bend, Ind.



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

4 H.P. Kerosene or Gasoline Engine $79.50

GREATEST value ever offered in 4 H. P. water cooled stationary engine. Just the thing for carpenters and builders. Pays for itself in a short time. Runs any kind of woodworking machinery—band saws—boring machines—planers—combination wood-workers, etc. Also great engine for running cement mixers or can be used around the home for pumping water—running ice cream freezers—electric light outfits, etc. Very simple, easy to operate and very economical, best material and workmanship, made to last a lifetime. Every engine shipped complete, all ready to run, nothing to do but fill the fuel tank, put in some water and start up. **No extras to buy.** Absolutely guaranteed by a big responsible concern.



Write for Catalog today and ask about
30 DAY TRIAL OFFER

GRAY MOTOR CO.
877 U. S. Motors Building, :: DETROIT, MICH.

SEND for our free Booklet and see how an Aldine Fireplace is suited to your needs

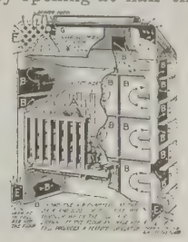


Mission Design

You can get as much heat with **one** Aldine Fireplace and save 60% on your fuel bill as from **four** common grates.

This is because it is really a return draft stove in fireplace form. 85% of the heat is thrown out into the room instead of 85% being wasted as in common grates.

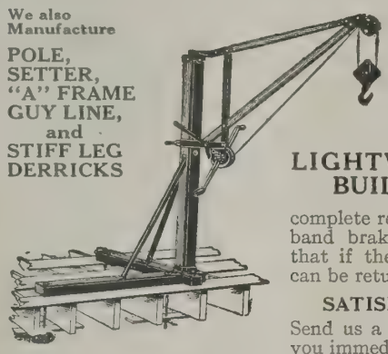
It can be set in any chimney opening at half the cost of a common grate, no special chimney construction is necessary, no pipe to connect, extra large firepot; made in seven patterns, at prices no higher than any good common grate. 50,000 now in use.



Satisfaction guaranteed or your money back.

Rathbone Fireplace Mfg. Co.
6208 Clyde Park Ave Grand Rapids, Mich.

We also Manufacture
POLE,
SETTER,
"A" FRAME
GUY LINE,
and
STIFF LEG
DERRICKS



We are proud to state that we have the only practical Circle Swing Builders' Derrick on the market and to prove our statement we will be pleased to send you one of our

LIGHTWEIGHT CHAMPION BUILDERS' DERRICKS

complete ready for use with cable, block, band brake, **price $36.00,** on trial, so that if the derrick is not satisfactory it can be returned. Our motto is

SATISFACTION OR NO SALE

Send us a trial order and we well assure you immediate shipment.

Write for Illustrated Circular "N" with prices

SASGEN BROS., 2053-57 Racine Ave., Chicago, Ill.
NEW YORK OFFICE: 103 Park Ave.



"ATLAS" OAK FLOORING

is the best oak flooring at any price. The workmanship is guaranteed and it is easiest to lay.

All "Atlas" $\frac{13}{16}$ flooring is thoroughly kiln dried, dressed and matched, hollow back, bored, and matched, steel polished and wire bundled. All $\frac{3}{8}$ flooring is thoroughly kiln dried, dressed and matched, end matched, steel polished and wire bundled.

In addition to wire bundling "Atlas" $\frac{3}{8}$ flooring we also pack it in crates when desired at a small additional cost.

If your Dealer fails you on "Atlas" write us direct.

THE WILDBERG LUMBER CO.
Ninth and Eggleston Avenue, :: CINCINNATI, OHIO

Here's a Building Paper that Has Strength and Fibre and Body to It

A Building Paper that is easy to put on—and that stays put—

Amafibre
BUILDING REG. U.S.PAT. OFF. 08. PAPER

Is just what its name implies—a fibre paper, wonderfully light in weight—and yet the strongest, most durable building paper you ever saw.

Amafibre Building Paper is water proof, wind proof, insect proof—and largely sound proof.

Being tough and light it is extremely easy to put on. It does not stretch nor tear and is readily handled. It is made of pure sulphite and comes in regular size rolls, 36 inches wide.

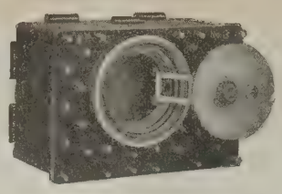
We want to send a Free Sample of Amafibre to Every Builder and Contractor in America. Will you write today for yours? Your name on a postal will do.

WELT & SONS PAPER COMPANY

DETROIT, MICHIGAN

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Gale Wall Safe



It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.
No Home or Apartment House complete without one. It has a combination lock.

WRITE FOR DESCRIPTIVE MATTER TODAY

WILLIS MFG. CO., - - Galesburg, Ill.

Fred Liebrich, Agent for Cook County, 1102 Monadnock Bldg., Chicago, Ill.

AUTOMATIC SASH HOLDER

saves cord, weights, pulleys and materials—no pockets—easier to install—for old or new windows. Send for sample and catalogue today. Agents wanted. Sold by the hardware trade or direct from 277 Broadway, New York.

Automatic Sash Holder Co.

Producers of **ROOF SLATES** BLACK GREEN PURPLE RED

Slate Blackboards Guaranteed Strongest and Best Finish

Pamphlet with setting instructions on application

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By I. P. HICKS 94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

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PHŒNIX INSIDE SLIDING BLINDS

COMFORT CONVENIENCE ECONOMY

The lately patented springs and corrugated steel rods put the "Phoenix" far in lead of less improved styles.
Write for Catalog P-T.

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LEARN REINFORCED CONCRETE DESIGNING

Ten Lessons by mail covers the field—$5.00
Sample lesson, twenty cents
So easy that school boys can learn it.

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Von Gerichten Art Glass Co. Designers and Workers in Decorative Glass

Quality not Quantity

Pittsburg Office Royer Hotel Bldg.

Write or come to the Studios of the

Von Gerichten Art Glass Co.

550-558 S. High Street
COLUMBUS, O., U. S. A.

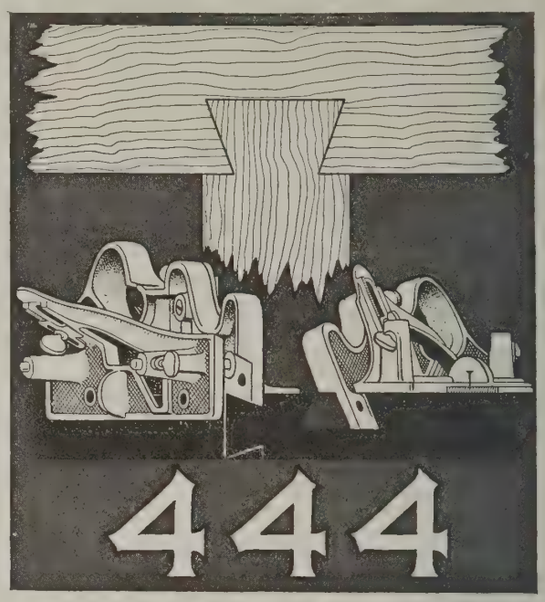
Workers in Art Glass and Mosaics.

Catalogue Free

STANLEY DOVETAIL TONGUE AND GROOVE PLANE.

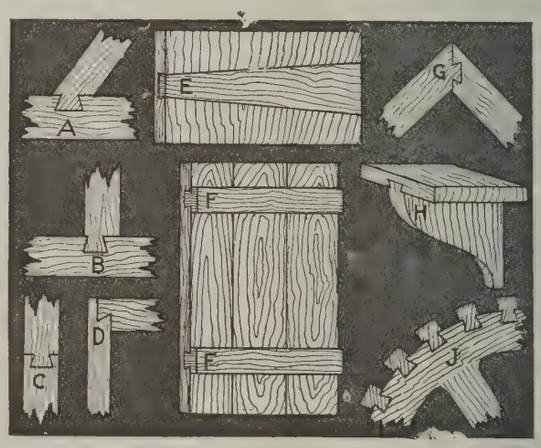
A new and novel tool which accomplishes a result sought for many years by wood workers in general, namely—to form a dovetail tongue and groove with one hand tool.

This result was reached by designing a plane which at one setting cuts a groove with a cutter having a horizontal edge guided by an oblique fence, and in the other setting cuts a tongue with a cutter



having an oblique edge of the same angle guided by two fences at right angles to each other, one being parallel to one side of the cutter.

The operation of the plane is simple, and the accurate and perfect fitting joints obtained, both parallel and tapering, will convince the operator of the utility of this unique and original tool. Below are shown some of the numerous kinds of Dovetail Tongue and Groove Joints that can be made with its use.



A Dovetail tongue and groove joint with the groove cut in the regular manner, and the tongue cut on a bevel, used for supports.

B Dovetail tongue and groove joint with unequal shoulders or a joint with a regular groove, but where the tongue is offset.

C Dovetail tongue and groove joint as can very often be conveniently used when one is forming an end to end timber match.

D Dovetail tongue and groove half joint, frequently used by carpenters to a very great advantage in concealed nail work.

E Dovetail tongue and groove joint as applied to a flush key batten, where used in strengthening wide, thin boards across the grain.

F Dovetail tongue and groove joint as it is very often used to construct a batten on doors made of several boards, etc.

G Dovetail tongue and groove joint where both the groove and tongue are cut on a beveled surface, making a strong corner.

H Dovetail tongue and groove joint shown in one of its most useful applications, that of a bracket supporting a shelf.

J Dovetail tongue and groove joint as applied to the setting of gear teeth around the outer rim of any gear pattern.

The manufacturers of this unique tool have issued a very attractive circular containing a detailed description, as well as complete instructions for operating, and will be glad to send same to anyone interested. Address—Stanley Rule & Level Co., New Britain, Conn.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Build Artistic Stairways From Gordon-Van Tine Stock!

Save 50%! Special Millwork Catalog FREE



A Flight of Stairs Complete for $23.93

Our Stair Department Will Save You Big Money

Through our ceaseless efforts of selling reliable stairwork at cost plus one small profit, we have been able to produce and sell stairwork at prices which leave a handsome profit for the contractor. In our Grand Free Millwork Catalog we itemize individually, each and every article required for the stairs, and explain fully just how this material comes to you and attach net prices. With this information at your command, an infinite variety of arrangements of stairs can be figured within a few moments, and you know the exact cost without entrusting your interest to any outsider.

The fact that part of this material is already machined ready to go right into the stairs, reduces the erecting cost very materially. We use only thoroughly kiln-dried material in making up the different parts of this stair stock, and only the most skilled and expert mechanics are employed in the production of the finished article. By using kiln-dried lumber you avoid any of the annoying effects of shrinking or coming apart of the stairs after they are put in the building. The itemized list for a flight of stairs which is given on this page, shows you at a glance how reasonable the material for a complete stairs can be purchased.

The fact that you have had no previous experience in the stair building line should not deter you one moment from learning its simplicity now. If there are any points which are not practically clear to you regarding the proposed stair for which you are in the market, write us, and we will give you the advice of an expert stairbuilder.

List of Material Required for Stairs Shown Above

E349	14 feet Face Stringer.....	Yellow Pine @	$0.06½	$0.91
E731	10 feet Wall Stringer.....	" "	.05	.95
E8421	7 feet Base	" "	2.80	.20
E725	18 ft. Wall Stringer, Extension	" "	.01½	.27
E8420	26 feet Base Moulding.....	" "	.82	.21
E347	13 Steps.....	" "	.40	5.20
E961	2 Landing Steps.....	" "	.15	.30
E726	1 Round End Step.....	" "	2.90	2.90
E727	14 feet Return Nosing.....	" "	.02	.28
E348	15 Risers.....	" "	.20	3.00
E8060	75 feet Scotia.....	" "	.30	.23
E336	1 Newel.....	" "	2.57	2.57
E341	2 Angle Newels.....	" "	1.60	3.20
E343	14 feet Rail.....	" "	.11	1.54
E962	12 feet Fillet.....	" "	1.00	.12
E345	11 Balusters, 28-inch.....	" "	.08½	.94
E345	13 Balusters, 32-inch.....	" "	.08½	1.11
	Total Cost.....			$23.93
	Dealers' Prices.....			90.00
	Saving to You.....			$66.07

This Saving of $66.07 Should Appeal to You

You get a high standard of workmanship, superior qualities of lumber, choice designs, prompt shipments and ***guaranteed safe delivery***. You get low freight rates and quick delivery. These are facts, and should appeal to you at once. Send us your order for Stairs today.

YOU WILL BE SATISFIED AND SAVE $66.00 OR MORE

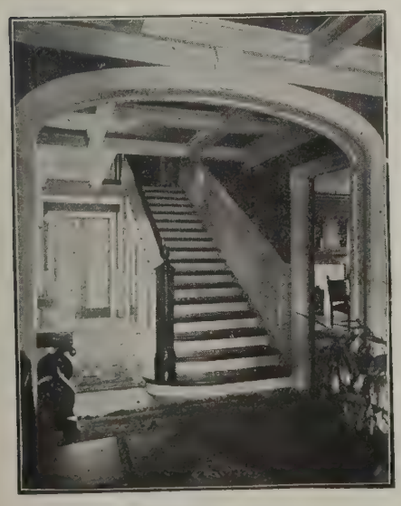
Vast Assortment of Oak and Yellow Pine Stair Material

Our stock designs of Stair Newels, Rails, Balusters, Steps, Risers, Face and Wall Stringers and miscellaneous materials in Oak and Yellow Pine is very complete. A line which is at once adapted to the swell and modest cottage or most elaborate home.

Correct in Every Detail

We call particular attention to the style of construction, for instance, of our posts; the correct size of all mouldings, in order that the assembled effect may be harmonious and complete. Likewise, the turning of the balusters and shape of rails are especially adaptable for these specific purposes.

With the styles illustrated, an infinite variety of arrangements of stairs is permissible, and it is a very rare exception when special work will be required for any particular purpose. Our designs are modern and up-to-date. All Newels are hand smoothed and made from thoroughly kiln-dried stock. All carvings are handmade and not composition ornaments. Every Newel from one-inch lumber, with glued lock joint. Height of all starting Newels 4 feet, with 8x8 base and 6x6 shaft, suitable for open or closed stringboard. Base of post, 20 inches long, allowing one or two risers. Every Newel wrapped in paper and carefully packed. The stock is all thoroughly machined, well kiln-dried and can be shipped promptly.



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Write for the Gordon-Van Tine Catalog of Millwork, Sash, Doors, Lumber and Builders' Hardware. We Save our Customers a Million Dollars a Year.

Many of the most successful Contractors and Builders in the United States buy from us exclusively. We guarantee quality, satisfaction and safe delivery.

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Get our latest Catalog. The prices speak for themselves.

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We have been in the Building Material Business since 1865

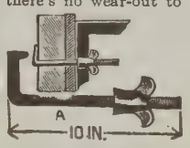
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OVERCOME BY
Pearson's Nailer



for it works as well in one season as another. Wear your gloves or mittens and (with it) drive more nails than you ever did. Quit using your mouth as a nail pouch. PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 wire nails, and the Red Nailer is for the galvanized 3d, No. 13, 1¼-in. wire nails. $5.00 each, express prepaid. Money cheerfully returned if Nailer is not as represented.
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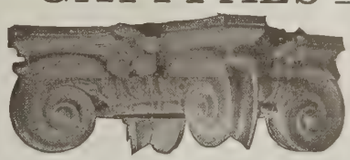
$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)
THE TAYLOR STEEL SCAFFOLD BRACKET
ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



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JAMES L. TAYLOR MFG. CO.
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LOW FREIGHT RATES
On Machinery and Household Effects
That's what we can offer SHIPPERS from points east of the Mississippi River destined to Interior and Pacific Coast Points by our plan of shipping in CARLOAD LOTS. Latest maps of any principal western state free on application by addressing Forwarding Department of the
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Plastic Relief Work a Specialty



Most Complete Catalog ever issued
DETROIT DECORATIVE SUPPLY CO.
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Lignine (Wood) Carvings, Unbreakable
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add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.
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It contains many beautiful designs of Consoles, Columns and Grilles.
NORTHWESTERN GRILLE WORKS
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A FREE SAMPLE OFFERED.

Welt & Sons Paper Company of Detroit are offering to send a free sample of their Amafibre Building Paper to every contractor and builder who will write for it.

Amafibre is really a very superior building paper.

As the name implies it is a fibre paper very strong and tough. It is also very light and these two qualities, lightness and toughness, make it easy to handle, hence recommend it to the man who has the actual work of putting it on to do.

Amafibre is waterproof, windproof and largely soundproof. It is very durable and once in place stays as long as the house lasts.

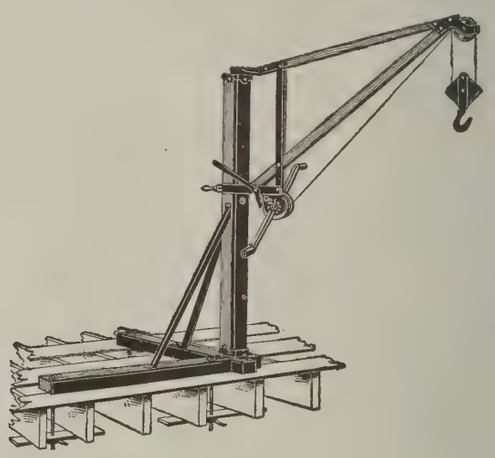
It is a sulphite paper for use in any place where building paper is usually applied—and enjoys even a wider range of usefulness than ordinary building papers, owing to its toughness and weather proof qualities.

Contractors, builders and others who are interested are invited to write to the makers for a sample showing quality and texture.

MODERN METHODS IN BARN RAISING.

The old time builder can tell you of the "barn-raising" he attended, the celerity with which a swarm of workmen raised the separate pieces and bents into place, and he will also tell you that it required as much muscle as brains to erect buildings in those days. Possibly a cumbersome block and fall constituted the entire mechanical equipment necessary to construct the building. The rest was left to main strength and numbers coached on by the leader, trying to keep his gang ahead of the other side.

With the advent of modern conditions, however, many customs have more or less dropped out, and new ones take their place. It is no longer possible to secure a large number of skilled and muscular workmen who are willing to work at top speed in competition for glory mainly. Labor must be paid for as used, and it becomes necessary to employ fewer men for a longer period. To raise the heavy framing, mechanical aids are necessary to displace expensive manual lifting, and this is best done by means of a portable derrick. One of the popular styles of derricks is shown herewith. The manufacturers, Sasgen Brothers, 2053-57 Racine avenue, Chicago, Ill., advise us that contractors everywhere are enthusiastic over the variety of work to which this derrick is adopted. This particular pattern, known as the Light Weight Champion, weighs only 250 pounds, and has a lifting capacity of 1,500 pounds. A derrick of this character will quickly save its cost in raising material, window frames, girders, etc. Mention the NATIONAL BUILDER to Sasgen Brothers, will secure detailed description of this and other labor saving devices which the up-to-date minute contractor should not overlook.



SASGEN BROS.' DERRICK WILL SWING A COMPLETE CIRCLE.

THE ECONOMY OF FIREPROOFING.

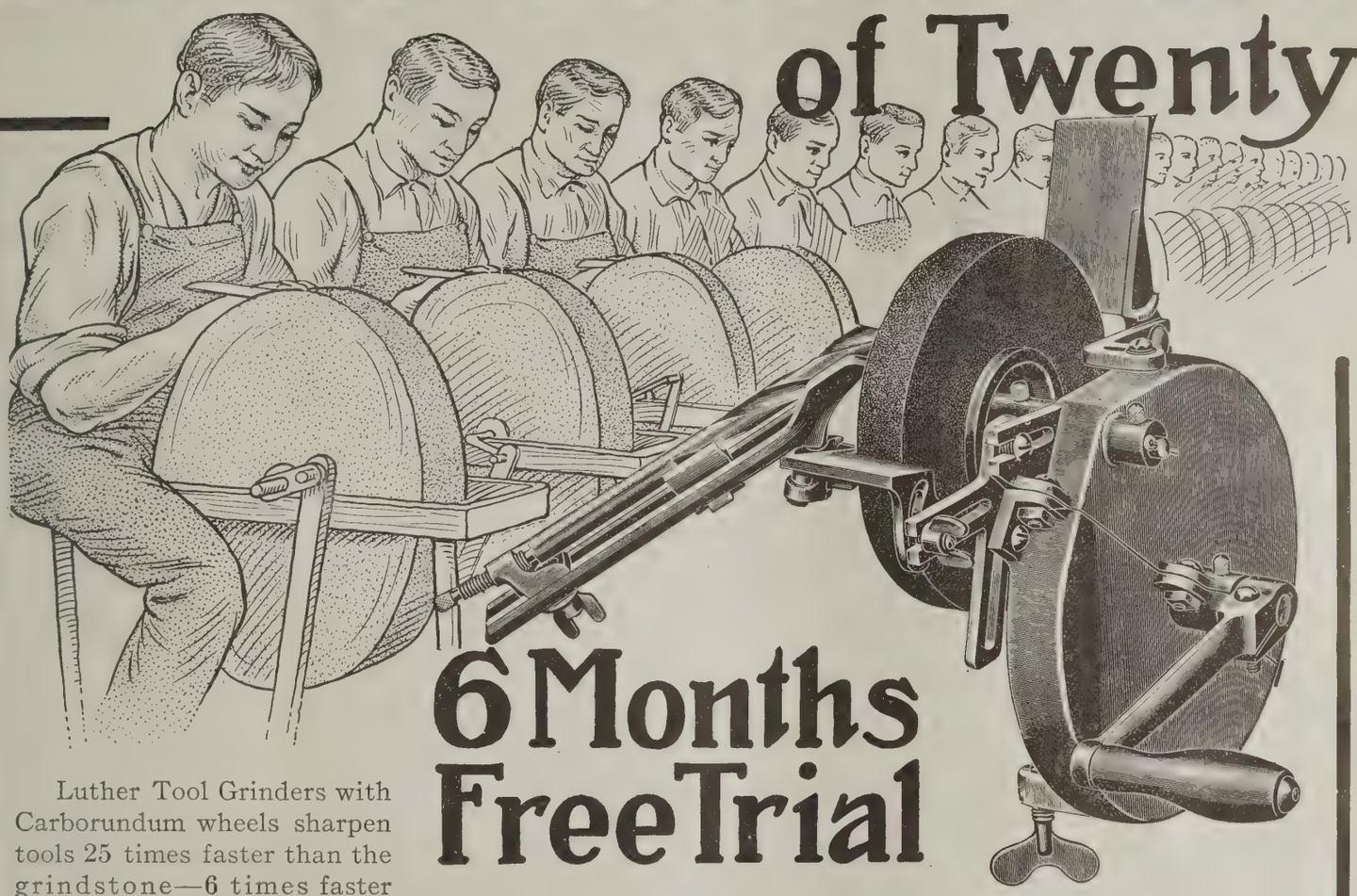
The fireproof roof, as a part of fireproof construction throughout, is coming to be regarded as a profitable investment. The elimination of fire insurance premiums for a few years will go far toward paying for the added cost of a fireproof building. In short, prevention is better than cure, and the best way to deal with the fire problem is to make fire impossible.

A contemporary writer has well said that the greatest bugbear of the mill owner whose factory is not of the modern concrete fireproof construction is the ever-present fear of fire. On account of this fear and the desire to lower insurance premiums, there has resulted the investment of thousands of dollars in the insallation of sprinkler systems and their maintenance. Such a tremendous investment is but a small part of the cost of fire inspection, the maintenance of other equipment, and the organization and pay of private fire companies. All this expense could be forever eliminated by a thoroughly fireproof construction.

A recent consular report says that there are no wooden structures in Cologne, Germany. The buildings 400 to 600 years old are not wholly fireproof, but of slow-burning construction; all buildings erected now are of brick, stone, or cement and absolutely fireproof. Wooden stairways are not permitted in any except single residences of two stories; all others must be of iron or cement. There has not been a dwelling house burned in Cologne for many years, fires in most instances being confined to one room.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

One Man Does the Work of Twenty



6 Months Free Trial

Luther Tool Grinders with Carborundum wheels sharpen tools 25 times faster than the grindstone—6 times faster than emery wheels. It's the work of only a moment to sharpen any tool—the special attachments make it easy for even inexperienced persons to sharpen twist drills, chisels, etc. We offer you the *free use* of this outfit for a half year to prove how it saves tools, how it gives them the bright, keen edge that makes all your work go fast and easy, how it saves money by saving tools and outwearing emery wheels, how it makes money by increasing the volume of your work accomplished. Wheels guaranteed 5 years—will not draw temper—no need of cooling with water. We give you six months to prove on your own tools, in your own work, that this outfit is a money-saver for you—then if you don't want to keep it, send it back and you won't be out a cent. Return the coupon for our 6 months' *free trial offer.*

11 Tools in One

The Mechanic's Special Outfit consists of Mechanic's Special Grinder with the following accessories; rough wheel, fine wheel, chisel sharpener, twist drill sharpener, polishing spindle, buffer, polisher, oil stone, hone in leather case, scythe stone, foot power attachment—all wheels and stones are genuine Carborundum.

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1708 Madison St., Milwaukee, Wis.

COUPON

Please send me free and prepaid your free Carborundum booklets and 6 months' free trial offer on Mechanic's Special outfit.

Name .....

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Built Like A High Grade Lathe

Luther Tool Grinders are mechanically perfected—steel and malleable construction, machine cut spur gears, bronze bearings in oil bath, etc.—wheels guaranteed 5 years. Could we possibly make a more generous offer than 6 months' absolutely FREE TRIAL of this outfit? A whole half year's chance for you to prove how this outfit saves and makes you money. Return the coupon for full description and 6 months' FREE TRIAL OFFER, also free book about the discovery of Carborundum as printed in McClure's Magazine. Tear out the coupon *now.*



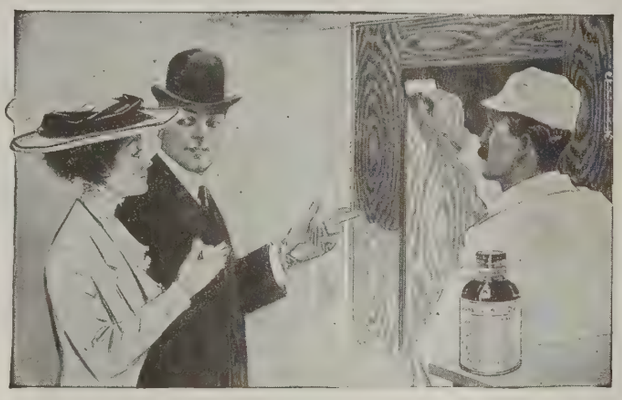
Special attachments enable inexperienced persons to sharpen Chisels, Twist Drills, Etc.

Luther Grinder Mfg. Co.

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Write Us Now For Free Samples of Johnson's Artistic Wood Finishes



Johnson's Wood Dye

is not a mere surface stain—but a deepseated dye, penetrating the wood and fixing a deep, rich, permanent color entirely different from ordinary stains, which are only "skin deep."

Made in the following fifteen attractive shades.

No. 126 Light Oak
No. 123 Dark Oak
No. 125 Mission Oak
No. 140 Early English or Manila Oak
No. 110 Bog Oak
No. 128 Light Mahogany
No. 129 Dark Mahogany
No. 130 Weathered Oak
No. 131 Brown Weathered Oak
No. 133 Green Weathered Oak
No. 121 Moss Green
No. 122 Forest Green
No. 172 Flemish Oak
No. 178 Brown Flemish Oak
No. 120 Fumed Oak

Half Gallons—$1.50 each

When used with Johnson's Prepared Wax or Johnson's Under-Lac, inexpensive soft woods such as pine, fir and cypress, may be made as beautiful and artistic as costly hard woods.

Ask your dealer for free samples of any shade of Johnson's Wood Dye and test it, or write us and we will send them from Racine.

Free Instruction Book, Edition N. B.-8
Sent on Request Also

S. C. Johnson & Son, Racine, Wisconsin
"The Wood Finishing Authorities"

ATLAS OAK FLOORING.

Changing styles in ornament and design are still holding on to one of the best features of modern construction. In the treatment of floors the substantial oak floor which has stood the test of thousands of feet is still the model for future use; carpets are fast disappearing as a floor treatment, and are giving way to polished hardwood.

In many places a good soft wood such as pine is already in place, but lacks the finish such as only an oak floor can have. For such places a thin oak flooring ⅜-inch thick can be laid directly on the old floor, giving the required surface without interfering with the doors, base trim or decorations.

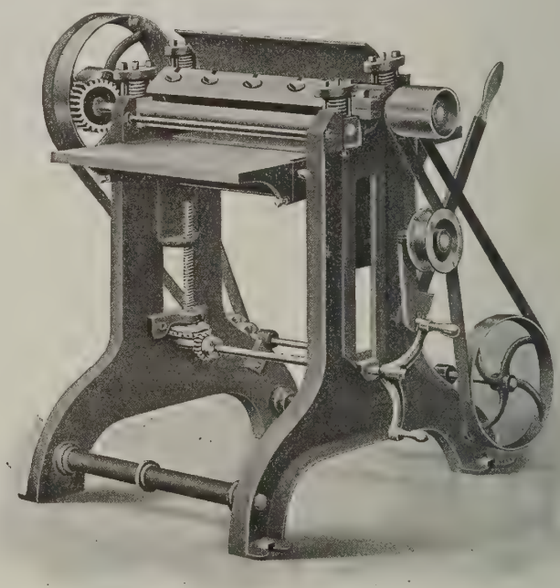
The Wildberg Lumber Company, Ninth and Eggleston avenues, Cincinnati, Ohio, have long been identified as distribution of the highest grade of flooring. At present their Atlas Brand is meeting with especial favors. The same care used in manufacture is used in preparing it for shipment and it is not unusual for them to crate the flooring to insure its delivery in first class condition.

Before placing an order for oak flooring it will be well for the contractor to get their ideas and prices. They can probably refer you to a nearby dealer who handles their product and if not they will furnish it direct.

THE GEM PLANER.

This cut shows the Gem Planer built in four sizes to plane 12½, 16, 18 and 20 inches wide, up to six inches thick. The speed is adjustable, making it work well on hard or soft, green or dry, wood. The location of two feed rollers, one before and one behind the cutterhead, insures even feed and carrying the lumber clear of the machine after the cutterhead has completed its work.

The Frank Machinery Company, Buffalo, N. Y., was established in 1854 as Frank & Company, thereby qualifying as one of the pioneers in the woodworking machinery line. The rapid development of the enormous forests of the United States required quantities of wood-



working machinery of the highest and heaviest grade, and this company has kept well in front in the production of machinery adapted to the use of the American mills. At the present time they are building a complete line of woodworking machinery, a line of planers from 8 inches to 42 inches in width and weighing from 200 to 12,000 pounds. They believe their line of medium-weight, medium-price tools is the largest on the market and also the best. The broadest and strongest possible guarantee covers all their products. The smaller tools and machines, such as planers, jointers, band saws, and saw benches are especially designed for contractors' use, and to meet the needs of various jobs, are built in various sizes.

The increasing use of machinery by even the smaller contractor is evidence of the time and money saving qualities of machinery. The independence from the planing mill, when a few odd pieces are wanted, is one of the striking qualities of the smaller machines. Many large jobs can be gotten out on a comparatively small shop equipment, for it is evident that the large job gives the wide-awake contractor a chance to prepare some weeks or months in advance.

We understand that the catalogues of the Frank Machinery Company will be sent to contractors and builders free when the NATIONAL BUILDER is mentioned, and we would suggest that those anticipating the equipment of a shop write to the Frank Machinery Company for advice on the matter.

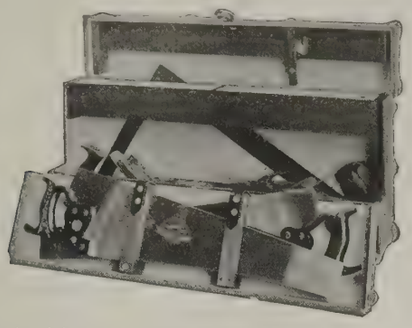
INDESTRUCTO TOOL CASES.

For many years we have been accustomed to the sight of a carpenter carrying his tools to a job in an open wood tray with a square rising inches above the other tools, and saws sticking out of one or both ends, and possibly a brace and bit hanging by one corner. Some others would come around with a heavy chest, two-man size, which would be dragged from place to place as the work required. It is no wonder tools were lost or left behind, or the heavier tools left at home to be brought down later.

In the Indestructo Carpenters' Tool Cases, as made by Wedell & Boers, 157 Jefferson avenue, Detroit, Mich., we find a case which overcomes many of the objections to other forms of carrying cases.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Composed of three-ply veneer covered with heavy canvas and painted in attractive colors, it has the appearance of prosperity and good workmanship. Bound with steel, with re-enforced corners, secure locks and catches, and a firm handle, the case will stand a vast amount of heavy service. Its lightness permits carrying more tools and the shape, not unlike a suitcase, makes easy carrying. The in-



side is arranged with separate compartments for saws, planes, levels, square, chisels, bits, etc.

The case is made in two regular sizes, to take 26 and 28-inch saws. Special sizes for larger tools and outfits can be made up at slightly higher prices.

We would suggest that every workman who must transport his tools frequently write to Wedell & Boers, and see just how it is to their advantage to have one of these excellent tool cases.

ARTISTIC METAL CEILINGS.

With the rapid increase in number of buildings, offices, etc., which must be made more or less fireproof or fire resisting, the demand for metal ceilings has increased. Primarily designed only to retard fire, the possibilities of metal ceiling and plates from an artistic and decorative standpoint, have evolved a large number of most excellent designs.

For the manufacture of plates suitable for decoration, heavy



BANKING ROOM WITH METAL CEILING.

presses and accurate machinery is required, while to produce the variety of designs required by a discriminating public, an enormous amount of dies, patterns, etc., are necessary. It naturally follows that only those firms especially adapted for doing a large business of the better class can hope to compete for general work.

The Milwaukee Corrugating Co. of Milwaukee, Wis., and Kansas City, Mo., has long been favorably known among the users of stamped metal work. Their latest catalogue shows many beautiful designs of metal ceilings suitable for various purposes. Among others we find the Banking Room illustrating this article.

The art catalogue of the Milwaukee Corrugating Co. is, we understand, sent free upon mention of the NATIONAL BUILDER.

SEVERE TEST OF UTILITY WALL BOARD.

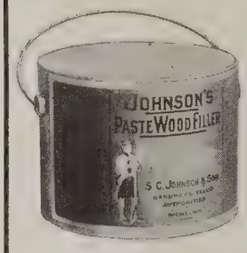
A test that proves very conclusively the imperviousness of Utility Wall Board against the extreme of heat and cold and dampness, has just been completed by Mr. C. A. Heppes at the facftory at 4502 Fil-more street, Chicago.

The hardest problem that wall board manufacturers have to solve is the problem of making a board that will not shrink or warp when subjected to extremes of heat and cold, and that will not absorb moisture.

Six months ago Mr. Heppes felt very confident that he had solved this problem. In order to satisfy himself absolutely, however, he decided upon a test which is probably about the most severe to which wall board was ever subjected.

He selected a thin brick wall in the most exposed portion of his factory building and attached the wall board to this wall, putting it on in the ordinary way, as close to the bricks as possible. He then covered the wall with wall paper so that the slightest sign of shrink-

Write Us Now For Free Samples of Johnson's Artistic Wood Finishes



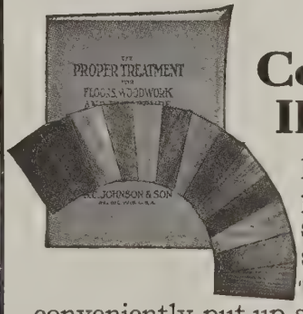
Johnson's Paste Wood Filler

is made in five shades for filling the grain of all wood, soft and hard. Manufactured from the best and most expensive silex, linseed oil and best Japan dryer and guaranteed to give satisfaction.

All wood which is to be finished natural should be given a coat of Johnson's Natural Paste Wood Filler No. 10 and a finish-wax, Under-Lac and Wax or Under-Lac and Varnish.

We recommend the use of our colored shades of Paste Wood Filler where a golden oak, dark oak and Antwerp finish is desired on hard woods, also for use over Johnson's Wood Dye where a filled grain effect is desired.

Ask your dealer for a free sample of any shade of Johnson's Paste Wood Filler



Johnson's Color Panels and Illustrated Book

Let us send you free a complete set of wood panels showing all shades of Johnson's Wood Dye on various woods. These panels are conveniently put up so that you can easily show them to prospective customers. By doing so we are sure you will procure many contracts at profitable prices for work to be finished with Johhson's Artistic Wood Finishes. The dye *always* matches the panels.

We will also send you a copy of our new book illustrated in many colors and containing color plates of the dye. This book gives full instructions for finishing and refinishing all wood—soft and hard. It is invaluable. Call upon your leading paint dealer for samples, wood panels and book. Or write us giving your dealer's name and we will send them to you from Racine. Ask for booklet Edition N. B.-8.

S. C. Johnson & Son, Racine, Wis.

"The Wood Finishing Authorities"

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ing or warping would show immediately. Next he placed a row of steam pipes about an inch from the wall along its entire length. These pipes were used to heat the room and, of course, became very hot during the day and cold at night. All this was done in January of this year. The outside of the wall, of course, was subjected to the extreme cold of the winter weather, while the inside was hot from the steam pipes. At night both the inside and the outside were subjected to the cold. Later in the spring the heat in the steam pipes was turned off and the moisture from the inside of the factory combated the cold from the outside.

After six months of this kind of severe treatment the wall board shows not the slightest sign of shrinkage or warpage. It is almost impossible to tell even by feeling where the joints have been made and even in the corner, where is the severest test, the wall paper does not show any sign of pulling or cracking.

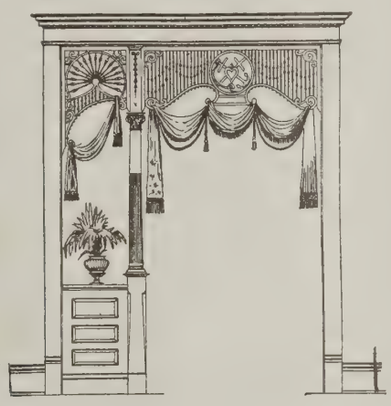
It is hardly possible that plaster or any other kind of wall finish could have stood up so perfectly under so severe a test, and the result is certainly one of which the manufacturers of Utility Wall Board may well be proud. Any wall finish that will stand up for six months under such extreme conditions is as nearly perfect as could well be expected.

STYLES IN GRILLES.

Forty, thirty and twenty years ago, the presence of a grille was about as necessary in a complete home as the front door, and was the keynote for the decorations of the principal rooms. The delicate fret-work was frequently made a background for the most expensive hangings and draperies. Such a grille is shown in this article.

The changing fashions in buildings has made its impression on the interior decorations as well as on the exterior. The elaborate moulded casings have given way to plainer lines, and the grille, too, felt the changing artistic hand.

Today few of the grilles show the delicate tracery, spindles, etc.,

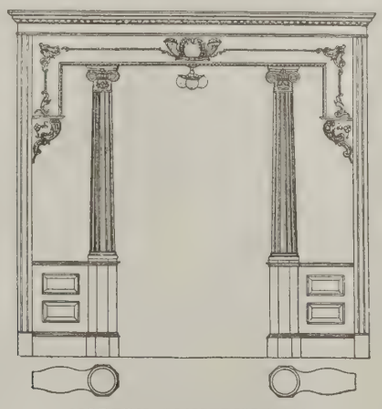


THE STYLE OF 30 YEARS AGO.

of former days, but in its place we find more of the solid, dignified, heavier columns of more nearly classic design. The education of the masses, as well as the designers feel the effect of good design and the restful lines of the present details do not need extensive draperies to relieve them.

For the manufacture of intricate scroll work, fine machinery and accurate workmanship was necessary as well as careful design. In the manufacture of modern casings, columns, etc., universal care is necessary, from the selection of the wood, throughout the processes of manufacture to the finished product. One piece of green wood or a piece off color or grain, will ruin the finest piece of work, for the finished work must stand with its design and construction in the open, where the slightest defect is magnified.

In the manufacture of high class grilles, interior columns, etc., the Chicago Grille Works, 834 Wells street, Chicago, holds a most enviable position. With a record of nearly twenty years in one location, increasing their plant from time to time, they feel justly proud



MODERN CONSTRUCTION.

of their progress. Their intimate knowledge of materials, conditions, and a perfect plant enables them to manufacture the best class of work at slight cost above greatly inferior goods. While they have been disposing of their product through jobbers in the past, it is now possible to buy direct from them, thereby saving time and the middleman's profit. The mention of the National Builder will secure one of their beautiful catalogues, which should be in the hands of every contractor and builder.

"BURMITE QUALITY COUNTS."

Some time past, quite a number of the architects, contractors and property owners considered ready-to-lay roofing simply a material which could be bought for so much a roll and nailed down without any special care. This condition has been changed however. Those who will look over the new book of bungalows, garage and home designs issued by the Bermingham & Seaman Co., Chicago, will awake to the fact that a high grade, ready-to-lay material, such as "Burmite," is much better than the average smooth-surfaced roofing generally found on temporary structures.

The manufacturers of Burmite show and can prove, by many buildings on which their material has been used, that Burmite is suitable for the finest residences, churches, apartment buildings, etc. For instance, in their book of designs is shown a two-story and



attic cottage, the first story being constructed of cement blocks in rock-faced ashlar design. The second story is sided with Burmite "Stoddard" slate-green with panel strips of wood, painted white, and Burmite slate-red for the roof. The effect of this combination of colors makes an extremely artistic appearance, besides being much cheaper and having better lasting qualities than cement, plaster or stucco.

Another good effect is shown in a large three-story, half-timbered summer home. In this Burmite slate-green has been used throughout as siding, panel strips of wood painted white are used to cover joints, and Burmite slate-red is on the roof.

Not only is Burmite being specified by artistic home builders, but it can be used on the interior as a burlap. The slate-green, for instance, can be easily nailed on for the ceiling and siding down to within three feet of the floor, and the balance then covered with the Slate-Red. This would make a very nice combination for a kitchen or dining room, and really make a fireproof wall as well. Panels painted in some good contrasting color would add greatly to the fine appearance of rooms so decorated.

The lasting qualities of Burmite for either exterior or interior work are excellent. Property owners are even using it for porch and veranda flooring and for stair treads.

Burmite consists of a felt base thoroughly saturated with pure asphalt. This is reinforced with strong burlap, carefully protected on both sides by pure asphalt. (The important feature of this roofing is its wearing surface, which consists of Bird Sand and a double layer of Slate Chips, imbedded under great pressure.)

The Slate-Surfaced Material comes in two colors—slate-green and slate-red. As the colors are the natural tints of the slate, they are referred to as non-fading. The manufacturers claim for this ma-



terial, which is shipped in rolls with nails, lap cement, etc., for laying, that it requires no painting, remains uniform in color, is a perfect fire-retardent, hail-proof, and impervious to moisture. It is said that it requires no expert labor in laying, and that on roofs of any degree of pitch it meets every condition involving rain, snow, sleet, sparks, sliding ice and sudden changes of temperature. It is guaranteed for ten years without painting or coating.

As a material for grain elevators, it is far superior to corrugated iron in many ways. It is said that dampness from the grain causes the iron siding to rust from the inside and that grain elevators sided with Burmite do away with this objection and makes as fireproof a building at a much less cost.

The Bermingham & Seaman Co., Tribune Bldg., Chicago, offer to send, upon request, their book of bungalow and house designs, which is printed in colors and is a very attractive thing for contractors and builders to show prospective home owners and to specify from. Besides this book, they are mailing samples which clearly show what Burmite is, both as to color and manufacture.

Burmite can be had from local lumber or hardware dealers, but where not carried in stock, a request for it should supply the demand through that dealer within a few days.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

Amatite ROOFING

Needs No Painting

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

With Amatite, nothing of the sort is required. It gives real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real mineral surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and the user saves all future expense for repairs or paint because it will need neither.

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Address nearest office.

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and the first cost is not all important—it's the first cost **plus repairs.**

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RED CEDAR SHINGLES
Reduces Roofing Cost

because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

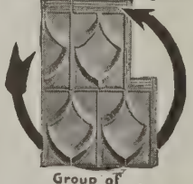
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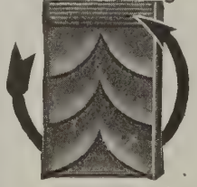
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Profit Sharing Interest Bearing Deed Protected

How to know CORTRIGHT Metal Shingles


Group of Metal Slates


Group of Victoria Shingles


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Imperial Shingle

Since Cortright Metal Shingles became so successful 26 years ago, a lot of manufacturers have thought that all they had to do was to make a shingle to look something like Cortrights, and it would be equally successful. But they've failed.

After they sell a man a roof with the argument that it's just as good as "Cortright's" it usually proves so troublesome as to discourage him altogether with metal shingles.

Even some carpenters and builders have been fooled by this "just as good" argument, and it's still a worse investment for them than for the property owner, for if you lay a roof that's only going to be a yearly annoyance to your customer you lose many times your original profit.

That's why it is so important that you should know these four designs, and look for the words

"CORTRIGHT" REG. U.S. PAT. OFF.

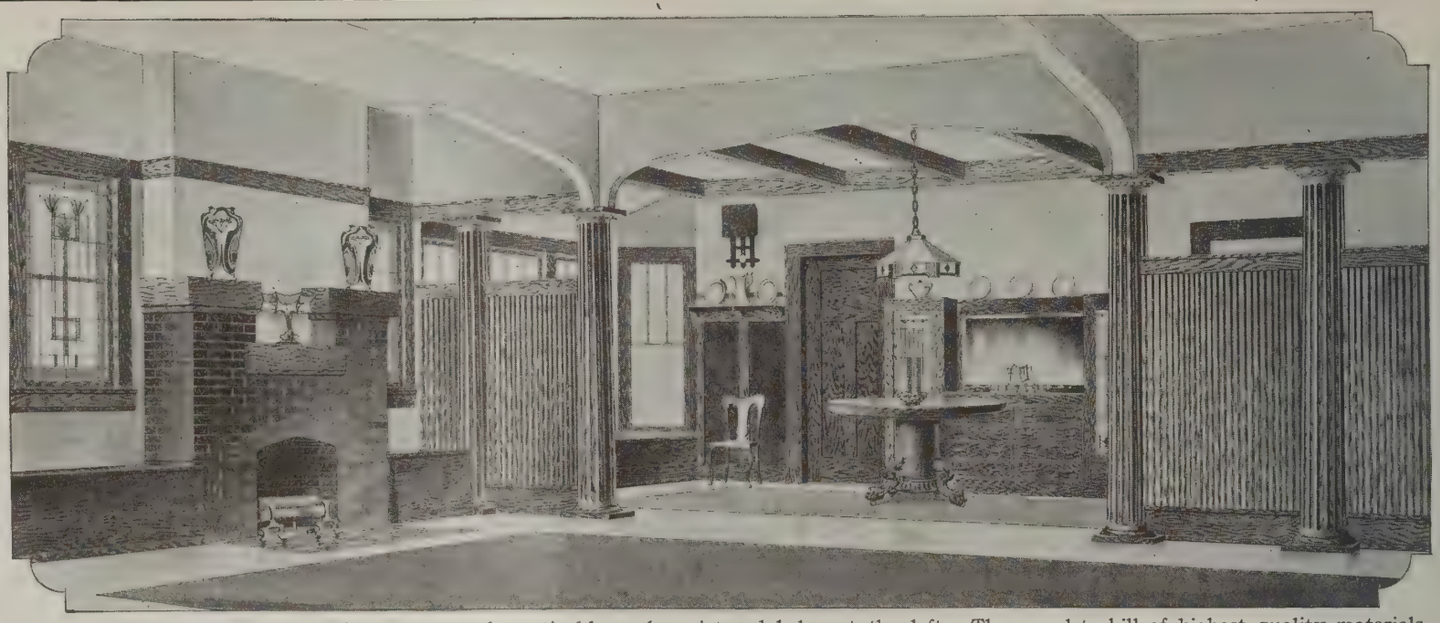
which are stamped on the top of each genuine Cortright Shingle. (See where the arrows are pointing.)

And to prevent you from taking any kind of risk, why don't you send for our two free roofing books that you can keep on hand for reference.

Write for them right now before you forget.

CORTRIGHT METAL ROOFING CO.
PHILADELPHIA and CHICAGO

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The living and dining rooms of the pretty and practical bungalow pictured below at the left. The complete bill of highest quality materials for this bungalow as shown, excepting only the brick, plaster and cement, was purchased from Sears, Roebuck and Co. at a cost of $1,292.00, a complete set of building plans and specifications, for which the average architect would charge $150.00 or more, being supplied without cost.



A charming bungalow, just completed at Greeley, Colo., in the Rocky Mountain country, at a total cost of $2,843.91. The owner, J. P. Berck, estimates that he saved $500.00 by buying all his materials from one firm, Sears, Roebuck and Co., at wholesale prices. (See interior view above.)



This modern home, of which an interior view is shown below, was built complete at New Rochelle, N. Y., "Forty-five minutes from Broadway," at a total cost of $3,960.00, and affords an interesting example of the kind of houses designed and planned by Sears, Roebuck and Co., and of the high grade materials they produce.



A glimpse of the artistic and handsomely finished interior of the seven-room residence shown above at the right, recently erected from plans drawn by Sears, Roebuck and Co., which were supplied free with complete specifications. The same company furnished all lumber, lath, cedar shingles, mill work, beam ceiling, clear cypress siding, oak and maple flooring, finishing lumber, Craftsman doors and buffet, leaded glass, glazed windows, medicine case, building paper, pipe, gutter, sash weights, hardware and painting material for $1,653.00.

Reproduced from The Book of Modern Homes, to which builders are referred for floor plans and detailed descriptions of these and 100 other residences of the newest designs.

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Let Us Ship YOU a Modern Home Complete

Have you ever discovered, after exerting yourself to the utmost in the interests of a client and actually losing money on his job through delays for which your supply dealers were to blame, that he was going around warning other intending builders not to patronize you because you failed to keep the cost of his house within your estimate? You guessed wrong.

Why guess? Why not quote a flat price on every job you are asked to figure on, a price that your competitors cannot touch? With our Wholesale Lumber Price List, our Building Material Catalog and our book of plans on your desk you can file your bid the **same day it is asked for** and can **land the job** while your rivals are writing to dealers all over the country to get prices that are sure to be one-third higher than our direct from factory wholesale prices.

There are bigger profits than ever in building modern homes by modern methods if you **buy your materials the modern way.** Adopt the Sears, Roebuck and Co. plan on your next contract. Avail yourself of the almost unlimited resources of our Modern Home Department. Let your client select one of our 100 houses or bungalows, for which we will furnish you, free of cost, complete building plans and specifications. Then, if you know the capacity of your workmen, you can quote your client a flat price for his house instead of estimating its cost by guess. By this plan you can also know in advance just what your profits will be when the job is finished, and can thus spend your profits as the work progresses.

Some of the best informed builders in the contracting business—men who know practically everything about the technical side of home building—fail to get ahead because they are too careless to **buy right** when ordering materials and supplies.

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The sample prices quoted below are for the best quality goods that can be produced. They afford only a suggestion of the big savings you can accomplish by ordering your mill work and building material from us.

Remember, we sell direct from the factory, at one profit prices, not only every line of material shown on this page, but everything required to build houses of the type illustrated on the opposite page, complete and ready for occupancy. We quote:

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Door Jambs	.45 up
Quarter Round Molding, per 100 feet	.25

Send us your next list. Let us quote you our Wholesale Price, DELIVERED TO YOUR STATION. Then compare prices. You will find our prices lowest when quality is considered.

Write for our Mill Work Catalog.

Seroco Ready Mixed HOUSE PAINT

Made in our own modern paint factory, the perfect product of twenty-eight years' practical experience. We buy our own raw materials and are not dependent upon any other paint manufacturers to supply our wants.



$1.10 to $1.23

A Gallon, According to Quantity.

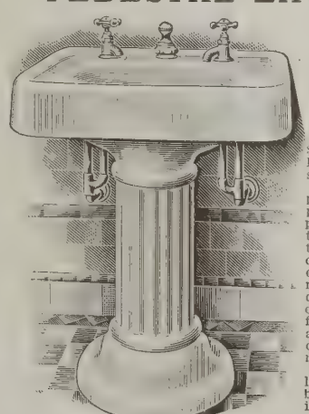
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ONLY $25.00

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Your money, including any freight charges you may have paid, will be cheerfully returned if you are not perfectly satisfied.

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To know how much the best lumber is actually worth, and how much profit you are paying the local dealer, you have only to compare your bills with our Wholesale Delivered Lumber Price List, showing exactly what any bill will cost you delivered at the freight depot in your city. We save you from $100.00 to $150.00 on an average size carload of lumber.

If that last statement be true, can you afford to ignore it? Can you read our guarantee and doubt its truthfulness?

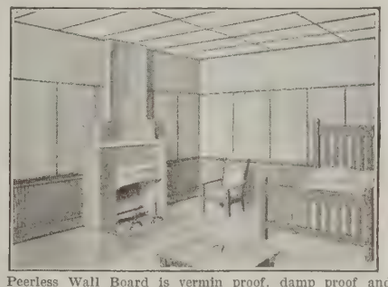
We carry on hand, in our own great lumber yards, adjacent to the finest timber lands in America, a stock of 1,250 carloads (nearly 15,000,000 feet), embracing a full range of sizes for every kind and grade; also a duplicate of this stock at our yards in Southern Illinois. We have exactly what you want in the quantity you want, and it is ready to ship.

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Made of three plies of heavy sanitary fiber board, with two layers of best grade asphalt between, and cemented under heavy hydraulic pressure into one solid fabric.



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Our Prices on Peerless Wall Board Save You One-Half.

Sheets are 3-16 inch thick, 32 inches wide, and are furnished in 8, 9, 10, 11 and 12-foot lengths.

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KEEN KUTTER

Pocket Knives

are the kind that "take hard usage." Of course, you could break one, because a knife isn't a crowbar, but fact is, any kind of *ordinary* use you'll put a Keen Kutter Pocket Knife to, won't "faze" it at all.

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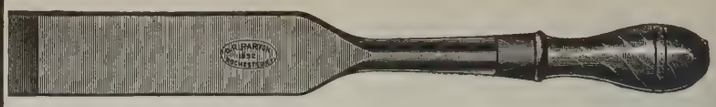
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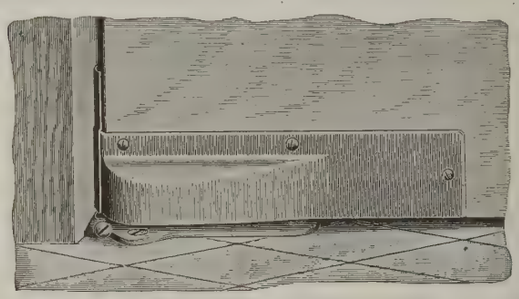
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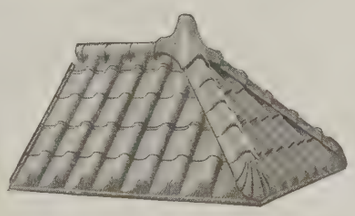
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Guaranteed to remain in perfect condition for years, when put on according to directions. Expansion and contraction thoroughly provided for.

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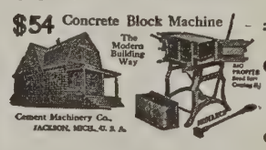
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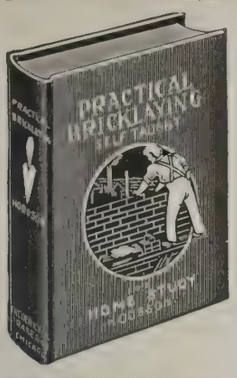
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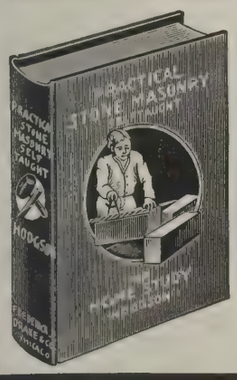
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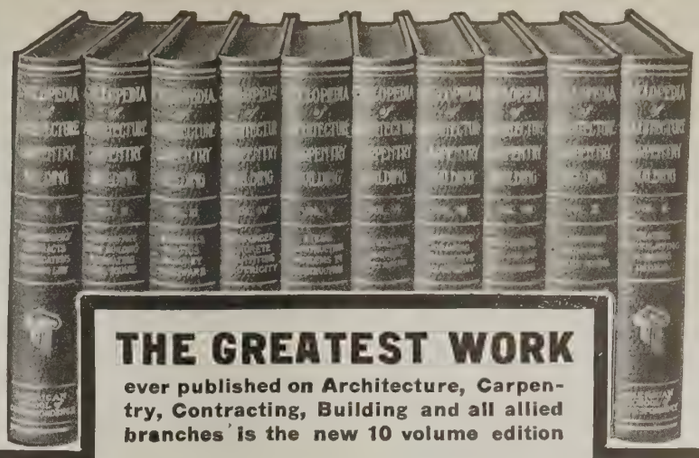
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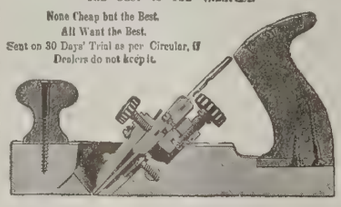
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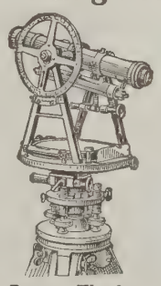
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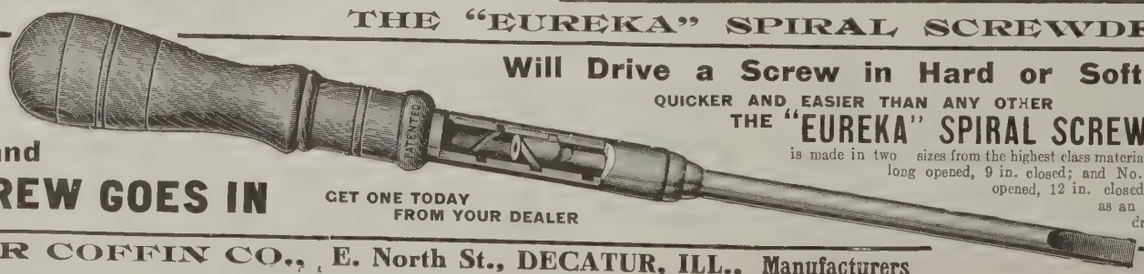
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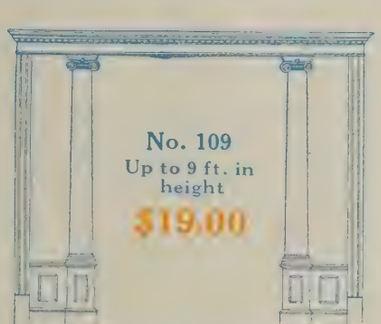
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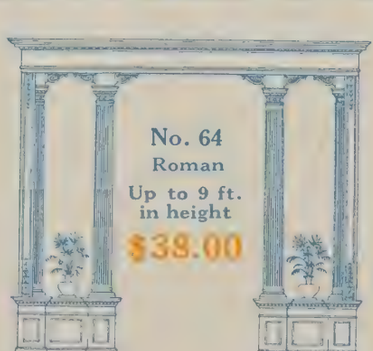
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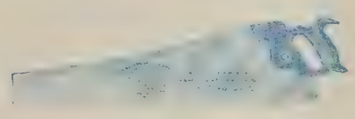
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The Kind of Saws Mechanics Want

The complete line of SILVER STEEL SAWS contains over twenty-five different patterns—all made in a range of lengths from 18 inches up and in all points from 4½ to 12.

We have selected four of the most popular patterns, which we wish to show you this month.



This is No. 53. The Blade is of SILVER STEEL, Damaskeened finish, Skew Back. The Perfection Pattern Handle is of thoroughly seasoned, applewood, beautifully carved and finished. It retails from $1.60 to $2.50 each according to size.



This is ATKINS No. 51 with old style straight across handle. The Blade is of SILVER STEEL, Damaskeened finish, Skew Back. The Handle is of thoroughly seasoned applewood. This Saw sells from $1.45 to $2.15 according to length.



This is ATKINS No. 68 and one of the finest Saws we make. The Blade is of SILVER STEEL and is given our highest mirror polish. Skew Back. Carved and polished applewood handle, Perfection Pattern. This Saw sells from $1.65 to $2.50 according to size.



Here is ATKINS No. 66, SILVER STEEL, high mirror polish, Skew Back, apple handle, old style straight across pattern. This is a strictly high class Saw and retails from $1.60 to $2.25 according to length.

THE HANDLES

We want to call your particular attention to the difference in the hang of these two handles. Nos. 53 and 68 have the Improved Scientific Perfection Handle. Easiest on the saw arm. Nos. 51 and 66, the old style straight across handle if you prefer it.

ATKINS ALWAYS AHEAD!

Send for our Saw Sense Book or Carpenters Catalog which will tell you about the complete line. It's free upon request. Or send us ten cents to pay postage and we will send you with our compliments a substantial nail apron, our little book called "Saw Sense," a monthly time book and other useful information in regard to High Grade Saws.

YOUR DEALER SELLS THEM or will order them for you from his wholesale house. If he won't supply you, let us know. Buy one and try it. If it does not run easier, cut faster and hold its edge longer than any other Saw—if it is not more satisfactory than any saw you have ever used before—take it back to your dealer and get your money back or exchange it for a new one.

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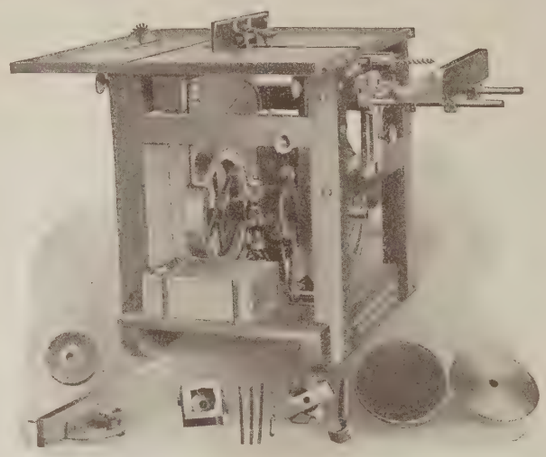
That will live up to your expectations, one that will do all we claim for it and then some besides. Our Saw Rig is built from the best materials by the most expert workmen, which enables us to guarantee these machines to be free from defects for life.

We have equipped it with the very best attachments we could manufacture, and together with a most reliable and powerful engine, we are able to put before you a Portable Saw Rig which we are satisfied to sell on the following conditions:

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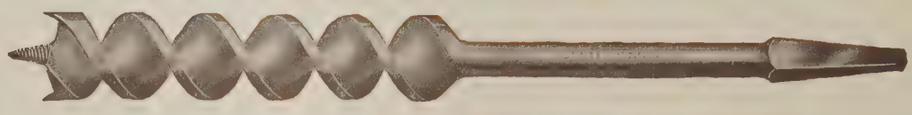
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BISHOPRIC WALL BOARD AND SHEATHING

BISHOPRIC Wall Board is cheaper and better than lath and plaster. It is the ONLY Wall Board COMBINED WITH LATHS and Asphalt Mastic. Laths are necessary in a Wall Board, just as they are in plaster walls, to prevent warping and to insure solid, rigid, stiff substantial

WALLS AND CEILINGS

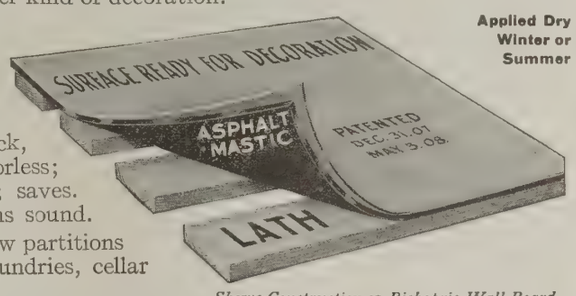


Bishopric Wall Board Easily Applied

Bishopric Wall Board also is the only Wall Board with a water-proof body. The Asphalt Mastic in which the laths are imbedded affords absolute protection against dampness. Does away with delays in building. Applied winter or summer. Is nailed to studding dry, ready for immediate application of paper, paint, burlap or any other kind of decoration.

Bishopric Wall Board is made of kiln-dried, dressed laths imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut in the factory into 4x4 ft. sheets. Shipped in crates ready for immediate nailing to studs. It is guaranteed not to swell, shrink, warp, crack, flake or blister. It is clean, sanitary and odorless; proof against moisture, cold, heat and vermin; saves fuel and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Applied Dry Winter or Summer

Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

T. W. Hanes, Carpenter and Contractor, Mounds, Ill., wrote August 15: "I have used 13 crates of Bishopric Wall Board, and the waste could be put in a hat."

Wm. Cooper, Taxidermist, Milo, Me., March 9, wrote the Philadelphia Farm Journal: "Your interesting paper has been a real bonanza to me. I wanted a cheap, warm method of lining my new work room. An advertisement in your paper gave me the very idea and material at a price that suited my pocket. I wrote to two firms who advertised with you, but selected 15,000 ft. of sheathing from the Bishopric Wall Board Mfg. Co. of Cincinnati. If the stuff was made on purpose, it could not suit me better; and a most prompt, obliging firm they are, too."

Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.

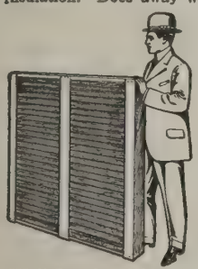


Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.



Wall Board and Sheathing are shipped in crates

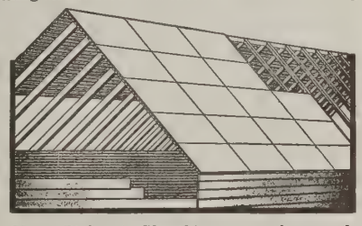
The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

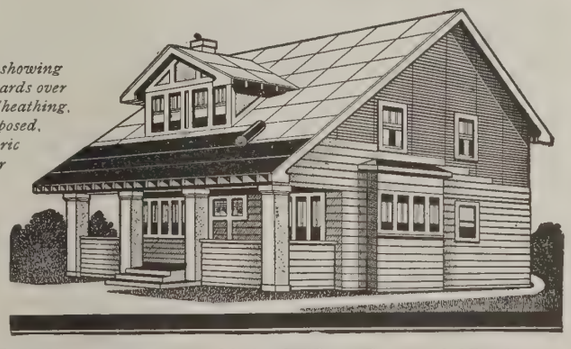
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing, (smooth side of sheathing exposed)

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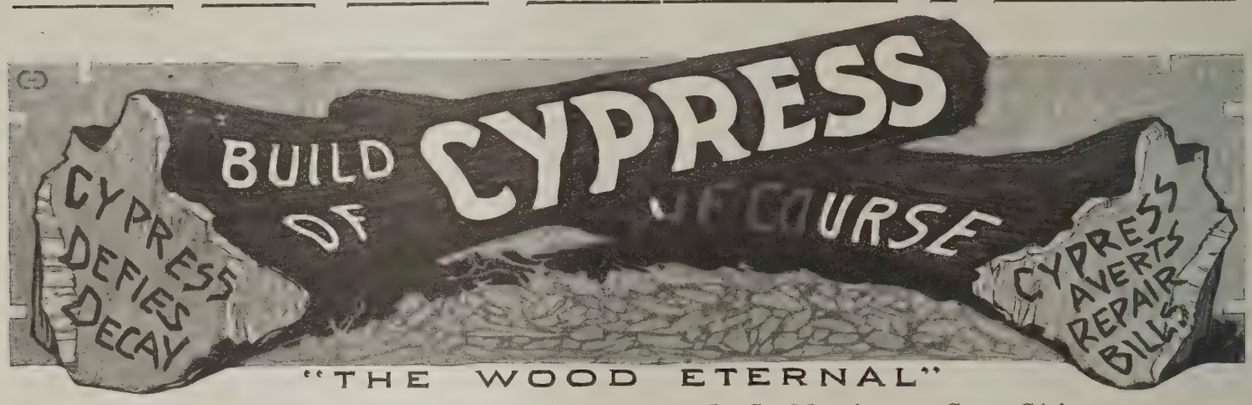
Zero on one side, hot humidity on the other, constant contact with wet rich earth and compost, constant sprinkling and sweating, all combine in *an invitation to hurry up and rot.*

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Korelock Veneered Doors

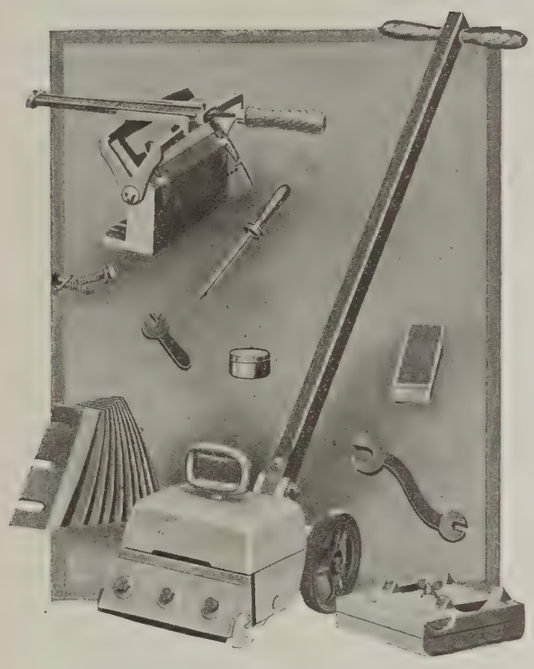
Birch and Oak Doors Ready to Ship

WRITE FOR CATALOGUE C

of Paine Lumber Co. — The Originators

PASTE THIS DOME ON LETTERS
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IT WILL HELP.

It is Yours for the Asking



The Acme Floor Scraping Outfit

To Try It for One Week

No "If's" or "Ands" about my offer. It is a straight business proposition and one that I have adopted to make sales. It is impossible for me to send a representative to every contractor interested in a floor scraper, so instead, I send the Acme Floor Scraping Outfit to represent itself.

I allow you to work with the machine for one week and if at the end of that time you are not satisfied with the results and do not consider the Acme Floor Scraping Outfit the best equipment on the market, simply pack it up and ship it back to me at my expense.

Does this sound like an offer that is worthy of your consideration?

Further particulars and catalog on request.

JOSEPH MIOTKE

249 Lake Street - MILWAUKEE, WIS.



Don't Take Our Word For It—Let Us Send You A Sample

TRY Utility Wall Board on just one job—Note how light in weight and how easily handled it is—Yet how stiff and substantial. Try it under the worst possible conditions and note how staunchly it stands up. No other wall board that was ever made is so moisture-proof and at the same time so readily adapted to any style of artistic decoration.

UTILITY WALL BOARD

is made of exceedingly tough, durable fibre. It is more satisfactory than any other substitute for lath and plaster. You can put wall paper over it with perfect safety. A wall or ceiling finished with Utility Board is permanent—there to stay as long as the building stands.

A New Beautifully illustrated book of interiors will give you some valuable ideas. Send for it at once. Also for the Free Sample

Utility Wall Board is sold through dealers in building supplies everywhere

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4502 Filmore Street **Chicago, Illinois**

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11 Tools in One

25 times faster than Grindstone

6 times faster than Emery wheel

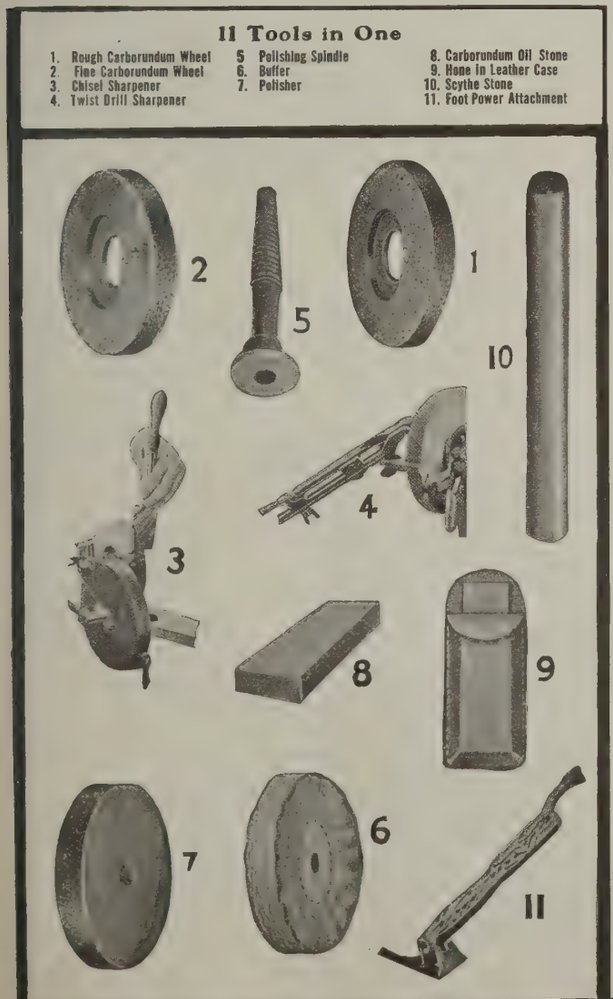


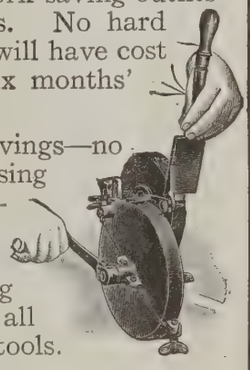
Will not draw temper

Save tools—save time—do all work easier, faster by having your tools always keen. Luther's Mechanic's Special Outfit supplies every sharpening, burnishing and polishing need, makes it the work of only a minute to do the toughest job of sharpening. The outfit consists of the Luther Mechanic's Special Carborundum Grinder with 11 accessories. This is the most complete sharpening, buffing and polishing outfit ever offered, and the most remarkable value.

6 Months' Free Trial

We offer you a whole half year's free trial of this full outfit to prove in your own shop, on your own tools, how this grinder saves and makes money for you—more than pays for itself in the time you use it free. If after a half year's use you do not firmly believe it is one of the greatest time-saving and work-saving outfits you have ever seen—if you do not believe it is a real money-maker for you, return it to us. No hard feelings on our part, and the six months' use will have cost you nothing. Return the coupon for our six months' free trial offer.





Carborundum wheels peel steel away in tiny shavings—no danger of drawing temper—no need of hard pressing—no need of cooling with water. The sharp Carborundum crystals cut toughest steel as emery does copper. Luther Grinders save and make money for any tool user—save money by saving time and tools, make money by making all work easier and faster because of keen, bright tools.

Luther Tool Grinders

are built like high grade lathes—steel and malleable construction, machine cut spur gears, bronze bearings in oil bath, etc. The machine lasts a life-time, and the wheels are guaranteed for 5 years and outlast any number of emery wheels in severest service. This outfit is a very considerable economy for any tool user and we want you to prove it—FREE.

Luther Grinder Mfg. Co., 1808 Madison St., Milwaukee, Wis.

Return This Coupon

Return this coupon for our extraordinary half year's free trial offer on this entire Mechanic's Special Outfit, and for *free* booklet reprinting from McClure's Magazine the story of the discovery of the wonderful artificial diamond abrasive. Cut out the coupon *now*.

LUTHER GRINDER MFG. CO.
1808 Madison St., Milwaukee, Wis. **COUPON**

Please send me free and prepaid your free Carborundum booklets and 6 months' free trial offer on Mechanic's Special outfit, also free booklet about the discovery of Carborundum.

Name .....

Address .....

Dealer's name .....

Address .....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Can Not Chatter Nor Leave Waves

Head and Shoulders Above All Others

WHY? Because it does perfect work. But—to convince yourself, ask any user. He will tell you that—with or against the grain—the Weber never fails to please the owner. That it saves time, trouble and money, and enables the user to underbid all others and make up the difference in speed.

The WEBER DOUBLE ACTING Floor Scraper

is the result of years of concentrated effort, brought to present perfection by a practical floor worker and contractor of wide experience, and is rigidly guaranteed to suit you.



Satisfactory Results Guaranteed

FREE TRIAL

5 to 10 Days

Send for the Weber. Try it 5 to 10 days free. Give it the hardest kinds of actual working tests. If its work isn't the best you've ever seen, send it back at our expense. **Write Today**

JOHN F. WEBER,
President
Weber Mfg. Co.
661 71st Ave.
WEST ALLIS, WIS.

The WEBER Scrapes Both Ways

Bear This Name in Mind

WEBER

WEBER

WEBER

When You Buy a Floor Surfacing Machine
BUY A GOOD ONE—IT PAYS!

The Triple "A" Spring-Driven Floor Smoother combines the advantages of the hand machine and the power machine. No more expense than the former, yet has the capacity and ease of operation of the latter.

No wasted energy pulling a dead weight.

About half of all the Triple "A"s sold have been bought by owners of dead weight machines. What's the answer?

"Get the best first and save extra expense."



The Triple "A" to be appreciated needs only to be seen in operation.

For advertising purposes we will give a special discount on the first machine sold in each town.

SENT ON FREE TRIAL

WRITE FOR FULL INFORMATION

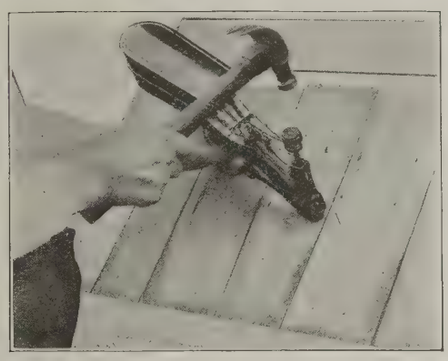
TRIPLE "A" MACHINE COMPANY

34 North Clark Street CHICAGO

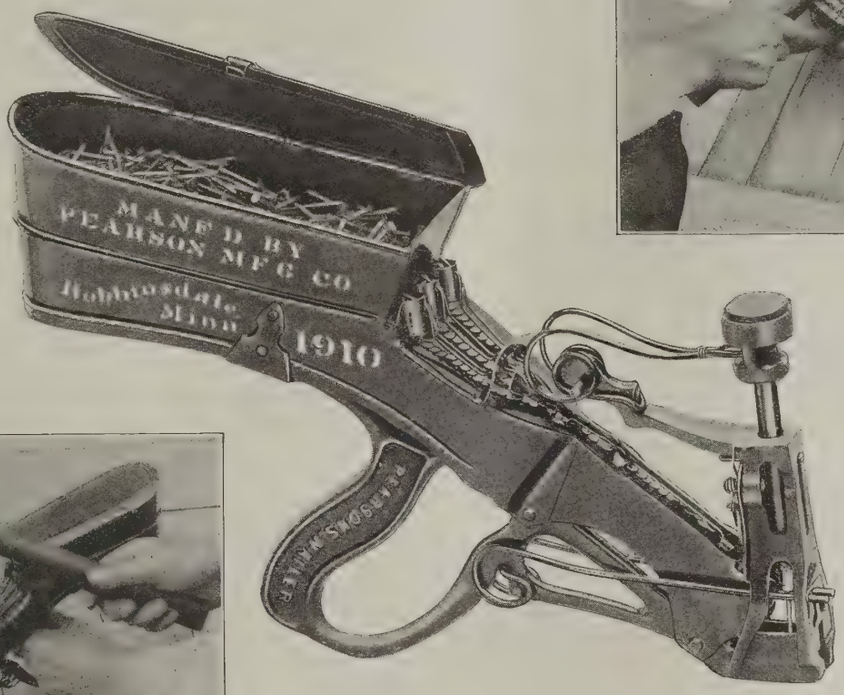
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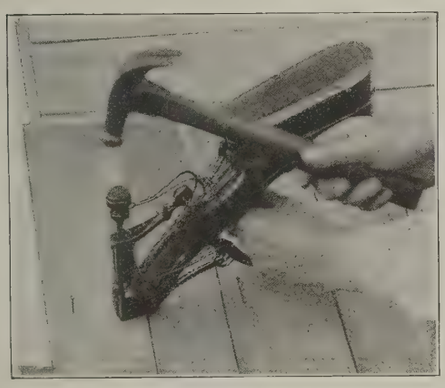
A Minneapolis Carpenter Drives 125 Shingle Nails a Minute with a Pearson Nailer when shingling

YOU may not become quite so expert, but Pearson's Nailer will do your shingling quicker, easier and with more comfort than in the old way.



Pearson's Nailer works well on roofs of any pitch or on a level. It weighs about 2 pounds—is very strong—easily handled and drives the nails automatically.





Hit the plunger with the hammer—and the nail is driven down into the roofing about half an inch. Another blow with the hammer on the nail and the nail is clear down.

Just throw the nails in by the handful (the Nailer holds easily between 500 and 600 nails in the top) and start nailing.

You Can Wear Gloves or Mittens When Shingling with a Pearson Nailer

Doing away with all danger of freezing—smashing thumbs or fingers—besides driving much faster than in the old way. The unsanitary way of carrying nails in the mouth is done away with also—and you can smoke while nailing.

Thousands of Carpenters and Contractors are now using Pearson's Nailers—You will be just as well pleased after a trial.

10% DISCOUNT

For 30 days, to introduce the Nailer to new users, we will give a 10% discount. Or instead of $5.00, the price will be $4.50 net. Besides, we will prepay express. Send in your order at once for either the Blue or Red Nailer. The Blue Nailer (painted blue) is for common 3d No. 14 wire nails and the Red Nailer is for the galvanized 3d No. 13 1¼-inch wire nails. Order from your dealer or direct from us, and be sure to state size wanted according to the nail used. Money returned if Nailer is not as represented.

10% REDUCTION

CIRCULARS ON REQUEST

PEARSON MFG. CO., Robbinsdale, Minn.

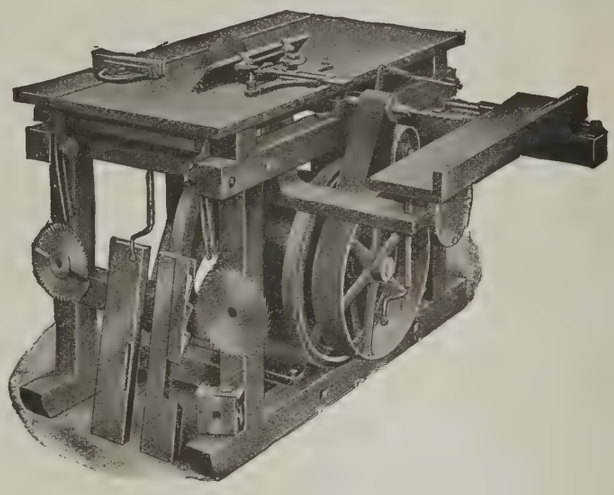
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE PURCHASE OF AN

"AMERICAN"

SAW BENCH

IS A TRUE ECONOMY



The purchase of some machines is a mere extravagance, because they earn nothing. **The purchase of an "AMERICAN" Saw Bench is a true economy, because its use means a saving of time and labor, an improved quality of work, and better business all around.**

Moreover, the "American" Bench is built to be **permanently profitable. It has the qualities which give it lasting power even under hardest service.**

The earning power of an "AMERICAN" Saw Bench does not fall off with long continued use.

An "Amercian" Bench will do all that any saw bench can, with the further great advantage of doing it better, more economically, and over longer periods.

Money placed in an "AMERICAN" Bench is an investment with maximum dividend-paying power.

AMERICAN SAW MILL MACHINERY CO.

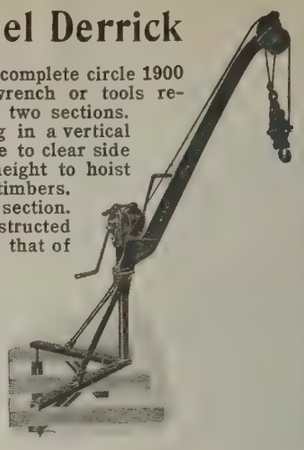
Woodworking Machinery of All Kinds

Solid and Inserted Tooth Circular Saws

80 Laight Street
HACKETTSTOWN
NEW JERSEY

1650 Hudson Terminal
NEW YORK CITY
NEW YORK

Taylor Portable Steel Derrick



Tested at factory, hoisted and swung complete circle 1900 lbs. Shipped ready to operate. No wrench or tools required to set derrick on job. Made in two sections. Beam section connects post by tipping in a vertical position and projects at such an angle to clear side wall of building and has sufficient height to hoist wheel-barrows, window frames and timbers. One man can climb a ladder with either section. Consider the durability of a derrick constructed entirely of malleable Iron and Steel and that of Wood, more compact, more powerful.

Derrick complete with three-way block, channel steel brackets, bolts for attaching to building, price $40.00, and four and one-half cents per ft. for crucible steel cable attached. Drum capacity 300 ft.

Special platform and chains for attaching derrick to gondola railroad cars, price $15. Chains for hoisting wheel-barrows, price $2.00.

John L. Taylor, Manufacturer

Taylor Portable Steel Derricks
1034 W. Lake St. - - Chicago
Telephone Monroe 3066



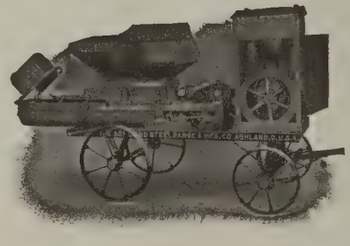


M ASHLAND M

Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers

I I



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The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry. A high-grade mixer at minimum cost. Our business has been built up on repeat orders. Correspondence invited.

E E

Send for Catalogue B

THE ASHLAND STEEL RANGE & MFG. CO.

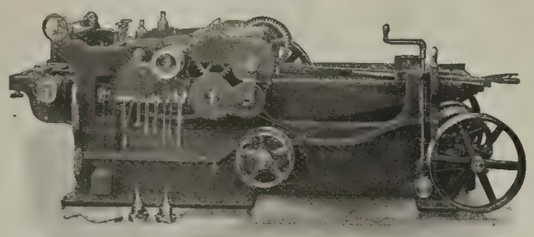
ASHLAND, O.

R ASHLAND R

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Woodworking Machinery

H.B. SMITH MACHINE COMPANY, SMITHVILLE, N.J.



The New Smith Combined Planer and Matcher Materially Reduces Production Costs

The new design makes of it a **Double Surface Planer** with a **Matcher Attachment** in which the table may be raised or lowered according to the thickness of material to be planed, a convenience which simplifies adjustments and makes for economical operation. Divided feed rolls and chip breakers provide facility for planing two narrow boards at the same time. The Pressure Bar and Chip Breakers to the Upper Head are adjustable to and from the cut, which enables the machine to utilize **projecting cutters** for working upon mouldings and novelty sidings.

The machine will work all four sides up to **14 inches and 4 inches thick and will surface two sides 24 inches wide and 6 inches thick.**

Detailed information will be mailed upon request. **Our iron-clad guarantee protects you.**

OFFICES

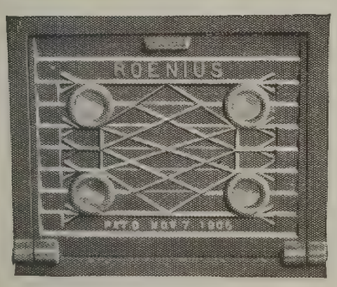
New York Chicago Atlanta Memphis

Smithville

H.B. SMITH MACHINE COMPANY, SMITHVILLE, N.J.

79-2059

Roenius Wood and Coal CHUTES

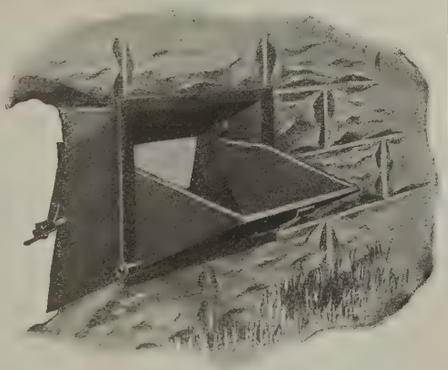


Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

ROENIUS CHUTES

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.

Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY

MANUFACTURERS

Grand Rapids, Wisconsin



ARE YOU in doubt, or do you know that there are better things ahead?

Doubt never raised a man's salary—confidence makes many fortunes.

The purpose of the International Correspondence Schools is to give a man confidence in himself by training him in the line of work he prefers. With this equipment he goes to any employer with confidence in his ability to fill the position he seeks.

I. C. S. training is today one of the greatest recommendations that a young man can have. Great employers value it because it is REAL.

A man with I. C. S. training applies to such concerns as Baldwin's Locomotive Works, Cramp's Shipyard, Westinghouse Electric Company, the great Railroad Systems, or any other branch of industry, with the confidence that he will have an opportunity not offered to the untrained man.

Doubt or Confidence

To learn about the I. C. S. it is only necessary to mark and mail the attached coupon. For example, if you desire to become a Civil Engineer you put a cross opposite that occupation. Or, if you desire to become a Mechanical Draftsman, Electrical Engineer, Architect, Advertising Man, Stenographer, Bookkeeper, or fill any other occupation mentioned, you simply mark the position you prefer.

Mark and mail the coupon and the I. C. S. will show you exactly how to accomplish what you desire and will place at your disposal the best industrial training that can be given to any man—young or old.



Mark and Mail the Coupon TODAY

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Box 1332, SCRANTON, PA.

Please explain, without further obligation on my part, how I can qualify for a higher salary and advancement to the position, trade, or profession before which I have marked X.

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Structural Draftsman	Stationary Engineer	Bookkeeper
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Street and No. _____

City _____ *State* _____

Present Occupation _____

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THE NATIONAL BUILDER

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Charles A. Miller, Jr. } Associate Editors
Wm. C. A. Stevenson }

Porter-Hodgson Co., Publishers, 542-550 South Dearborn St., Chicago

FRED. A. HODGSON, President

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THE NATIONAL BUILDER seeks the advertising of reliable houses only, and asks that prompt notice be given by any reader who has cause for complaint against an advertiser, that the matter may be investigated, and the advertisement discontinued should the advertiser be proved untrustworthy.

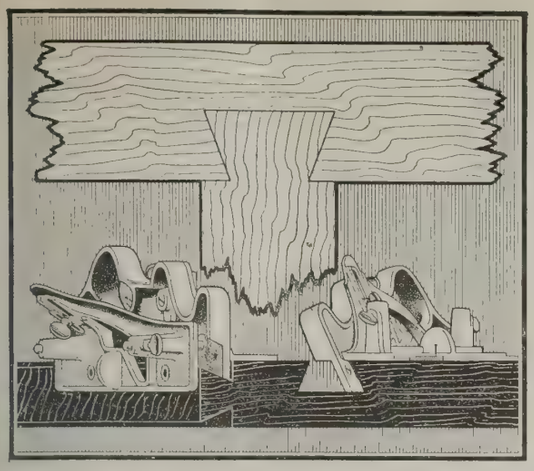
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Stanley Tools

"444"

A Combination Dovetail Tongue and Groove Plane

Something entirely new. A Plane that will at one setting cut a dovetail groove, and in the other setting a dovetail tongue to match.

The operation is simple and the accurate and perfect fitting joints obtained, both parallel and tapering, will convince the workman of the utility of this unique and original tool.

A most valuable addition to the kit of pattern makers, cabinet makers, carpenters and wood workers in general.

Send for complete description.

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New Britain, Conn. U.S.A.

STANDARD THE WORLD OVER

EVERY TOOL GUARANTEED



Hand Power Elevators and Dumb Waiters

for all purposes

Cut shows the Improved Sedgwick Hand-Power Invalid Elevator Outfit.

Catalogue upon request

Sedgwick Machine Works

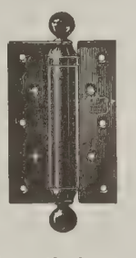
130 Liberty St.
New York

Bommer Spring Hinges are Quality Goods



But cost no more than the inferior kinds

The Springs Never Go Lame

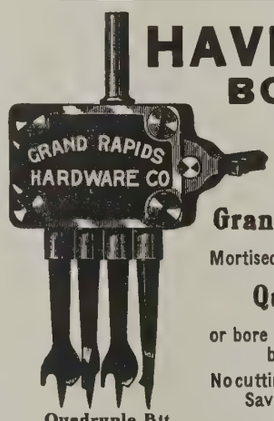


This Trade Mark on Every THE BOMMER SPRING HINGE Genuine Bommer Hinge

Reputations are made by consistently giving your customer the best spring hinges and avoiding imitations or substitutes

Bommer Spring Hinges are sold by all Hardware Dealers

HAVE YOU POWER BORING MACHINES?



Quadruple Bit
Price $5.00
Can not be used in a hand brace

IF SO,
No Sash Pulley Can be Classed with the

Grand Rapids No. 12

Mortised at one Punch with the

Quadruple Bit

or bore four holes with a single bit and it's done.

No cutting, fitting nor trimming. Saves time and money

Write For Free Samples



Grand Rapids Hardware Co., 118 Pearl St. GRAND RAPID MICH.



Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

TRUS-CON JOIST HANGERS

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

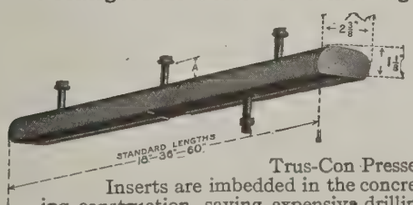
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are imbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots. Write for details and prices.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MR. CARPENTER AND JOINER:

There is absolutely no necessity to spend one minute figuring with your square to get the desired angle of any cut.

Save Time, Labor and Brain Work

and make any one of 390 different cuts instantly without the use of your square, by using

REISSMANN'S RAFTER AND POLYGON GAUGE

By its use you can obtain any desired angle, pitch, bevel, mitre or side cut for rafters, planchers, moulding, sheathing or shingles instantly, and with minute accuracy. It is the most useful and indespensable tool to every mechanic connected with the building industry. The Gauge is made of heavy galvanized iron, heavily japanned, is practically indestructable, and will last a lifetime. Size 10x13 inches.

PRICE POSTPAID ONE DOLLAR

Satisfaction Guaranteed or Money Refunded. Order Now.

Wrap a Dollar Bill in this advertisement and mail at our risk.

ADDRESS ALL ORDERS TO

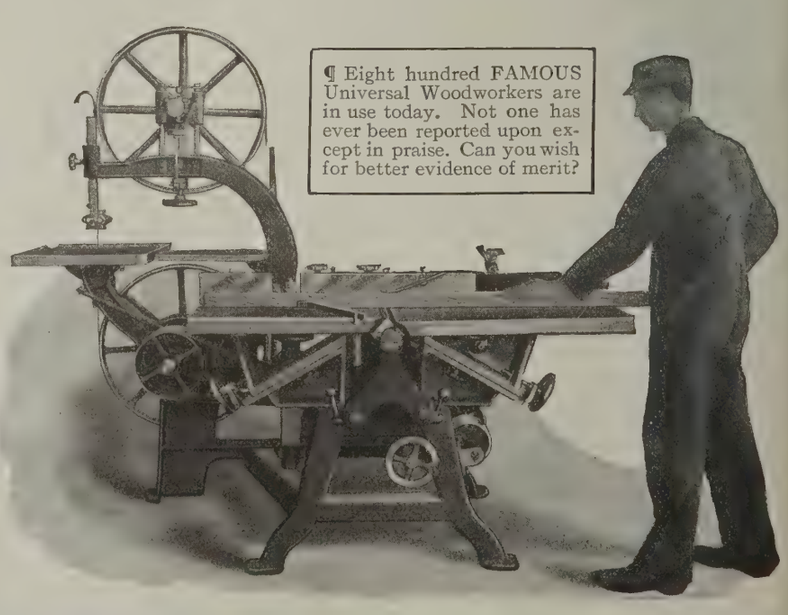
William Bremer Company, Jamaica, New York

The FAMOUS Universal Woodworker Does Sixteen Different Kinds of Work—Is Sixteen Machines in One

No. 1 Operation: Jointer, Two-Side Edger and Moulder

¶ With this attachment stock as wide as 12 inches can be joined, two-side edging can be accomplished with good results, and various kinds of small mouldings can be made. All this work can be done on the FAMOUS Woodworker in every way as rapid and as good as on a machine that does nothing else.

¶ But the FAMOUS can be used as fifteen **other** machines **as well.** Think it over. Then send for the new catalog.



¶ Eight hundred FAMOUS Universal Woodworkers are in use today. Not one has ever been reported upon except in praise. Can you wish for better evidence of merit?

The Sidney Tool Co.

SIDNEY, OHIO

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The A. R. Williams Mach'y Co.
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MONTREAL
Williams & Wilson
320-328 St. James Street

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The A. R. Williams Mach'y Co.
260 Princess Street

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The A. R. Williams Mach'y Co.
57-61 Alexander St.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Plant of B. F. Goodrich Co., Akron, O., the largest rubber factory in the world, covered with J-M Asbestos Roofing

Made of indestructible Asbestos (Rock) Fiber and Trinidad Lake Asphalt, the great weather-proofer, J-M Asbestos Ready Roofing is literally a pliable stone. Fire, acids, gases, chemical fumes, heat or cold have no effect upon it. It is therefore practically indestructible

And because of its stone nature, J-M Asbestos Roofing never needs painting or graveling. Its first cost is its only cost. Asbestos being a non-conductor of heat and cold, this roofing keeps a building warm in winter and cool in summer.

Think what a protection J-M Asbestos Roofing is to a building and what it saves in paint and repair bills! It is adapted to any building—anywhere.

We'll sell you J-M Asbestos Roofing direct from our nearest branch if your dealer won't supply you.

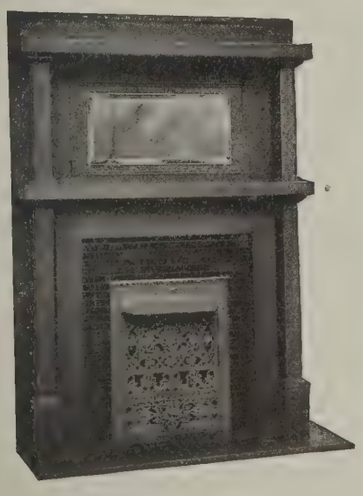
Write nearest Branch for Sample and our handsomely illustrated Catalog No. 303.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products — ASBESTOS — **Asbestos Roofings, Packings, Electrical Supplies, Etc.**

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For Canada:—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C. (1294)



$25.85

For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

CENTRAL MANTELS

are distinctive in workmanship, finish and style. Twenty years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

CATALOGUE FREE. Will send our 112-page Catalogue, the finest ever issued, free, to carpenters, builders and those building a home.

CENTRAL MANTEL COMPANY

1237 Olive Street, St. Louis, Mo.

Over 500 Sheldon Clamps Are Used Daily in Our Heavy Mill and Cabinet Bench Manufacturing Department

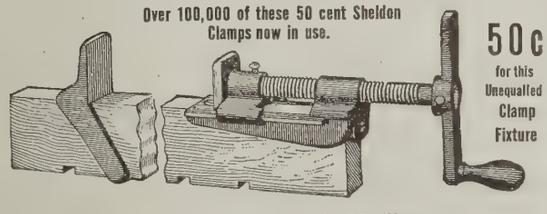
WE HAD TO HAVE

Exceptionally Strong Clamps—which were Quick Acting, TightHolding and Long Lasting—so we made them ourselves.

¶ **Woodworkers Who Knew Perfect Clamps** saw them—and told others. That's why we are now making and selling over 25,000 a year.

Quick Acting and Long Lasting

Over 100,000 of these 50 cent Sheldon Clamps now in use.



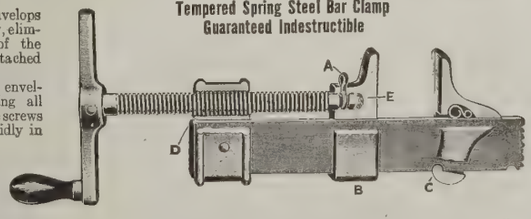
50c for this Unequalled Clamp Fixture

Tempered Spring Steel Bar Clamp
Guaranteed Indestructible

A.—Steel collar envelops groove in end of screw, eliminating possibility of the head becoming detached from the screw.

B.—Ample sleeve enveloping bar, eliminating all bending strains on the screws and holding head rigidly in position.

C.—An indestructible latch cast into head engaging in a tempered steel notch in bar.



D.—Screw head driven and headed on to bar before pinning, insuring absolutely permanent alignment under any pressure.

E.—Hardened steel plate eliminating wear at end of screw.

¶ **Stock up Now and Be Well Equipped.** It will pay you and save a lot of time.

¶ **We Refund Your Money** on any Sheldon Clamp returned within a year from purchase, which shows any weakness or wear.

¶ *Write for Catalogue and Prices.*

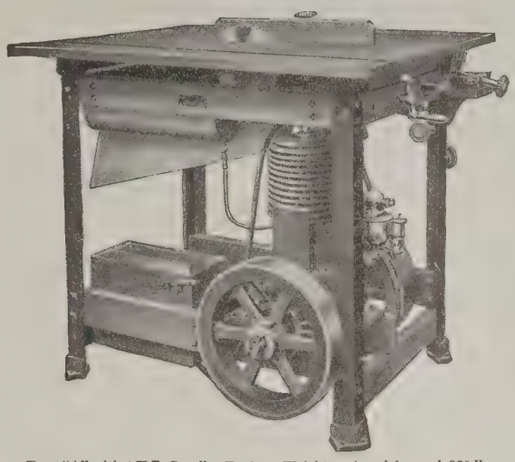
E. H. SHELDON & CO.

321 North May Street **CHICAGO, ILL.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Have You Investigated

The Grimm Woodworker



Type "A" with 4 H.P. Gasoline Engine. Weight equipped for work 350 lbs.

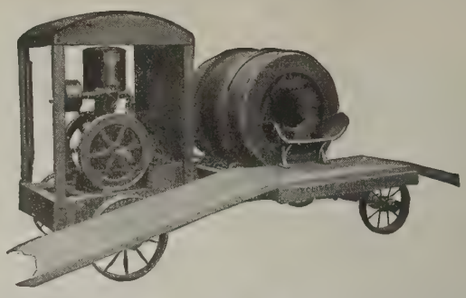
Nine Machines in One

8-inch Rip Saw	Boring Machine (3 bits)	4-inch Jointer
8-inch Cross Cut Saw	Moulder (8 prs. knives)	Jig Saw (3 blades)
6-inch Dado Head	10-inch Sander	Two Emery Wheels

Progressive building contractors are fast coming to realize the importance of substituting practical machines for hand labor. The **Grimm Woodworker,** furnished either with gasoline engine or electric motor and combining so many important attachments in one machine, is undoubtedly one of the greatest time, labor and material savers yet brought out.

Write for descriptive booklet and our attractive selling plans.

Grimm Manufacturing Company
42 Erie Street, Buffalo, N. Y.



You Can Pay for the Mixer on a Single Job by the Greater Economy of Operation

It is not alone the saving of one-third in first cost, one-half in power, one man to operate the hoist and two-thirds the delays and repairs, but the greater portability enabling it to always be kept at the most convenient position on the job for rapid work, that are the distinguishing features of the

Eclipse Concrete Mixer

And we offer our patrons not only greater economy of operation, but unequalled service in shipment. We carry 100 Eclipse Mixers in stock at our factory, stores, warehouses and branch houses for immediate shipment.

It is pre-eminently the mixer for the contractor because it saves money in nearly every possible use.

Our new 1911 catalog No. 32 is just off the press and gives full information how to handle the Eclipse to obtain best results. Write for it. Our testimonial booklet explains how other contractors are making money by using the Eclipse Mixer.

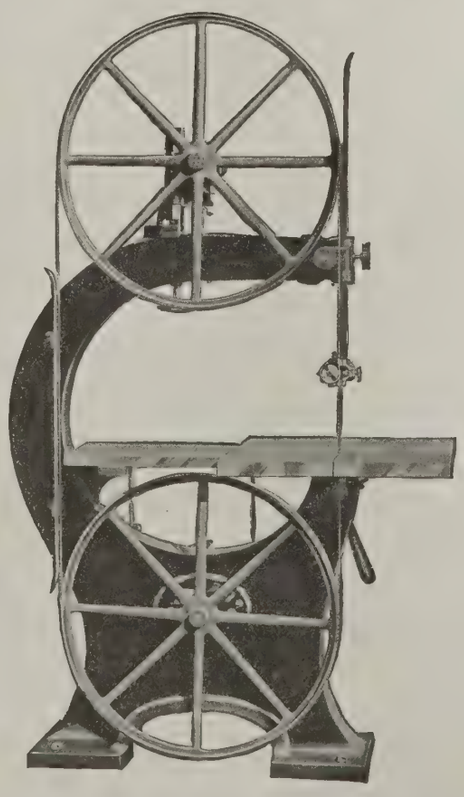
You can buy the small size Eclipse Batch Mixer Complete with Power at a lower price than a Continuous Mixer.

MANUFACTURED BY

The Standard Scale and Supply Co.

CHICAGO	PITTSBURGH	PHILADELPHIA	NEW YORK
1345-1347 Wabash Av.	243-245 Water St.	35 So. 4th St.	136 W. Broadway

BUY A BAND SAW THAT IS DURABLE



CRESCENT

Band Saws satisfy those practical, experienced mechanics who need strong, substantial tools.

The reason CRESCENT Band Saws are so popular is because they have earned a well-deserved reputation for durability and accuracy where hard service is demanded of them. Each day they are pleasing some of the most exacting band-saw operators in every civilized country, and as you appreciate what it means to have a thoroughly dependable, well-built, practical band saw, you should certainly look into the merits of the CRESCENT line before you order.

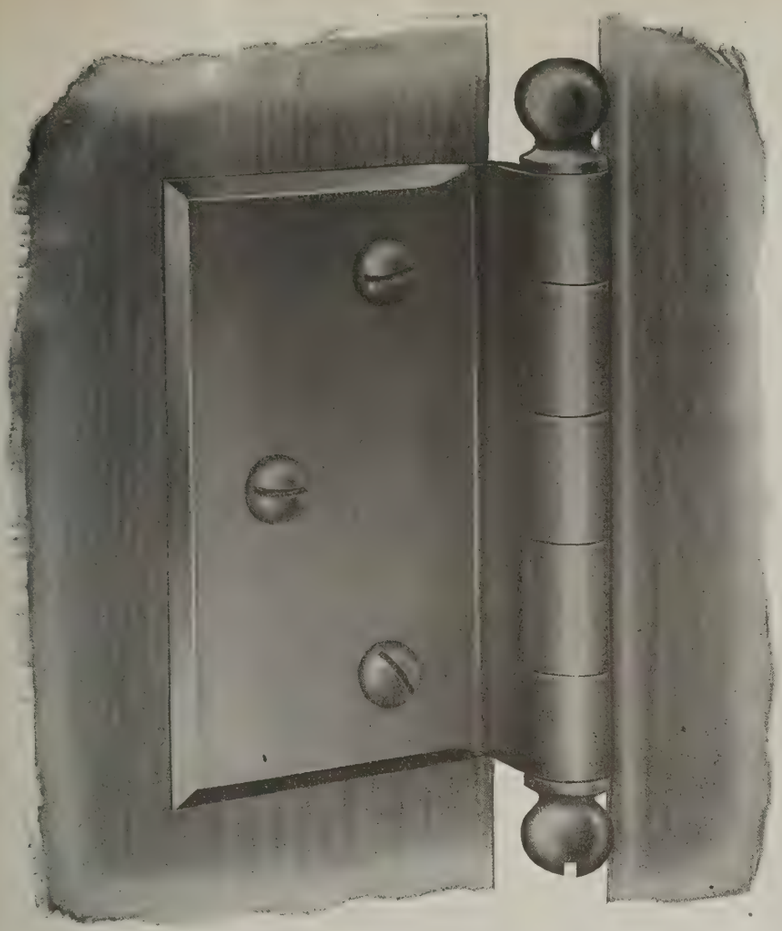
Send for a catalog telling all about these splendid machines, and our line of Saw Tables, Jointers, Borers, Swing Saws, Planers, Planers and Matchers, Wood-Workers, Disk Grinders.

The Crescent Machine Co.

No. 10 Main Street

LEETONIA :: :: OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



No. 450 —CUT FULL SIZE, 3½ INCH

WE INITIATE—NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

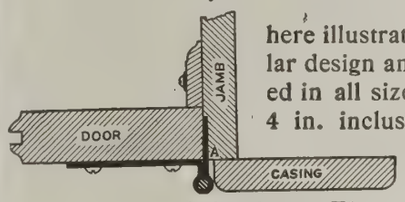
The TIP is threaded and screws into the Butt in both the Japanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter.

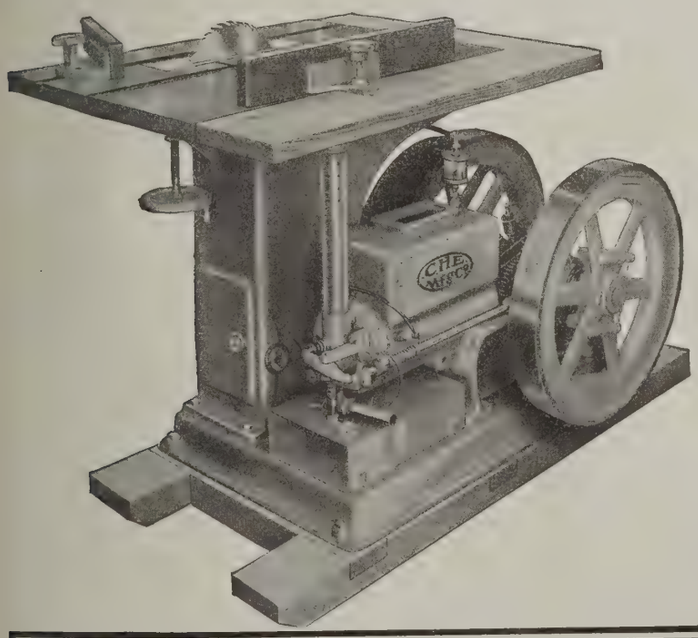
These are exclusive "NATIONAL" features.

Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 in. inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., STERLING, ILL.



WE ARE THE PIONEERS

In the manufacture of portable saw rigs. We have them in four sizes. The portable rig shown here is our number two all iron with 6 H. P. water hopper cooled engine.

WE GUARANTEE 4 INCH ON THE RIP WITH THIS OUTFIT

More C. H. & E. Portable Saw Rigs on the market than all the rest of our imitators combined.
This outfit has all attachments and the price is right.

WRITE FOR DESCRIPTIVE FOLDER

C. H. & E. MANUFACTURING CO., Inc.

319 Mineral Street - - - - - - MILWAUKEE, WIS.

The Power to Grow

Have You Got It?

The man who starts to make concrete blocks with an Ideal Block Machine usually begins to grow from the work "go."

His product is absolutely perfect—true in its proportions, accurate in alignment, sharp cornered and perfect—the kind of blocks the architect, contractor and builder wants.

When increased capacity is needed, there is no necessity to replace the old machinery with new. Using the same block machine with which he started, there are in the Ideal Line numerous time and labor saving attachments with which to attain the desired increase in output, reduce the proportionate manufacturing cost and multiply profits.

No matter how big your business grows



Ideal Concrete Machinery

Will take care of it perfectly

The Ideal is the one block machine that is never outgrown

The Ideal Automatic Power Tamper—for instance, attached to the **Ideal Block Machine** doubles output and cuts down cost. **The Ideal Scraper & Finisher Attachment** automatically insures smooth backed, sharp cornered, perfect blocks. Other big capacity increasers are the Ideal Core Actuator, Ideal Material Conveyors, Ideal Gravel Graders, and the Ideal Continuous Proportioning Mixer. We also equip plants in any unit or capacity desired, for either high pressure or low pressure steam curing or air curing.

Use the coupon to ask for particulars on any of these machines in which you are interested. Or ask us any questions that are in your mind as to the adaptability of Ideal Machinery for your work.

Ideal Concrete Machinery Company

421 EMERICK ST., SOUTH BEND, IND.

London, Ont., Can. Chicago Office: 1075 Old Colony Bldg. **New York Office,** 1958 Hudson Terminal Bldg.

Architects are referred to Sweet's Index, Pages 28-29

Please send me your catalogue No. 12 on Ideal Block Machines

Name.....Town.....State.....

Your present business.....R. F. D. or Street No.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

CARBORUNDUM Sharpening Stones



You Can Tell a Good Workman By the Condition of His Tools

That is why so many **GOOD** carpenters use **Carborundum Sharpening Stones**—the stones that keep all edge tools keen and smooth cutting; that never become "slicked" over. **Carborundum Stones** are distinctly different; they cut the steel quickly and easily, leaving a fine, fast-working edge. Other stones merely rub. For general bench tools, the **Carborundum Round Combination Stone** is most practical and convenient; the shape allows for the rotary motion required in sharpening chisels, plane bits, etc.; for tools requiring an extra fine edge, there is the extra hard, extra fine stone. A bottle of **Carborundum Temperoil** will complete the outfit nicely.

No. 107.	Round Combination Stone	$1.00
No. 156.	Extra Hard, Extra Fine .	1.00
No. 108.	Oblong Combination . .	1.25

FROM YOUR DEALER OR DIRECT

The Carborundum Company
Niagara Falls, N. Y.



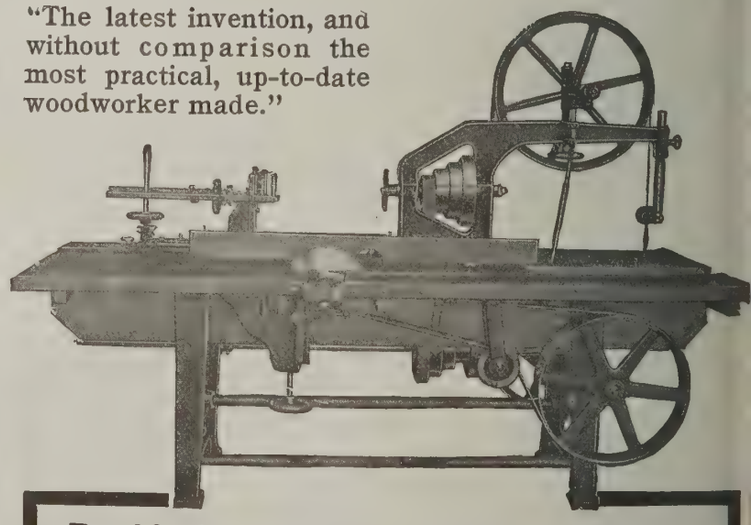
MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw gauges to slide with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

"The latest invention, and without comparison the most practical, up-to-date woodworker made."



Buffalo Crain Combination Woodworker

Note the ample size and capacity of the parts which perform the four vital operations in your shop: **1. Lathe**—40″ between centers; **2. Band Saw**—taking 12″ under the guide; **3. Saw Mandrel**—taking saw sup to 12″ dia.; **4. Planer Head**—taking 5″ or 10″ bits. The convenient location, strength, simplicity and easy adjustment of these vital parts, are of the greatest advantage. Drilling, boring, sizing, jointing, moulding work, tenoning and, in short, practically every operation of daily occurrence in a woodworking shop, can be performed on it **without extra attachments.** As an investment, it is a true gold mine. **Three men can work at it at one time.** Lowest power cost. Ask for Booklet 1785.

Buffalo Forge Co., Buffalo, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Announcement of Awards In Cash Prize Contest

IN the April issue of this publication we offered $150.00 in cash prizes to those giving us the best reasons why they use and recommend Johnson's Wood Dye and Johnson's Under-lac. There were forty-one prizes: First prize, $25.00; five second prizes of $10.00 each; ten third prizes of $5.00, and twenty-five fourth prizes of $1.00 each. The answers had to be in by June 15th, 1911.

The scores of replies received show to what an extent Johnson's Wood Dye and Johnson's Under-lac are depended on by men who look upon every job they do as a standing advertisement and part of their reputation.

Johnson's Wood Dye

is recommended by these men and thousands of others because it is more than an ordinary stain. It is a genuine deep-seated dye that penetrates the wood, giving a rich, permanent color without raising the grain in the slightest. It is easiest to work with, too, and most economical, because it goes farther than any other coloring. It is made in 15 artistic shades, and by lightening or darkening, or blending certain colors, over a hundred beautiful effects can be obtained.

Johnson's Under-lac

is the choice of careful painters and finishers because it is far superior to any varnish, both in results and working qualities. It is not thick and sticky like varnish, is much more easily applied, and dries in half an hour. Better than any kind of shellac, and easier to work with.

Let the Prize Winners Tell You

If you had before you the stack of letters we received in this contest you could hold no further doubts of the *advantage to you* of using nothing but Johnson's Finishes in your work.

The two letters we have space to print here will give you the facts from your own point of view—from the standpoint of the man who does the work and must abide by the results. Read these letters, then if you have not tried Johnson's Wood Dye and Johnson's Under-lac

Send for Free Samples and Prove Their Worth Yourself

We want you to know the superior merits of these Johnson's Finishes. We want you to know, at our expense, that with them you can do better work with less labor. Send us your name and address and name of dealer from whom you purchase supplies. We will see that you get, *free*, and without obligation, samples of Johnson's Wood Dye and Johnson's Under-lac. Also ask for copy of our free book—"Specifications and Instructions for Finishing New Woodwork and Floors"—Edition No. N. B. 9. Address

H. R. BRUNELL Hoboken New Jersey
Wins First Prize

To Mr. Brunell was awarded the First Prize of $25.00 for his direct reasons for using and specifying Johnson's Wood Dye and Under-lac. We give below the reasons and some experiences with these finishes which Mr. Brunell sent us at the same time:

Gentlemen: I will give you a few experiences with your Dye and Under-lac. I am foreman for a New York firm, and have used your Dyes for the past five years. I used your No. 129 Dark Mahogany on Mr. Walker's house in Montclair. He is an architect and has one of the finest constructed houses there. This winter we did quite a large job in the Greenwich Bank Building at 35th Street, corner 6th Avenue, the offices of The American Undergarment Co. We have landed two jobs on account of them. I think without a doubt these offices are the finest in New York City. I could write you a score of such places where we used your Dyes. Three years ago at the Chapter House in Hoboken and Scottish Rites Temple, Jersey City.

I will now give you my reasons for specifying your Dyes from a mechanic's point of view: I find your dyes are easily applied, there is no sediment to them and mix well together, when so needed. But the beauty of them is this: They have such a rich, clean color, give the depth, bring out the figure and all the details of the wood, do not raise the grain and can make a perfect job with either your Wax or Under-lac.

Your Under-lac I like for these reasons: It works freely, does not run, dries very hard over night, gives a first-class effect of rubbing, and is very easily kept clean, just give a light rub with cheese cloth. Your Dyes and Under-lac are both very durable.

A Second Prize Winner

Mr. Stanley Sivers, 606 3rd St., Albany, N. Y., has been awarded a $10.00 prize for the following:

My reasons for recommending your Under-lac are: 1st.—For its good body. 2nd.—Amount of surface it will cover. 3rd.—Does not mar or chip. 4th.—Will not raise grain of wood. 5th.—Good drying. 6th.—Better than shellac.

My reasons for recommending your Wood Dye are: 1st.—For richness of color. 2nd.—Penetrating the hardest wood. 3rd.—For not raising the grain of the wood. 4th.—Will not mar or scratch. 5th.—Is transparent and does not cloud. 6th.—For long service. 7th.—Can produce better work. 8th.—Because I can satisfy people who know what they want and are willing to pay for it.

Other winners of Second Prizes, getting $10.00 each, are:

Mr. F. P. Connolly, 151 S. Water St., York, Pa.
Mr. F. B. Carter, Portland, Oregon.
Mr. Albert Borchardt, Monticello, Arkansas.
Mr. H. W. Richards, 164 Oak St., Elgin, Illinois.

List of Third Prize Winners

$5.00 awarded to each:

C. T. Sullivan, 46 Stewart St., Fall River, Mass.
T. A. Cooper 308 McClellan St., Schenectady, N. Y.
Joseph Denno, Alpena, Mich.
R. F. Flannery, 325 Poole Ave., Long Branch, N. J.
J. N. Humble, 816 E. Cachela Poudre, Colorado Springs, Colo.
Elmer Rosengren, 404 Anson St., Marshalltown, Ia.
J. White, 6121 Sangamon St., Chicago, Ill.
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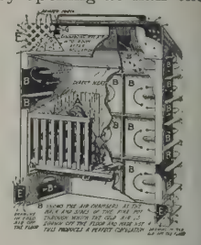


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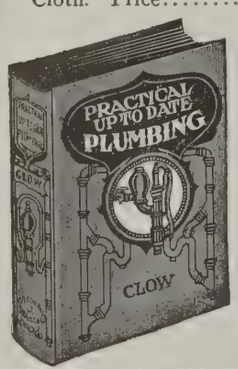
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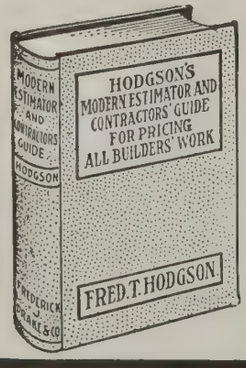
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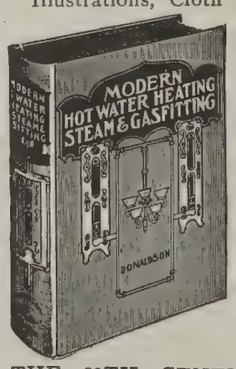
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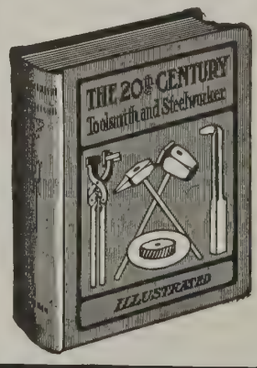
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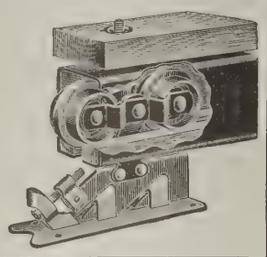
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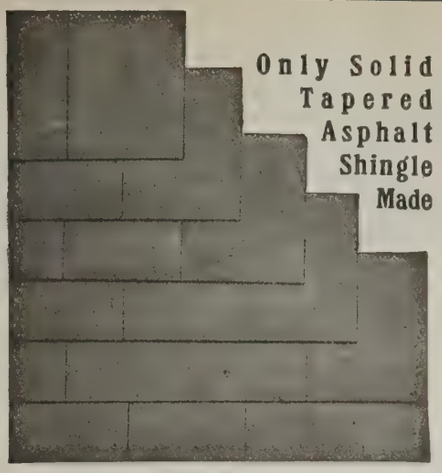
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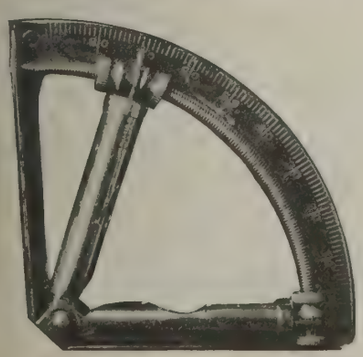


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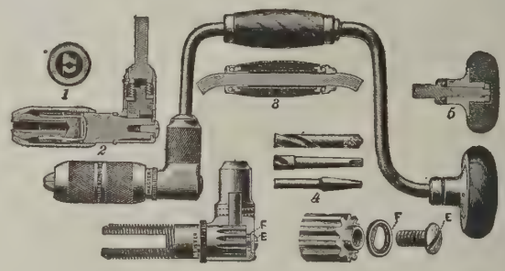


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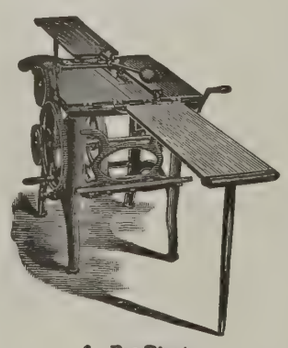
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The Master Brace is made in 4 sizes, with 8, 10, 12 and 14 inch sweep.

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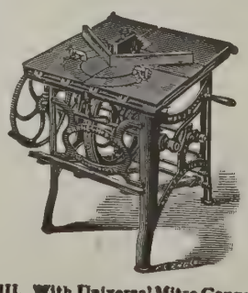
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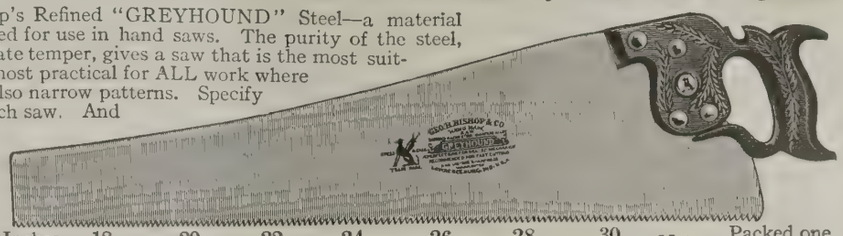
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SPEED & EASE — TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

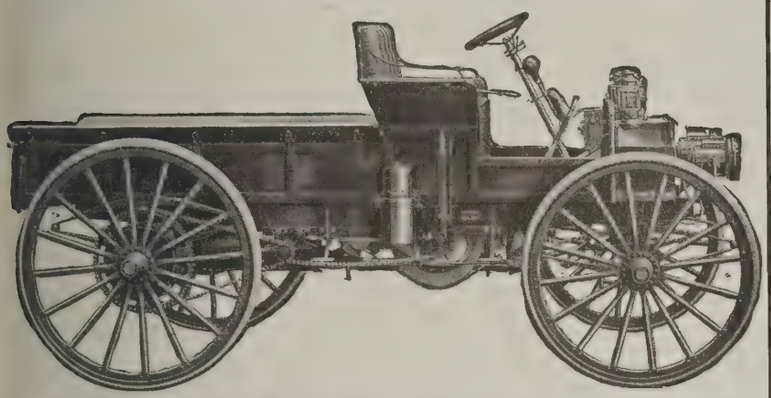
They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.



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GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana

Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		



Where Haste Makes Money

The International Commercial Car is a wonderful help in quick transportation of the essentials in tools, finishings, and light materials. How much time and money is lost for the want of the right-size auger bit or those few necessary boards!

International Commercial Cars

save their initial expense many times over in the delays avoided and the relief of having things when you want them. An International is always ready; always at your service, regardless of roads or weather.

Easily handled, easily stored, simple, strong, and dependable. Let us tell you all about them.

International Harvester Company of America
(Incorporated)
81 Harvester Building, Chicago U S A

Miller's Two Minute
Lever Lock Mortiser

Chisels the opening for Locks and is the greatest time and labor saver



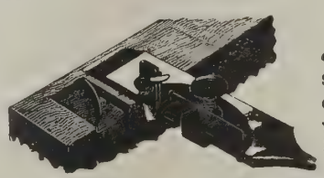
One builder wrote us last month: "You may expect an order for 3 machines as the carpenters are going crazy about my machine. The more I use it, the better I like it."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

are sent on trial to any reliable contracter and builder. Write for circulars and order now for spring work.



We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs and similar work—which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.
Nevada Building, CINCINNATI, OHIO — Western Office, RIVERSIDE, CAL.



No. 5955

ARE YOU GETTING YOUR MONEY'S WORTH?

We carry a complete stock of the latest and most up-to-date designs of lock sets and trim hardware.

Send for our Builders' Hardware Catalog and Net Price List. FREE to contractors and material men.

State whether contractor or material man. We do not sell to contractors or builders in Cook County, Illinois.

No. 5955 Inside Lock Sets. Old Copper Finish. Price per set, $0.44
No. 8355 Inside Lock Sets. Dull Brass Finish. Price per set, $0.44

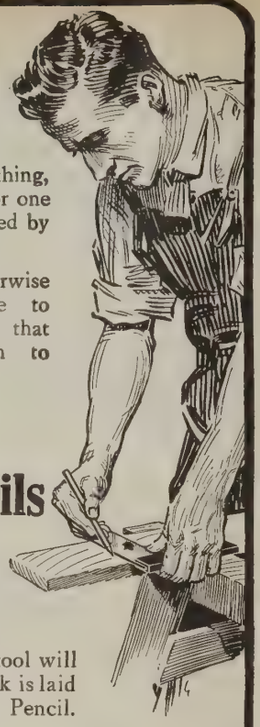
REHM HARDWARE COMPANY
1503 Blue Island Ave. **Chicago, Illinois**



No. 8355

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Good Leads Make Clean Marks



A carpenter's pencil is a small thing, but the mechanic who puts a poor one in his kit is likely to be bothered by bad work and lost time.

Many an open joint in an otherwise good job is directly traceable to a gritty, brittle pointed pencil that wouldn't mark plainly enough to furnish a true saw guide.

E. C. S. Carpenter Pencils

will never serve a painstaking worker that way.

Of course, they mark plainer on a smooth board than on a rough one, but, smooth or rough, your tool will never lack a clear guide if the work is laid out with an E. C. S. Carpenter Pencil.

These pencils hold a very fine quality of lead of great toughness. The casing material is fine, straight-grained cedar. The parts are thoroughly glued together and *won't separate.* All in all, the E. C. S. Carpenter Pencil is the most *satisfactory* one made today for mechanical purposes.

E. C. SIMMONS KEEN KUTTER CUTLERY TOOLS

E. C. Simmons Extra Grade 7 Inch No. 107 Germany

"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS.

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SIMMONS HARDWARE COMPANY, Inc., St. Louis and New York, U. S. A.

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By the Coyne (Practical) Method you can learn one of the above trades easily and quickly, and at low cost. Living expense can be earned while attending school.

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L. L. COOKE, Director

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"SAW POINTS"

A FREE BOOKLET

¶ We have just issued a booklet called "Saw Points" that will show you the proper way to care for your saw.

¶ Every user of a Saw should know how to care for it, as a Saw won't saw unless it is properly set. A Saw will render poor service if not kept in good condition and a Saw to obtain the best results with the least possible effort must be properly set and sharpened. Send a postal for our booklet No. 7, "Saw Points." It will tell the correct method of using the Morrill Saw Set.

CHARLES MORRILL

277 Broadway, New York

STAIN AND PRESERVE YOUR ROOFS

A handsomely stained roof gives distinction to the commonest house, and the rich, velvety moss-green and tile-red shades of

CABOT'S Shingle Stains

not only beautify the shingles, but thoroughly preserve them. They are made of Creosote, "the best wood preservative known," and the finest and strongest colors, ground in linseed oil. They cost half as much as paint, can be applied at half the labor cost, and are suitable for shingles, siding, and other exterior woodwork. *You can get Cabot's Stains all over the country. Send for samples and name of nearest agent.*



Stained with Cabot's Shingle Stains
Train & Williams, Architects, Los Angeles, Cal.

SAMUEL CABOT, Inc., Manfg. Chemists, Boston, Mass. 350 Dearborn Av., Chicago

SPECIAL OFFER TO CARPENTERS



CARPENTER'S SPECIAL

Try it at Our Expense

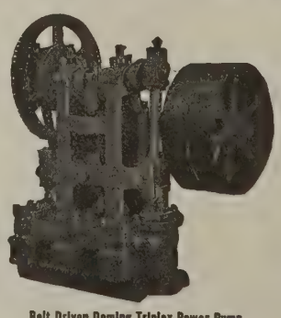
Until your dealer becomes stocked with this new combination India Oilstone we will send one on trial, express paid, for $1.00. Try it ten days. If not satisfactory return and receive your dollar back,
PIKE MFG. CO. .. PIKE, N. H.

Try it at Our Expense

COMBINATION INDIA

We want every carpenter to try this oilstone which was designed solely for carpenter's use. In addition to above offer we will include an attractive glass top souvenir sharpening stone with every order on condition you mention your dealer's name in your reply.

DEMING PUMPS



Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



NORTH ELEVATION



REAR ELEVATION



FRONT ELEVATION



SOUTH SIDE ELEVATION

SUPPLEMENT TO

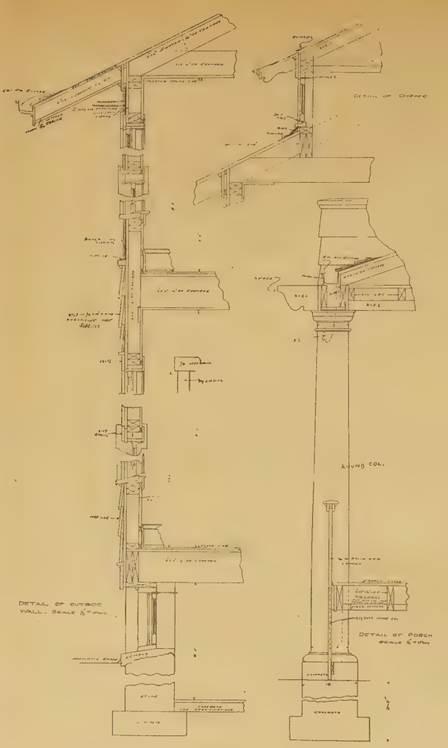
THE NATIONAL BUILDER

OCTOBER, 1911

NATIONAL BUILDER DESIGN No. 346, THE AURORA HOUSE

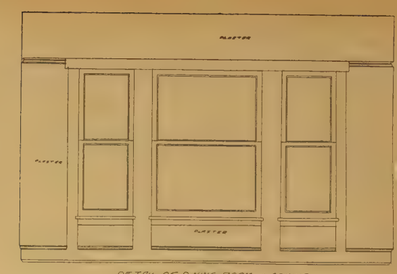
SCALE OF PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 8 FEET.

FOR ESTIMATE SEE PAGE 29

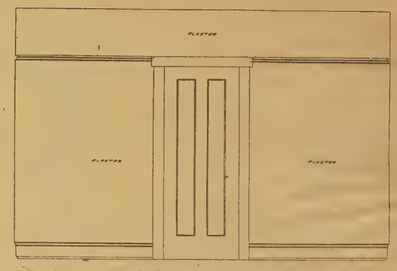




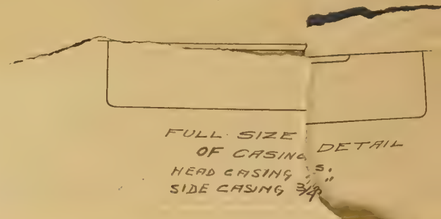
DETAIL



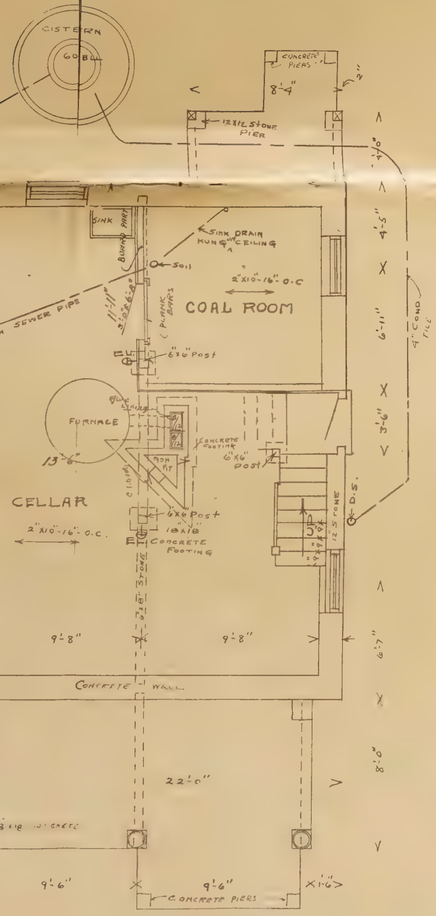
DETAIL OF DINING ROOM LOOKING TOWARDS THE WINDOWS



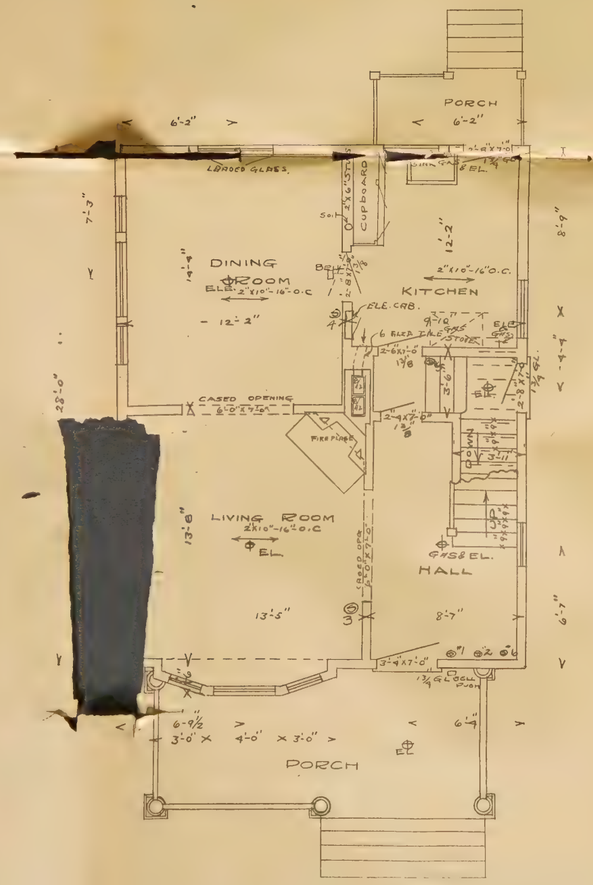
DETAIL OF DINING ROOM LOOKING TOWARDS KITCHEN



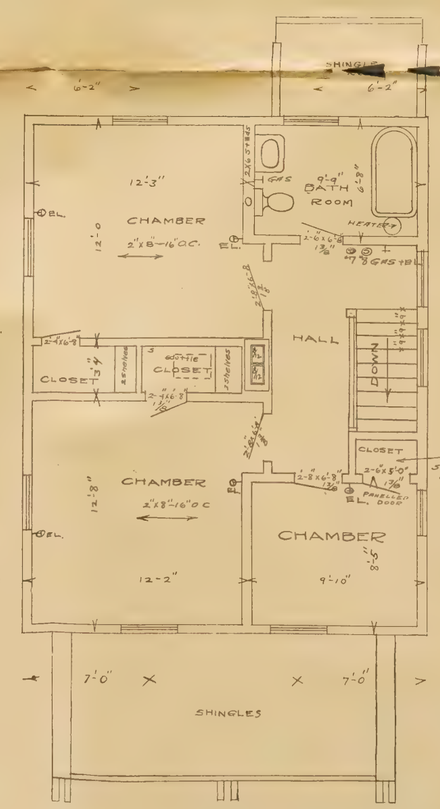
FULL SIZE DETAIL OF CASING. HEAD CASING 3/4", SIDE CASING 3/4"



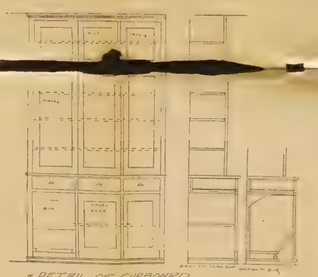
FOUNDATION PLAN



FIRST FLOOR PLAN

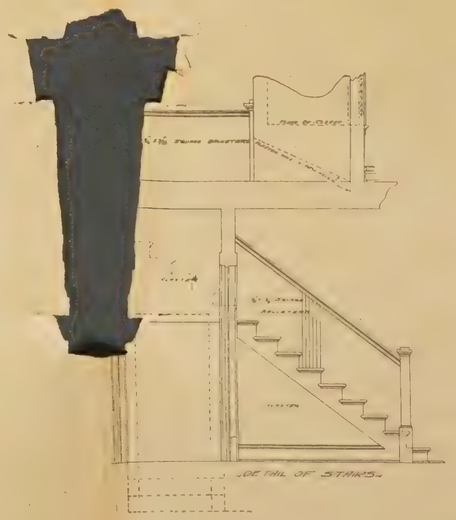


SECOND FLOOR PLAN

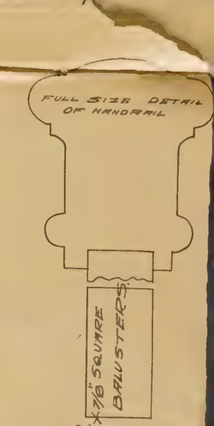


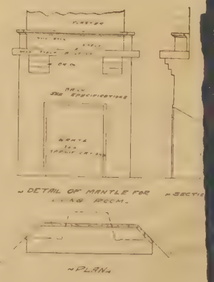
DETAIL OF CUPBOARD

FULL SIZE PICTURE MOULD



DETAIL OF STAIRS





DETAIL OF MANTLE FOR KITCHEN RANGE

SECTION

PLAN

THE NATIONAL BUILDER

Vol. 52 CHICAGO, SEPTEMBER, 1911 No. 9



THE WAGNER BUNGALOW, built in Chicago, Ill.

NATIONAL BUILDER DESIGN No. 345

L. E. Russell, Architect, Chicago, Ill.

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $4,725.89

Probably no cause has contributed more to bungalow construction than apartment house life. The convenience of having all the rooms on one floor has been carried to the suburbs and country, where such construction was considered not only impossible, but positively unhealthy to sleep so near the ground. In the cities the high value of land is perhaps sufficient reason to economize by piling one house on another, but in the suburbs this reason is not so apparent. The bungalow has been called a one-story flat, which perhaps it is, with the added charm of being set in a garden with plenty of light and air. It will be noticed that most of the bungalows are owned by city people who are accustomed to one-floor life and know its convenience.

In the Wagner Brick Bungalow we have an arrangement particularly adapted to a northern climate. A vestibule is needed to protect the house from the storms and cold of winter as well as the dust and heat of summer.

The relation between the various rooms is such that each is readily accessible from another, requiring much less work for the housewife.

ESTIMATE OF WAGNER BUNGALOW

Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

EXCAVATING AND MASONRY.

270	yards excavating, 35c	$ 94.50
480	cu. ft. concrete footings, 25c	120.00
32,500	brick laid in foundation, $12	390.00
10,000	face brick laid in wall, $20	200.00
40,000	brick laid in main walls above foundation, $13	520.00
32	cement stone window sills, $1.50	48.00
40	lineal ft. coping, 50c	20.00
	Concrete steps	22.00
	Pier footings	8.00
	Chimney caps	4.00
	Fireplace flue	40.00
	Boiler flue	30.00
	Hollow tile wall for coal bin	25.00
165	yards concrete floor at 70c	115.50
	Concrete porch floor	40.00
	Total excavating and masonry	$1,677.00

LUMBER BILL.

		Feet.
2,	6x 8x18 ft. girders	144
2,	6x 8x14 ft. girders	112
5,	6x 6x14 ft. posts	210
32,	2x10x16 ft. first flg. joists	864
26,	2x10x18 ft. first flg. joists	780
26,	2x10x14 ft. first flg. joists	628
12,	2x 8x16 ft. wall plates	252
34,	2x 4x16 ft. ceiling joists	374
30,	2x 4x14 ft. ceiling joists	270
16,	2x 4x12 ft. porch ceiling	128
40,	2x 6x12 ft. rafters	480
30,	2x 6x18 ft. rafters	540

4, 2x 6x24 ft. hip rafters	96
16, 2x 6x16 ft. rafters	256
4, 2x 6x20 ft. rafters	80
180, 1x 2x 9 ft. furring	270
120, 2x 4x18 ft. partitions	1,440
8, 2x 8x18 ft. partitions	192
50, 2x 4x16 ft. plates	550
20, 1x 4x12 ft. bridging	80
30, 1x 6x12 ft. backing	180
Total ft. framing lumber	7,926
7,926 ft. framing lumber at $27	$214.00
1,600 ft. No. 2 sheathing, 8-inch for rough floor, $27	43.20
2,400 ft. 6-inch. No. 2 sheathing for roofs, $27	64.80
24, M. R. C. shingles, $4	96.00
250 ft. 5/8x4x16 ft. Y. P. ceiling for porch, $30	7.50
250 lineal ft 1x12 fir. finish, $45	11.25
250 lineal ft, 1x6 fir finish, $45	5.62
1,650 ft. 3/8x2¼ face oak flg., $70	115.50
300 ft. 3/8x2¼ face maple flg., $60	12.00
5 rolls R. R. paper, 75c	5.25
Total lumber bill	$575.12

MILL WORK.

3 cellar window frames, 22x22, $1.75	$ 5.25
2 cellar window frames, 26x22, $1.75	3.50
1 cellar window frame, 30x22	1.75
1 cellar twin frames, 22x10, 2 lt	3.50
2 cellar window frames, 32x22, $1.75	3.50
1 cellar door frame, 3 ft. 0 in. x 6 ft. 10 in.	2.50
1 cellar door frame, 2 ft. 8 in. x 6 ft. 8 in.	2.50
1 cellar door frame, 2 ft. 0 in. x 6 ft. 0 in.	2.00
3 cellar sash, 22x22, $1.50	4.50
2 cellar sash, 22x10, 2 lt., $1.50	3.00
2 cellar sash, 26x22, $1.50	3.00
2 cellar sash, 32x22, $1.70	3.40
1 cellar door, 3 ft. 0 in. x 6 ft. 10 in. x 1¾ in.	4.75
1 cellar door, 2 ft. 8 in. x 6 ft. 8 in. x 1⅜ in.	2.60
1 cellar door, 2 ft. 0 in. x 6 ft. 0 in. x 1 ⅜ in.	2.40
1 front door frame, 3 ft. 0 in. x 7 ft. 0 in. with side lts.	12.00
1 vestibule door frme, 3 ft. 0 in. x 7 ft. 0 in. with sid lts.	9.00
2 triple window frames, center 38x28 side windows, 22x28, $8	16.00
2 window frames, 24x12, 1 lt., $2	4.00
1 window frame, 40x28, 2 lt.	3.00
1 window frame, 32x14, 2 lt.	2.25
1 window frame, 30x28, 2 lt.	2.25
1 double sash door frame, 2 ft. 0 in. x 7 ft. 10 in.	5.00
2 window frames, 32x28, 2 lt., $2.25	4.50
1 twin frame, 28x28, 2 lt.	2.25
1 window, 44x28, 2 lt.	2.50
2 window frames, 18x28, 2 lt., $2.25	4.50
4 side light sash for front and vestibule doors, $2.50	10.00
2 windows, 38x28, 2 lt. d. s., $4.50	9.00
2 windows, 22x28, 2 lt. d. s., $2.10	4.20
2 sash, 24x12, 1 lt. s. s., $1	2.00
1 window, 40x28, 2 lt. d. s.	4.50
1 window, 32x14, 2 lt. d. s.	2.00
1 window, 30x28, 2 lt. d. s.	3.10
2 sash doors, 2 ft. 0 in. x 7 ft. 0 in. x 1⅜ in.	9.00
2 windows, 32x28, 2 lt., $3.70	7.40
2 windows, 28x28, 2 lt., $3	6.00
1 window, 44x28, 2 lt.	5.00
2 windows, 18x28, 2 lt., $2.10	4.20
2 pair jambs cased openings, 4 ft. 0 in. x 7 ft. 0 in., $1	2.00
4 pair jambs, 2 ft. 8 in. x 7 ft. 0 in., 80c	3.20
4 pair jambs, 2 ft. 4 in. x 7 ft. 0 in., 80c	3.20
2 pair jambs, 2 ft. 0 in. x 7 ft. 0 in., 70c	1.40
1 pair jambs, 2 ft. 6 in. x 7 ft. 0 in.	.80
1 pair jambs, c. o., 4 ft. 0 in. x 7 ft. 0 in.	1.00
1 front door, 3 ft. 0 in. x 7 ft. 0 in. 1¾ in	18.00
1 vestibule door, 3 ft. 0 in. x 7 ft. 0 in. x 1¾ in.	18.00
1 rear door, 2 ft. 10 in. x 7 ft. 0 in. x 1¾ in.	9.00
4 doors, 2 ft. 8 in. x 7 ft. 0 in. x 1⅜ in, $4.50	18.00
4 doors, 2 ft. 4 in. x 7 ft. 0 in. x 1⅜ in., $4	16.00
2 doors, 2 ft. 0 in. x 7 ft. 0 in. x 1⅜ in., $3.75	7.50
1 door, 2 ft. 6 in. x 7 ft. 0 in x 1⅜ in.	4.00
1 medicine case, complete	8.00
1 linen closet door	2.00
1 case in parlor	12.00
240 ft. casings, 12 ft. cypress 1,000 ft. casings, 12 ft. cypress } 3 cents For windows and doors	37.20
250 ft head casing cypress, 3c	7.50
250 ft. fillet cypress, ½c	1.25
270 ft. cap. mold cypress, 2c	5.40
270 ft. cap. cypress, 2c	5.40
560 ft. base cypress, 4c	12.40
560 ft. floor mold cypress, ¾c	4.20
560 ft base mold cypress, 1c	5.60
400 ft. picture mold cypress, 1½c	6.00
50 ft. plate rail 4 members cypress, 12c	6.00
62 lineal ft. beam ceiling cypress, 14c	8.68
2,000 ft. grounds, ½c	10.00
Cellar stairs	10.00
Side board	45.00
Cased opening north col. and pedestals	35.00
Case in passage	15.00
Mantel	40.00
Total mill work	$560.53

CARPENTER WORK.

7,926 ft. framing lumber, $10	$ 79.26
4,000 ft. sheathing, $10	40.00
24 M. shingles, $2.25	54.00
250 ft. ceiling	2.50
250 lineal ft. cornice, 12c	30.00
Setting frames	12.00
Porch work	20.00
1,850 ft. flooring	37.00
Smoothing 1,600 ft.	24.00
560 ft. inside base, 6c	33.60
400 ft. picture mold, 1½c	6.00
50 ft. plate rail, 10c	5.00
62 ft. beam ceiling, 15c	9.30
2,000 ft. grounds, ½c	10.00
Finishing 9 cellar window frames, $1.25	11.25
3 inside cellar doors	6.00
Cellar stairs	5.00
Front door	6.00
Vestibule door	5.00
Rear outside door	4.50
Double acting door	4.00
Cased opening, columns and pedestals	6.00
2 plain cased openings	4.00
20 windows, $2	40.00
12 doors, $3	36.00
Clothes chute	5.00
Passage case	5.00
Pantry work	8.00
Medicine case	2.00
Linen closet	3.00
3 closets, $1.50	4.50
Incidentals, 5 per cent	25.89
Total carpenter labor	$543.80

RECAPITULATION.

Excavating and masonry	$1,677.00
Lumber bill	575.12
Mill work	560.53
Carpenter labor	543.80
Hardware and nails	68.00
Tin work	42.00
Plastering, 720 yards, 27c	194.40
Plumbing	285.00
Electric wiring	45.00
Painting	200.00
Heating	310.00
Incidentals, 5 per cent	225.04
Total estimate	$4,725.89

EDITORIAL NOTES AND COMMENTS

That we want better, and more scientific workers in all our industries, goes without further argument.

* * *

Men and women properly trained, and made conversant with all the details of their various callings, make the best, the most useful and profitable citizens a country can possess, and form its greatest asset, besides being a nation's most formidable bulwark for the defence of her liberties, and the conservation of the welfare and happiness of the people.

* * *

Twelve or fifteen millions of dollars are expended by the government on the building and equipping a single Dreadnaught, whose life will not be more than ten or twelve years, while a hundred thousand valuable boys and girls whose services could have been rendered from ten to fifty percent more productive, during their present and future lives, had those millions been spent on them in giving them a thorough industrial, mchanical or agricultural training, at the proper period of their lives.

* * *

Battleships may be necessary—at times—trained mechanics, and expert agriculturists are necessary all the year round, and all the years in the cycle. An industrious community of expert workmen create more value than can ever grow out of a fleet of battleships, and the nation will be stronger and in a better position to ward off, and resist aggression, in any form, than if the country was encompassed by a line of steel fighting machines; and it is our opinion that if less money was spent in constructing these huge sea monsters, and a little more spent on building up and training the minds of the rising generation on lines leading to expertness and skill in manipulation and study of economy in the use of materials, in all sorts of structural work, the investment would produce overwhelming returns, and the cost of resource conservation, would be much less.

* * *

With some such object in view, Carroll S. Page, chairman of the committee on Cuban relations in the Senate, introduced a bill in the Senate on April last: "To co-operate with the States in encouraging instructions in agriculture, the trades and industries, and home economics in secondary schools, in maintaining instruction in these vocational subjects in state normal schools, in maintaining extension departments in state colleges of agriculture and mechanical arts, and to appropriate money and regulate its expenditure of one cent per capita per month by the National Government, which is the amount the bill calls for, if expended under the wise direction of properly organized authority, would do much to bring about results absolutely essential to the welfare of the great mass of boys—and girls also—of our land."

* * *

In a letter to the Editor of this journal, Mr. Page writes:

"The high schools, the academy and the college are taking excellent care of those boys who are financially able to avail themselves of their advantages, but it requires only superficial examination to show that the average boy, on arriving at the age when he must begin, because of lack of means, to be a bread-winner for the family, is neglected by the state and in far too many cases, following the lines of least resistance, drifts into a cheap manhood.

"That Germany is now outrunning us in the race for commercial supremacy is universally conceded. In my judgment, this is due in a large measure to the fact that when the German boy reaches the age of 12, 13, or 14, his characteristics, his physical equipment, the bent of his mind—his idiosyncracies, so to speak—are carefully ascertained and he is given the training which equips him for the life work which he decides to follow."

* * *

"Not so with the American youth of the great middle class, especially in our villages and cities. He is turned adrift, and the question presented to his mind is, not what will my future life work be? but rather, Where can I get a job that will furnish me the wherewith to buy my clothes and pay my entrance with my best girl to the moving picture show? If he can find a position as bootblack, newspaper vender, or messenger boy, he is content. In any event he follows the lines of least resistance and takes the work nearest at hand with little or no thought as to growing up into a well-rounded manhood. If he be a farm boy, he works along without specific training, and becomes another of that great number who secure from the soil only half the profits they should."

* * *

The adoption of this bill, or something similar to it, would certainly be of great benefit, not only to the young people of the country, but also to employers, business men, and every person who is compelled to earn a wage, employ or superintend labor of any kind. We have no adequate apprenticeship system for training skilled workmen, and our manual training schools—though doing excellent work as far as they go—are neither numerous or efficient enough to supply the demand for competent mechanics. In consequence of all this, the country is filled with incompetent men and advancement and progress are retarded and business enterprises handicapped, and the nation suffers to a much greater extent than dollars and cents can illustrate. Mr. Page's bill makes provision for state assistance in connection with the Federal grant, thus throwing a part of the cost of maintenance on the states, which seems to us the proper thing to do. It is to be hoped, our legislators in their combined wisdom, will see the way clear to make a law of this proposition.

* * *

Misery loves company, for which reason friends of the National Gallery of Great Britain are introducing Westminster Cathedral whenever derogatory remarks are made about the home of England's great painters or architects. Because of the little meaningless cupolas on the National Gallery, it is profanely known as the "cruet stand." The $1,500,000 Catholic Cathedral at Westminster, the construction of which was finished a year or so ago, is now known as "the factory."

It cannot be associated with the Singer building or the Metropolitan because its tower, while the most lofty in London, is a dwarf compared with either of the New York towers. Considered architecturally it is held by some to be a monstrosity. Its merits are not added to by the fantastic brickwork.

To support its 165 foot roof, the builders had to put in such massive oblong pillars that not nearly one-half of the congregation when the church is filled, can see the altar. The other day the Catholic officials from over seas attended a state ceremony in the great place. The result was a huge attendance. Only those in the middle aisle could see. Those in the great side aisles and in the balconies were barred by the pillars. Such is the result of strained art.

WANTED, A RUST PROOF METAL

MANY carpenters' tools that were formerly made almost exclusively of wood are now made of metal. Take plane stocks, for example, and in the old days these were made of wood in a great variety of sizes all the way from short smoothers up to the mammoth jointers 30 and 40 inches long and often each workman made his own planes and trued them up occasionally. Today many of these plane bodies are made of metal which insures their remaining true on the face and not warping, and also there has been attached to them many conveniences for adjusting the bits and they are a decided improvement on the old time plan.

The same thing is true with a number of other tools. There is more metal and less wood in tools, which contributes to stability and durability and yet there is one general complaint, and that is these metal tools and tool bodies rust easily. If one is left on a damp piece of board or is caught out in the rain or has been handled by perspiring hands and is laid up for a day or two it is discolored and rusted. Or, if out on a job and there comes a shower of rain and blows into the tool shed there is sure to follow a lot of rusty tools and a big job of cleaning and drying and polishing over with oil. What we need and what some inventor ought to get busy on is a metal for tools and tool bodies that is rust-proof. We cover wood with paint to prevent the weather affecting it and some parts of metal can be covered with a paint or enamel to protect it in the same way, but the parts being used cannot be so covered because the covering material would wear off. So, what we need to solve this problem is a metal or composition that will resist the moisture of the elements, which cause rusting of ordinary tools. Maybe we already have such metals if we would but work them into tools and maybe it would be necessary to get something entirely new. Anyway, what is wanted to put the modern tools in still a higher class is a rust-proof metal in the make-up that will retain its shape and resist the moisture and other elements tools are ordinarily exposed to.

CALIFORNIA'S MODERN MISSION BUILDINGS

By HORACE F. STOLL (Continued from August.)



STATUE OF FATHER JUNIPERA SERRA, FOUNDER OF THE MISSIONS, GOLDEN GATE PARK, SAN FRANCISCO.

There is scarcely a city of importance on the Pacific coast that does not boast of a mission schoolhouse. In fact, California has advanced as rapidly as any state in the Union in the development of the modern public school building. It was but a few years ago when the badly arranged and poorly lighted and heated school building was the rule, now it is the exception. The large rooms, spacious passage ways, open promenades, and low buildings insure safety for the pupils and teachers.

At San Jose, the center of the beautiful Santa Clara Valley, in Central California, I had an opportunity to inspect the San Jose Mission High School, which is the first California high school building constructed on the university plan. It consists of five separate and distinct buildings so grouped and connected as to form one general whole. The administration building, with its massive towers, is the central feature, on either side are the classical and science buildings and at the rear are the domestic science and manual arts building. They are all of the same type of mission architecture with rough cement plaster exteriors and red tile roofs and are connected by three cloisters. The entrance to the patio is through a mission wall, the reinforced concrete posts of which are replicas of the large towers in the main structure.

In a few weeks the Mission State Normal School, which is also an ornament to San Jose, will be ready for occupancy. It enjoys the distinction of being the largest reinforced concrete school building, in ground area, in the world. It covers a site 246 by 472 feet and with the exception of the tower in the center, is two stories high.



CARNEGIE LIBRARY, ST. HELENA, CALIFORNIA.

The school is built in the shape of a rectangle, broken up slightly by pavilions and buttresses and is absolutely monolithic. The concrete was poured by gravity from three high towers, 43,840 sacks of cement being used in a mixture of one to six (three parts river gravel and three parts crushed stone. It might be interesting to add that the reinforcement used amounted to something over 200 tons besides 116,000 feet of wire fabric. More than 1,300,000 feet of lumber were needed. This includes the cribbing, forms and interior finish. Forms were required for about 265,000 square feet of concrete. The exterior of the rough walls are covered with a pebble dash of white Portland cement. The interior of the corridors is treated stipple finish, while the interior of the building has the hard wall sand finish.

There are thirty-eight large classrooms, the average size being 24 by 32 feet. Open arcades on the center quadrangle afford comfortable passage from one classroom to another. The library is the largest room in the building and is a gem in itself. It is two stories high, 60 by 97 feet, and void of columns which obstruct valuable space and light. The ceiling is done in ornamental plaster, with panels of Corinthian pilasters in staff and stucco. There are accommodations for 40,000 volumes, the equipment including 22 double steel stacks, each one 14 feet long. There is also room for 44 reading tables.

I give these details to show the innovations introduced in California's new educational institutions. The San Jose Normal School, by the way, was erected at a total cost to the state of $272,000, or a little less than 16½ cents per cubic foot. It is one of the best bargains California has ever made.

At the Leland Stanford, Jr., University, at Palo Alto, the old mission architecture has been reproduced on an imposing scale. Gathered about a court 528 feet by 246 feet, enclosing an area of



SANTA FE STATION, OAKLAND, CALIFORNIA.

three and one-quarter acres, are the twelve buildings of the inner quadrangle. They are connected by a continuous one-story open arcade, facing the court, that reminds one of several of the missions in Southern California. The soft buff sandstone, the great expanse of red tile seen through the wide arcades, the simple but graceful arches, the wealth of tropical foliage, distant glimpses of trees and foothills and mountains—all give one an impression of peace and academic seclusion and make one feel that the adoption of the mission architecture at Stanford University was a happy inspiration.

And writing about colleges reminds one of the novel mission campanila at Mills College, California's foremost girls' seminary. It was presented some years ago by Mr. and Mrs. F. H. Smith, and cost in the neighborhood of $10,000. The clock tower and belfry combined, built of reinforced concrete, stands in the midst of venerable oaks, towering eucalyptii and flowering shrubbery. The ten bells were chimed at the World's Fair in Chicago and were brought to the Midwinter Fair in San Francisco, after which they were purchased by Mr. David Hewes and presented to the college.

Over at Idora Park, Oakland's great children's playground, is a characteristic mission wall or parapet that has attracted much attention. It is constructed partly of solid concrete and partly of

wood, metal lath and plaster. At the corners are miniature towers and at set intervals between, alternate openings filled with artistic ironwork and big piers mounted with wooden crossbeams covered with rambling vines that also festoon the wall.

Until the great conflagration of April, 1906, San Francisco fought shy of the mission type of architecture. It is possible that if their Mission Dolores were as imposing structurally as some of the missions in the South, California's metropolis might have been sooner inspired to imitate its principal features. I was surprised to find the mission's walls snowy white. This was due to a liberal coat of whitewash recently administered, but I was assured that the elements, in a few months, will undo the good work of the fathers, who have endeavored to make the mission as comfortable and attractive as possible, pending the construction of another imposing edifice on the corner.

The cathedral, which overshadowed the modest mission founded by the padres in 1776, was so badly shaken by the earthquake that it had to be torn down. Its removal has added tremendously to the dignity and impressiveness of the staunch little church whose



ST. MARK'S PROTESTANT EPISCOPAL CHURCH, BERKELEY, CALIFORNIA.

cross rises white against the blue sky. The mission did not entirely escape injury. Cracks were made in the walls and those left from previous earthquakes were widened. Several of the roof trusses, tied together with rawhide, were torn apart. The tiles were all displaced and many of them thrown to the ground and broken. In the interior, pilasters were thrown down and portions of the wall fell in. But the interior has been practically restored and before long the unsightly shingles on the roof and the wooden walls that protect the abode from the elements in the rear will be replaced with tiles and concrete.

A few blocks from the mission is a very striking little one-story mission block, with a miniature tower at the corner. The rough gray walls, bright white woodwork and warm red tiles made such a pretty color combination that I stopped to examine it more closely. Finding the corner division was given up to a saloon, fitted in mission style, I could not help picturing the look of righteous indignation that would have distorted the face of some pious old mission architect if, in his ramblings, he had stumbled on this enticing resort. It seemed almost sacrilegious to have a saloon in such a prim, sanctimonious looking building, and yet I came to the conclusion that since there must be places where one can quench his thirst, they might as well be artistic.

ROOFING BY THE STEEL SQUARE—No. 4

THE HIPPED ROOF

WHAT may be called roofing proper is the next stage of the work, the style of the roof shown in the article being hipped at each corner. This requires, in addition to the common rafters already dealt with, the "hips" or diagonals, and the shorter "jack" rafters, "strutters," or "cripples," which fit to the hips. What a hipped roof really is can be seen from the two photographs, Figs. 18 and 19; the one showing the elevation from

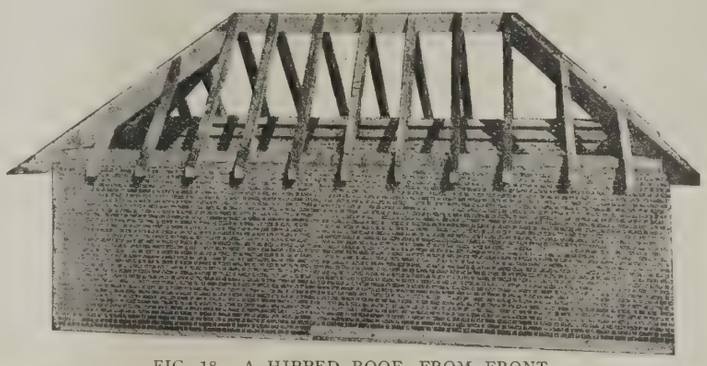


FIG. 18. A HIPPED ROOF, FROM FRONT.

the front, and the other the elevation from a corner point of view. Fig. 20 shows the actual working elevation, and Fig. 21 the plan of the complete roof.

An ordinary hipped roof is always shortened at each end equal to half the width of the building, less half the thickness of the ridge, so that the rafter which rests against the end of the ridge, at the top, and which is sometimes (and in the writer's opinion rightly so) called the "jack" rafter, comes the same length as the ordinary rafters. This rule may be departed from in some cases, but it is only to suit special conditions, which may at the present time be left out of calculation.

As an object lesson, consider the present roof to be 21 feet wide and to be of square pitch. The rafters will thus have 10½ feet rise, and the correct length for these will be found by going upwards in steps as shown in Fig. 22, with each part of the square at the 10½-inch mark, level with the back of the rafter. Twelve of these steps, as shown, will then take us up to the required height, and the hypotenuse of the twelve triangles will give the length of the rafter from the backing to the point of the top. The backing is the point at *A* (Fig. 23); any length below this must be added as required. The successive positions of the square in measuring up the rafter are shown in Fig. 24, and, of course, to assist in getting these accurate, the gauge shown in a previous article may be used.

To obtain the length of the hip required, make a drawing as Fig. 25, on which the outside line of the plates is *B*, the ridge line

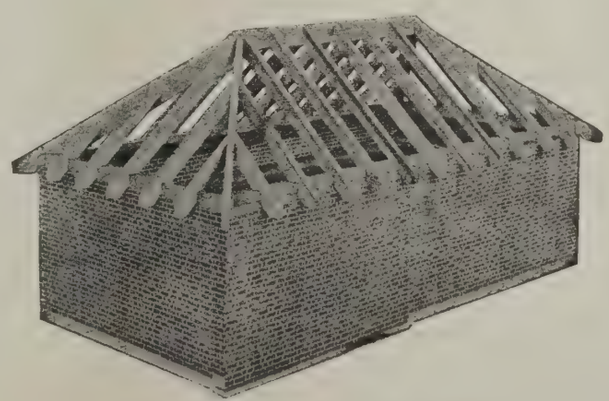
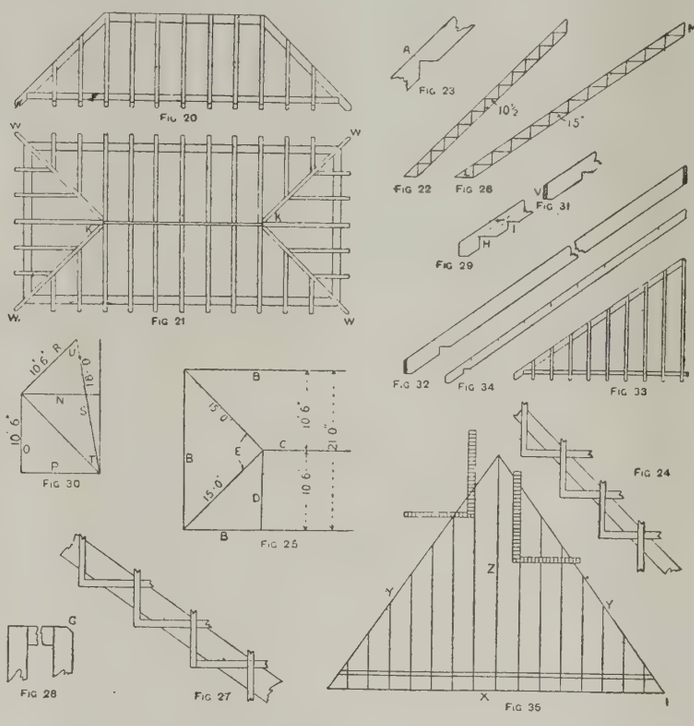


FIG. 19. A HIPPED ROOF, FROM CORNER.

C, the outside common rafter *D*, and the line of the hips *E*, all in plan, but correct to scale. On measuring along the line *E*, it will be found that this is 15 feet; thus is obtained the length of the hips in the same way as was that of the rafters, only instead of holding the square to the 10½-inch mark on both parts, the one must be to the 15-inch mark, as in Fig. 26, and as shown larger in Fig. 27.

This is correct in theory, but not in practice, as scantlings are

being dealt with instead of lines, and we must make allowance for the thickness of the timber. First as to the bottom end of the hip, the length given, or rather obtained above, is from the extreme corner, as Fig. 28, but as the corner must be cut off to obtain a seating for the hip, as at *G*, an allowance of an inch must be made for this. Owing to the hip when fixed having to stand diagonally with the other rafters, the backing will need to be practically half as deep again. The inch left on at *H* (Fig. 29) will increase the backing as nearly correct as it can be got in this small scale, making it as at *I*. At the top end of the hip these lines really go to the center of the ridge, but as the hips have to be fitted to each side of a rafter, as *K* (Fig. 21), the length must be reduced by an inch here, which will make it correct.



The horizontal and vertical numbers of the square as held in finding the length of the hip will also give the correct angles, respectively, thus *L* (Fig. 26) will fit on top of the plate, and *M* will fit to the rafters at the top.

Another way of obtaining length and bevels is given in Fig. 30, where the lines *N*, *O* and *P* represent the side and end plates, and ridge, respectively, the diagonal being the line of hip. At right angles to the latter line *R* is made, and at the distance equal to the rise of the roof, another diagonal *S* is drawn, which will give the length of the hip from backing to ridge, and the angle at *T* will rest on the plate, *U* fitting the rafters at the top, or in other words, *T* is the angle for the horizontal, and *U* for the vertical cuts.

The top end of the hip rafter will have to be cut to a point, to fit into the angle, and the two sides of this point must form a right angle one with the other when cut. It does not follow, however, that two cuts at an angle of 45 degrees are correct, as this is only so in a horizontal plane, the angles from the back of the hip varying with the pitch of the roof, and the method of getting these correctly will be given later on.

So far the hip from the backing upwards has been dealt with, but the diagonal position of the hip also affects the length of the foot, in the case of a square pitch the same as the one under consideration at present, the difference being in the proportion of two to one. That is, if the foot of the common rafter runs down 6 inches from the backing to the extreme point, the hip will run down 9 inches, and the vertical cut at the foot (*V*, Fig. 31) must be made to the same angles as the top, so as to line with the rafters on each side of the roof, as at *W* (Fig. 21).

In setting out for the jack rafters (or strutters) these may either be made even along the plates, as shown in Fig. 21, or they may be made to come evenly at the feet, as Fig. 33, or the medium may be struck, and the shortest allowed to come slightly further away from the hip. From the utility point of view it is immaterial, but for appearance the even spacing of the feet is the best, and to set these out, the distance from the middle rafter to the hip at the extreme point must be taken and divided up so that the number of spaces is known. The hip can then be divided up into the same number of spaces as in Fig. 34. Then on making a drawing to scale of the hip part of the roof, as Fig. 35, the length that each short rafter must be less than the common rafters will be found by applying the square as on the left of the drawing, and the angle of the top cut by applying the square as on the right, the hypothenuse giving the correct cut, which, as shown, cuts the two parts of the square at 23 inches and 16 inches, respectively. The down cuts, as well as the feet of these rafters, will be the same as on the common rafters.

The lines in Fig. 35 show the centers of the rafters when making the drawing to obtain the angles from. They should be on a comparatively large scale, and two lines giving the thickness of the rafters should be made. It is most convenient to work from the longest side, that is, the side towards the central rafter.

In Fig. 35, the line *X* shows the feet of the rafters, *Y* the length of the hip and *Z* the length of the common rafters.

SUDDEN RISE IN POPULARITY OF CYPRESS

INTERESTING FACTS ABOUT "THE WOOD ETERNAL".

Historians claim the early abodes of man were in the rock caves in the hills. It may be. Certain it is that architecturally stone and brick have left many interesting ruins, long since unfit for habitation. At the present time the great majority of people are living in frame houses, and even in the remainder wood plays a very important part as floors, trim, furniture, etc.

Among the qualities found in wood which render it particularly adaptable for its use as above, are first, its general distribution, being found practically wherever man can live; second, the ease with which it can be fashioned to suit our needs; third, its strength and stiffness, compared to weight, making a lasting product. Other qualities more or less modify the above and only emphasize its use by civilized man.

In many positions and for many uses the permanence of wood is of small consideration, as even the softest woods last a long time and stand considerable wear and tear before giving out. Frame buildings several hundred years old are standing today, the wood being practically as good as new. There are also buildings only a few years old which already show signs of decay. Proper protection from the weather and dampness, with proper ventilation, will add years to the life of any wood, while there are other woods which seem to be proof against decay and the attacks of insects, worms and other parasites.

Where each country and state has been so favored with timber growth, it is but natural that each should use the material nearest to hand. It is possible to find black walnut, now almost priceless on account of its scarcity, used for framing in the older houses in Indiana and Illinois. Oak, too, has been used for sills, girders, etc., on account of its local prevalence. White pine has been universally used through the northern states until the extent of the cutover land has given the general public the erroneous idea that practically little remains available. Fortunately there are yet untouched such immense forests of this fine wood that a century to come can be supplied at the present rate of consumption.

It is a curious fact that not in all cases is the most desirable or appropriate wood used. In many instances it is a case of using the kind and quality nearest the job, or which could be obtained at the lowest price. The average consumer does not specify the kind of wood with anywhere near the same discrimination he applies to other things. This, of course, is mainly due to popular ignorance of the distinctive qualities of different species.

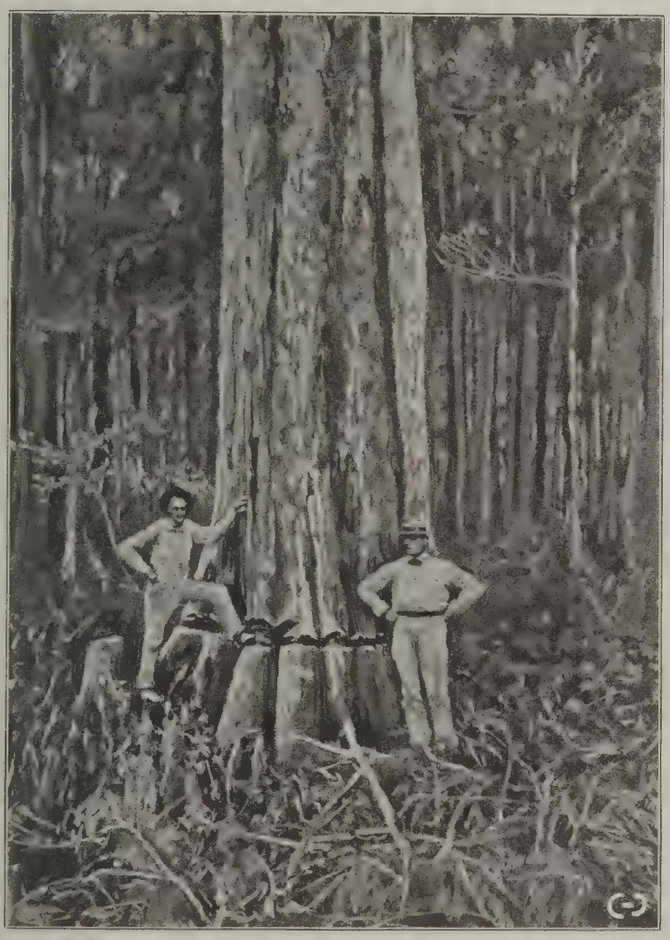
But it is not always enough that wood be convenient or merely of ample strength and durability. For the finer finish a beautiful grain must be present, or color, or perhaps an enameled surface is desired, as for a colonial interior or a bathroom. Here a wood must be selected without so much regard for mere cost or proximity. It must meet these higher conditions.

One of the woods which meets all-around requirements to a

remarkable extent is cypress. In the United States there are some seven recognized varieties, of which only one, "bald cypress," is of great commercial importance. This wood varies somewhat in different localities, being known as red, white, yellow and black cypress. Its growth is very slow, but the trees attain considerable size, sometimes a diameter of ten feet, with a height of one hundred and fifty feet, although the usual run is from three to six feet in diameter. The older trees are estimated to be at least 2,500 years old, so that the replacement by new growth is a slow process and does not keep up with the cut. The average cypress tree of commercial size will show an age of 500 years.

Of the peculiar decay-defying character of cypress the United States Forest Service (Bulletin 95), says: "Many instances of use exceeding a century are cited to show its lasting qualities. This is not only true when used as roofs, but for other purposes." The same document refers to several cypress roofs in New England on record as having given actual service for 250, 228 and other long terms of years, "one at Clifton, Staten Island, had 200 years to its credit when last reported, and was still in use."

"Cypress is put to almost every use as an interior trim for houses. It may be finished in natural color or stained. The wood contains little resin, and thus affords a good surface for paint, which it holds well. It is much used for door frames, window frames, transoms, ceilings, wainscoting, panels, doors, sash, balusters, inside blinds, brackets, newel posts, grilles, mantels and to some extent for flooring. It is a popular wood for kitchens, where it is subjected to dampness and heat. It shrinks, swells, or warps but little, and is used for drainboards, sinks, kitchen and pantry tables, cupboards and kitchen cabinets. For the same reason it is used for breadboards and wooden implements about the pantry, ironing boards, and clothes driers."



CYPRESS TREES ARE 75 TO 140 FEET HIGH, 3 TO 6 FEET IN DIAMETER AND AVERAGE 500 YEARS OLD WHEN CUT FOR LUMBER.

"For the parts of houses exposed to the weather it serves equally well. As siding it practically wears out before it decays. When made into porch and portico columns it retains its shape, holds paint, and has sufficient strength to sustain necessary loads. It is placed as cornice, gutters, outside blinds, pilasters, and railing and is much used for porch floors and steps."

The growth of cypress is largely confined to swamp and low lands of the states of the South from Maryland to Texas. Possibly no class of lumber is harder to get at, cut and get to the mill. Where railroads are not possible, it is customary to dredge elaborate canals through the swamps, to which the logs are drawn by engines and cables, and through which they are floated to the mills. The illustration will give an idea of the labor of constructing such a channel, it being frequently necessary to remove sunken logs with dynamite. Many of the canals are forty feet wide and ten feet deep, with fleets of tugs or "tow-boats."

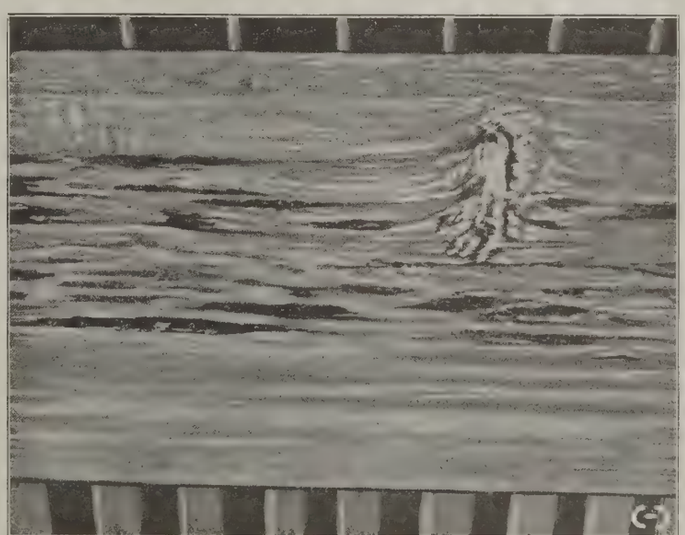
Cypress is practically immune to the ordinary diseases and insects which attack timber, but it has one which is seldom found in other woods. Some trees show that they have been attacked by a sort of fungus which fills the wood with small holes or spots, the appearance being that shown in the illustration. Wood so affected is called "pecky cypress" and it is claimed that in spite of its looks wood so affected will outlast even the famous heart cypress which is known as "the wood eternal." Logs buried many feet in the swamp show the marks of having had this disease and are in good condition, although their age is estimated at 30,000 years.



CANALS ARE BUILT AT ENORMOUS EXPENSE THROUGH THE SWAMPS. THEY MUST BE LARGE ENOUGH TO ACCOMMODATE TUGS AND BARGES.

"Pecky" cypress, the "vaccinated wood," while of course not so strong as perfect cypress, is used by railroads for ties, posts, foundation timbers, fencing, etc., and shows remarkable durability.

The interesting fact about "pecky" cypress is that the fungus which attacked it untold years ago evidently failed to make headway as on other species of trees and died soon after starting, being defeated by the presence of a peculiar oily quality—which scientists have named cypressene. It has no parallel and to it is thought must be due the historic long life of cypress wood under even the worst of rot-influences.



PECKY CYPRESS IS NOT AS HANDSOME A WOOD AS THE HEART CYPRESS, BUT IT IS VERY DURABLE.

PERFORMANCE OF BUILDING CONTRACTS By W. J. STANTON

(Continued from August.)

WHERE a building contract requires the use of hard bricks in the construction of the walls of a building, the use of a considerable quantity of soft bricks is not a substantial compliance with the contract. So, also, where the contract required the use of Yankton cement which cost $3.40 per barrel, while Milwaukee and Louisville cement at a considerable less cost was used, and two hundred barrels were required, the foundation wall did not taper up six feet from a three-foot width at the bottom to sixteen inches at the top but was blocked into a sixteen-inch wall two feet from the bottom at a saving of six thousand bricks to the contractors, the plate glass was not free from sand holes, and the rear and party walls were not built of selected brick as to color—the contract was held not to have been substantially performed. Where the contract requires the contractor to make a "water-tight" cellar by pursuing a certain method, the making of a "water-drained" cellar is not a substantial performance. Likewise where a contract required a foundation to be laid according to the usual building regulations and a cesspool to be constructed in a certain manner and cemented throughout, but the contractor failed to do so and failed to make the cesspool water-tight, in consequence of which the owner was required by the city officers to make it water-tight, is not a substantial performance of the contract.

Where the contract required the installation of screens and hardware made of bronze wire and doors fitted with Laramie checks, it is not a substantial compliance to use "bronzed" steel wire, which is worth only one-fifth as much as bronze wire, and merely bronzed hardware and no Laramie checks. Where the contract for the construction of a creamery required the building to have a one-third pitch to the roof, but it had a pitch of four inches less, which was, however, capable of shedding the rain; a large part of the shingles used were of inferior grade and so laid as to leave holes in the roof; and the siding used was unsound and split—the defects were held to be such as not to amount to a substantial performance, even though they could be remedied for one-fifth of the entire cost of the creamery when fully equipped.

The failure of a contractor to put three coats of plaster on a clothes closet wall according to the terms of his contract, will not, as a matter of law, defeat recovery by the contractor. Where the contract requires the buildings to be plastered and a certain chimney flue to be constructed, the failure to plaster a large room in the basement and to build the flue which was to be constructed constitutes a failure to substantially perform the contract. Where the contract for the decoration of a store room required the contractor to cover wood partitions with canvas to make a suitable surface to work on, and that the materials used should be first-class and the work done in a workmanlike manner, the fact that no suitable surface was made on the wood partition will not preclude a recovery on the basis of a substantial performance, where the contract was otherwise properly performed.

Where under a contract to repair an old house and build an addition to it no part of the second coat of paint upon the new part had been put on, two doors were not hung, no lock or fastenings on the front door and windows, and the workbench of the carpenters and paint which was to be used were still in the house, it was held that there was no such substantial performance as would allow a recovery after the destruction of the house by fire. Under a contract for the painting, varnishing and graining of certain buildings, the fact that some small places in the buildings were not properly grained and finished, the cost of which would not exceed five dollars, was held not to prevent the contractor from claiming a substantial performance.

The fact that some brick work was unfinished and the debris was not removed from some of the floors, the total cost of doing which would not exceed three dollars, will not prevent a recovery. A contract to perform the mason work on a building is substantially performed even though the cellar has not been cleaned and the rubbish removed. A contract to construct a barn cannot be said, as a matter of law not to have been substantially performed because the large doors have not been hung. A contract to furnish the galvanized work and tin roofing of a freight shed, together with two gangway openings, is substantially performed where the two openings were omitted through a mistake and the cost of making them did not exceed $35. Where a contractor intentionally failed to trowel-strike the brick walls of a building, used brickbats in the inner and outer tiers of walls, left holes in the walls by mortar falling out and the improper setting of the bricks, and used an inferior quality of brick in the structure, the defects are of such a serious nature that the contract is not substantially performed.

The rule of substantial performance does not apply where the variations from the terms of the contract are so substantial that an allowance out of the contract price for damages would not give the owner substantially what he contracted for. In many cases in determining whether or not the contract has been substantially performed, a controlling importance has been given to the cost of remedying the omissions, defects and deviations as compared to the contract price of the whole work in preference to a consideration of the character of them. Thus, where the contract price was $3,400 and the cost of completing the contract was $267, it was held there was no substantial performance. Where the contract price was $3,000 there was no substantial compliance where it would cost $350 to complete the building according to contract.

Where the contract price was $2,100 but the omissions on the part of the contractor amounted to ten per cent of the contract price it was held insufficient to show a substantial performance. A failure to finish work to the extent of one-seventh of the contract price has been held not to be a substantial performance.

It has been held a substantial performance where the contract price was $21,700 and the omissions were furnished at a cost of $154. A similar conclusion was held where the contract price was $17,393 and the omissions could be remedied for $317. So, also, where the contract price of a building was $48,700 and the value of the unfinished work was $2,274 the contract was held to be substantially performed. A contract calling for $800 has been held substantially performed where the cost of remedying the defects did not cost to exceed $75. The same conclusion was reached where the contract price was $390 and the omissions and defects did not amount to more than $14.

Where a building was to be completed by a specified day or render the contractor liable to certain penalties, it was held substantially completed where all that remained to be performed was the removal of the external rubbish, the remedying of a slight defect in the cellar, and a few other minor defects caused by the weather conditions.

The Supreme Court of Massachusetts hold that under the statute stating the allegation required in a mechanic's lien statement, it is not necessary, in a statement for a lien based on a contract to perform labor without materials, for a specified price, that the number of days consumed in performing the work should be stated.

A lumber company sold material for the erection of improvements upon real estate, furnishing items from time to time as desired until August 17th. On January 31st it tried to collect its bill, and failing to do so took security for its payment. The next day it sold two cans of paint and a brush to its debtor, and added its price to the bill, and sought to maintain thereon a material man's lien. Under these facts the Supreme Court of Kansas held that parties could not by such subterfuge increase the time for filing a statement of lien beyond the four months prescribed by statute.

The owner of land contracted for the construction of a building for $4,600, payable one-third when the concrete walls were finished to the roof and the door and window frames set in the wall, one-third when the roof was completed and the framework for the inside partitions and the joists and flooring installed, and the balance within 20 days after the house was finished and accepted. Thereafter the contractor for a discount of $200 in the price obtained a modification of the contract which was not filed, by which payments were made weekly as the work progressed, covered by bills for labor and materials and subcontracts. The Court of Errors and Appeals of New Jersey held that such subsequent agreement constituted a material modification of the contract, and that having been filed with the county clerk in pursuance to statute, a materialman, having furnished a greater part of materials after the contract was modified, was entitled to a lien therefor.

The Court of Appeals of Maryland holds that a city employing a contractor to perform a lawful work under its supervision or employing an independent contractor is liable for the negligence of the contractor in the performance of his work, and that a city making excavations in its streets must exercise due care to protect water and gas pipes, telephone and telegraph conduits and other agencies in the streets, and in protecting the life and property of abutting residents.

LEAVES FROM A STUDENT'S NOTEBOOK—No. 4

By GEO. METSON

NOTES ON COLUMNS AND STANCHIONS

OF cast iron columns, those circular in shape are the most common in use and the most economical in metal, and they also have the great advantage of having no angles to weaken them. The section shown in Figs. 2 and 3 are also commonly in use. In these it will be noticed that the angles are rounded. This is important as regards the internal angles, as in cooling, the crystals set at right angles to the enclosing lines of section, so that square angles would be a great source of weakness. Another point in designing in cast iron is that any increase in thickness of the metal must be made gradually. In order to test the trueness of the thickness of metal of a column as in Fig. 1, holes must be drilled. Differences in thickness of metal in columns of the shapes as Figs. 2 and 3 are noticeable to the eye, and can be measured with calipers.

Mouldings form a weakness, and are best added as separate castings as in Fig. 4, but small neckings are not so objectionable. Cast iron columns are now practically only used on account of the architectural treatment to which they lend themselves, small steel stanchions having to a very large extent supplanted them.

In order to spread the load over a larger foundation area separate base plates are used; these are shown in Fig. 5. Fig. 6 shows a method of carrying the ends of joists on cast iron columns.

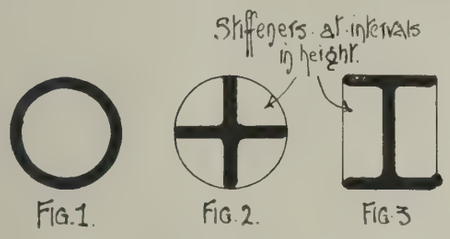


FIG. 1. FIG. 2. FIG. 3

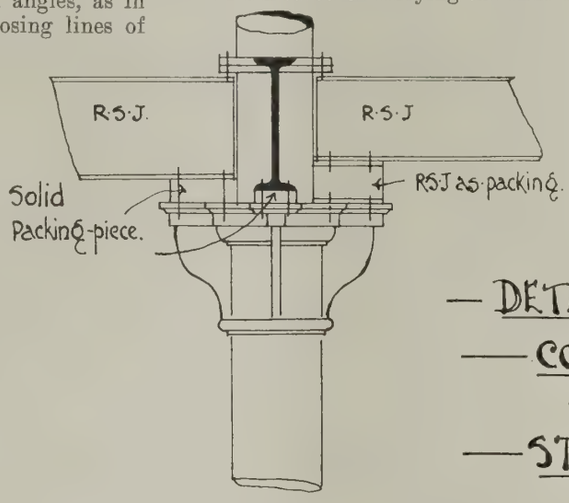


FIG. 6.

— DETAILS OF —
— COLUMNS —
— AND —
— STANCHIONS. —

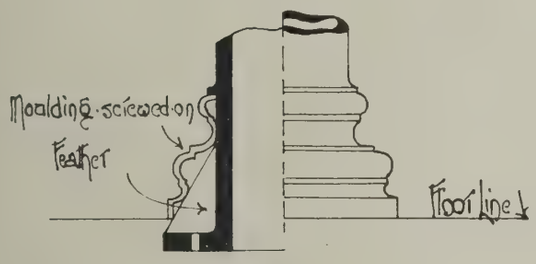
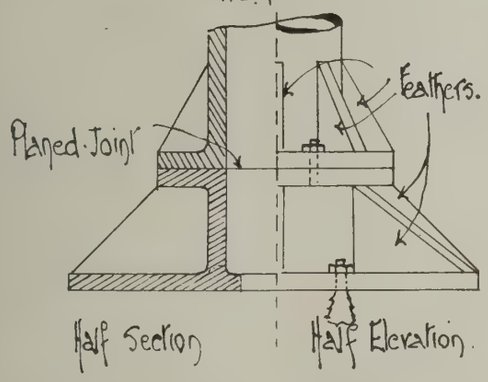
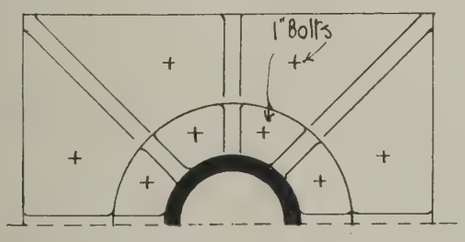


FIG. 4.





Half Plan of Column Base showing separate Base Casting.

FIG. 5

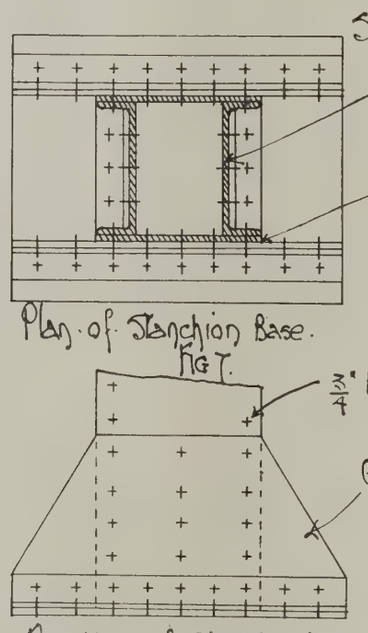


FIG. 8.

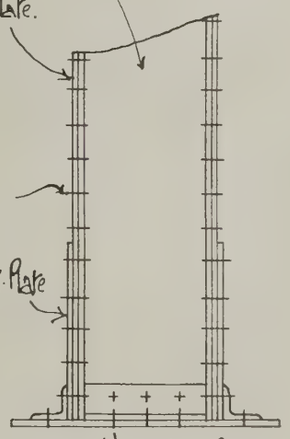


FIG. 9.

NOTE

¾" Rivets used throughout: those next stone to be countersunk.

Here can be seen the weakness of cast iron for columns as the flaw (if any) in the metal may be in the lug, and it is impossible to detect it, but cast iron has this advantage over steel for stanchions, although it be best to protect both from fire, yet it is not so important with the former as with the latter, as though under great heat it might crack, yet it would probably continue to support its load, whereas the steel stanchion would buckle, bend or entirely fail under such great heat.

Figs. 7 to 9 show details of steel stanchions, some of which call for special explanation.

Proceeding to design, let it be required to design a cast iron column to be 12 feet high, having to support a dead load of 42 tons. The following notes must first be given.

A column should never exceed in height thirty times its diameter. The diameter should be from 1-10 to 1-25 of the height. The thickness of the metal should be about 1-12 of the diameter.

The factor of safety (f. s.), used should vary with the length of the columns, taking 4½ as a f. s. for a column of height of 10 diameter and adding ½ for every additional 10 diameters, or part of 10 diameters; thus for a column of 20 diameters high use a f. s. of 5; for one of 30 diameters high use a f. s. of 5½. The columns to be perfectly fixed at the ends. Columns with large caps and bases are taken as having securely fixed ends.

The formula most commonly in use for columns, stanchions and pillars is Gordon's, which gives the approximate load in tons per square inch. It must be understood the solution only gives an approximate result. For truer results it is necessary to take into account the radii of gyrations, but this will be explained and examples worked out in a later paper.

Having found the breaking weight by the formula, a factor of safety (f. s.) must be used to ascertain the safe load.

Returning to the example to be worked, then our assumed diameter is 8 inches and the thickness of metal should therefore be 2/3 inches then

$$\frac{F\,A}{1+C\left(\frac{1}{d}\right)^2}=\frac{36\times(7\frac{1}{3}\times 3\frac{1}{7}\times \frac{2}{3})}{1+\frac{1}{800}\left(\frac{144}{8}\right)^2}=\frac{\frac{3872}{7}}{\frac{281}{200}}=394 \text{ tons nearly}$$

and using a factor of safety of 5 the safe load = 395-5 — 78 4-5 tons, which is on the right side of the 72 required and sufficiently near enough for all practical purposes.

The student must not be disappointed if his first attempt of assumed diameter and thickness of metal is out altogether as there is no certain way of obtaining the correct size—it must be done by means of "trial and error." Experience will of course aid him in assuming the diameter, etc.

Let it now be assumed it is required to design a steel stanchion of the same height to carry the same load, then, assuming H section

$$\frac{F\,A}{1+C\left(\frac{1}{d}\right)^2}=\frac{24}{1+\frac{1}{2000}\left(\frac{144}{8}\right)^2}=\frac{12000}{581}=21 \text{ tons nearly}$$

and using a factor of safety of 5 = a safe load of 21-5 or 4 1-5 tons per square inch, so that in one case $\frac{72}{4\,1\text{-}5}$ or 17.14 square inches of section will be required and a 9 inches x 7 inches x 58 lbs. will meet the requirements, its sectional area being 17.06 square inches.

The architect or the draughtsman would have turned up to Steel Merchants book of sections and tables and not have calculated, but the student should know how to arrive at the area of metal required.

It is always best to use stock sections. In built up stanchions, the space the stanchion has to occupy and the fancy of the designer will affect the design.

The same formula will answer for wooden pillars, the value of "C" being taken as $\frac{1}{250}$ and that of F as 2½ tons for good fir or deal and 3 for oak, but with wooden pillars the factor of safety employed should be 10.

Gordon's formula:

$$\text{Ultimate load in tons} = \frac{F\,A}{1+C\left(\frac{1}{d}\right)^2} : \text{ where}$$

F = ultimate resistance of metal, tons per square inch.
A = sectional area of metals.
C = a constant found by experiment, depending on the material and section used.
l = length of column in inches.
d = diameter or least width in inches.

Material.	Section of Column or Stanchion.	F	C
Cast iron	Solid round	36	$\frac{1}{400}$
Cast iron	Hollow round	36	$\frac{1}{800}$
Steel	Solid round	24	$\frac{1}{2250}$
Steel	Hollow round	24	$\frac{1}{3500}$
Steel	Solid Rectangular	24	$\frac{1}{3000}$
Steel	Hollow Rectangular	24	$\frac{1}{5000}$
Steel	L, T and +	24	$\frac{1}{5000}$
Steel	I and H	24	$\frac{1}{2000}$
Steel	Box or Compound	24	$\frac{1}{2250}$

THE ROCHESTER COLONIAL HOUSE

By WM. J. DUNN

For this home, lines of the old New England Colonial house are closely followed, and it is best adapted for a large or corner lot. Its construction is neither expensive nor showy, but hospitality speaks from every corner.

The foundation is built of cement blocks with tapestry brick facings above grade. The superstructure is of wood, while the exterior frame work is covered with matched sheathing, building paper and shingles laid seven inches to the weather. The shingles are stained a silver gray color while the trimmings are painted pure white. Blinds may be added and should be painted an apple green to get the best effect with present color scheme.

The entrance is on the side and for it the architect used for his prototype the old "Salem Stoop." Its charm lies in the beautiful design of the door and facings, while the trellis built at either side of the entrance with openings for two small windows, carries out the Colonial effect so eagerly sought.

The arrangement of the porch columns and the lattice work, while unique in design, is purely Colonial and forms an important decorative feature. The porch is private and can only be reached by two large French windows opening from living room. This is an ideal feature in a way. Both stoop and porch have red Welsh tile floors. Entering the reception hall, one is immediately impressed with the beauty of the staircase, with its broad landings of plain but simple design. The stair risers and spindles under the handrail are white enameled—a pleasing contrast to the other woodwork of red brick stained mahogany. The walls of the hall are covered with a tapestry wall paper of foliage design in brown and green. Here, as throughout the house, the curtains and draperies are chosen for Colonial effect.

To the right of the hall is the living room, extending the entire width of the house. It has a two-tone, green striped paper and is trimmed with mahoganized birch rubbed to an egg shell gloss. The fireplace has red brick facings and red Welsh tile hearth, both the brick and tile being laid with wide joints in white mortar. The mantel is also of mahoganized birch, designed in a simple manner. A built-in bookcase is at one side of the fireplace and at the other is a window seat with a low radiator concealed underneath French windows, open from the living room to the porch.

Simplicity is the keynote of the dining room with its hazelwood trim. Beneath a plate rack, six feet from the floor, the walls are covered with a red oatmeal paper while above gray oatmeal paper with figured cutouts is used. An artistic effect is also pro-

duced by the double glass door opening from the hall after the French window style.

The kitchen is very nicely arranged and is easy of access either from the dining room, reception hall, basement or servant's room. From here, there is a rear stair to servant's room on second floor. This service end of the house is trimmed with cypress finished natural and the walls are covered with "Sanitas."

The pantry provides cupboards, workshelf, flour bin, broom closet, and refrigerator and there is also a large window for light and ventilation. The trim here is cypress finished natural, also papered with "Sanitas" as in the kitchen.

The floors in reception hall, living room and dining room are white oak; in kitchen and pantry, Georgia pine. The rear porch opening off the kitchen has one side latticed full height. There are also openings to pantry for milk and to refrigerator for ice, so that these can be attended to from the outside.

The basement is reached from the rear hall, also by means of an outside hatchway and in it are found a laundry with soapstone tubs and other conveniences, a cold storage room for fruits, etc., hot water heating apparatus, and fuel room.

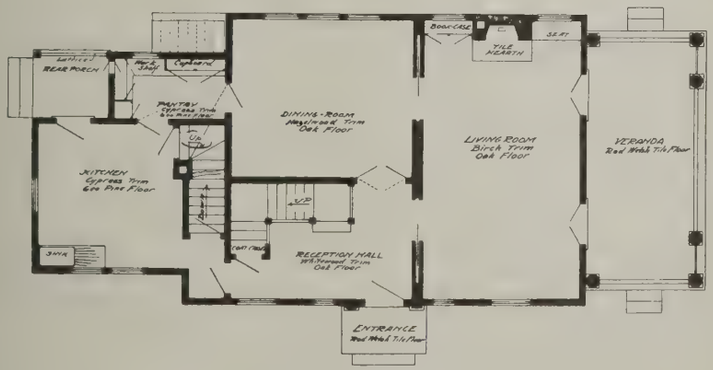
The main part of the second floor consists of three bedrooms, hall and bathroom, all of which are treated with white wood trim, which is white enameled finish. The doors are all finished in mahogany. The floors of hall and bedrooms are all white oak. The bathroom has a white tiled wainscoting and floor and is finished with porcelain fixtures with exposed nickel plated plumbing. A medicine case with plate glass mirror in the door is built in the wall just above the lavatory. The walls are all covered with striped wall paper in Colonial effects. The front and side bedrooms have each long clothes-presses fitted with shades.

The servant's room is over the kitchen extension with the rear stairs leading directly to it. By this arrangement the service end of the house is isolated from the living quarters of the family. This room is large and comfortable and has cypress trim finished natural, also white oak floors, is papered in striped Colonial effect paper and has two large clothes-presses opening off it. The attic is unfinished, but has ample space for two large rooms.

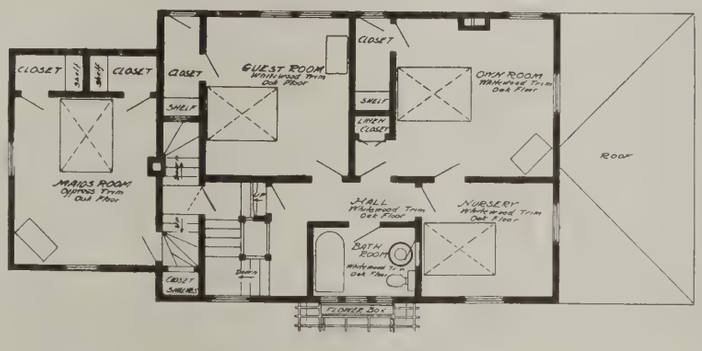
This house is built in Rochester, N. Y., for Mr. Charles Wm. Eldridge, architect, from plans of his own, as described above. It is 24 feet, 0 inches by 33 feet, 6 inches, with a kitchen extension 12 feet, 6 inches by 18 feet, 6 inches at rear, has hot water heat, tiled bathroom, guaranteed plumbing, combination gas and electric fixtures, range, shades, cement walks, etc., and was built for approximately $5,600.



Charles W. Eldridge, Architect — Rochester, N. Y.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

DEVELOPMENT OF GASOLINE ENGINES

By JOSEPH C. RILEY

ASSISTANT PROFESSOR OF MECHANICAL ENGINEERING, MASS. INST. TECH., BOSTON

Presented before the Congress of Technology at the Fiftieth Anniversary of the Granting of the Charter of the Massachusetts Institute of Technology.

* * *

(Continued from August.)

WITHIN the past three or four years special indicators capable of producing satisfactory results at 1000 revolutions per minute and upwards have been used in research work in a few technical schools and private testing laboratories. The instruments of Nagel, Watson, and Clerk and the Hopkinson indicator, are all of the optical type. They cannot be handled successfully except by skilled observers; in general they could not be used at all with the engine in actual service. The cylinder must be mounted on a rigid testing block and studied under artificial, ideal conditions. The data thus far available from such tests are merely fragmentary, but they are promising, and in time will surely be valuable. Conclusions drawn from a few isolated tests are not of much assistance. A series of tests is required, systematically conducted, with gradual changes in the one condition whose effect is to be studied and practical constancy of all other conditions affecting the result. Such investigations require a laboratory equipped with a good dynamometer and the best apparatus that can be devised for indicating and controlling the operation of the motor. Satisfactory dynamometers of the electric cradle type and also the hydraulic type are used by many engine builders as well as by the technical schools and automobile club laboratories, and much has been learned about the brake output of engines throughout the entire range of speed. What happens inside the engine cylinders, however, is not so well known.

Little improvement in power can be expected from the best engines; they are already excellent. There are automobile and marine motors today, of the four-cycle type, that give mean effective pressures from 87 to 95 pounds, based on the brake horsepower, even when driven at extremely high speed. This corresponds to gas mean effective pressures close to or exceeding 100 pounds, figures which would be considered good even for moderate speed stationary engines. On the other hand there are four-cycle engines of the same size that develop only 65 pounds mean effective pressure based on brake output. Of small two-cycle marine engines the maximum M. E. F.'s on brake output range anywhere from 70 to less than 50 pounds, depending on how well or how badly the fuel charge is supplied, exploded and rejected. The three kinds of two-cycle motors on the market, namely the three-port or valveless type, the two-port-with-automatic-inlet-valves, and the two-port-with-mechanical-inlet-valves have intrinsic differences in power which are not generally appreciated by the men who use these engines. The energy wasted in getting the charge into a three-port engine, or in dragging it into the crank-case against the pressure of a check valve with too tight a spring, and then blowing it into the cylinder after needlessly high compression, materially decreases the horse-power output. In some of the poorer engine equipments, the entering charge is further obstructed by insufficient passages through the carburettor; the charge is not merely throttled, it is fairly strangled; the wonder is that it gets in at all. Crank-case diagrams from such engines would set the designers to thinking.

Between the better and the poorer designs of gasoline engines there are wide margins in power, to say nothing of fuel economy. The dynamometer tells us that they exist and that the better results are well worth striving for, but it does not show whether deficiency in power is due to constricted passages, defective ignition and combustion, or any other definite fault. Now the scientific way to remedy a defect of any kind is to begin by investigating first its magnitude and then its cause; and the instrument adapted to such a study in the case of the gasoline engine is the indicator—in the half-size pattern, within limits, and then in the optical type.

With all fast running reciprocating engines the necessity for arranging the cylinders to secure regularity of driving effort and for balancing the moving parts to prevent excessive vibration is apparent. Good mechanical balance is particularly desirable for the class of engines discussed in this paper, because the total masses corresponding to a foundation are very light, and the services in which the motors are employed are such that vibration cannot be tolerated. The best engines for automobiles, boats and aeroplanes give evidence of having been planned by men trained in the principles of dynamics, as well as in all other elements of mechanical design. Some builders, however, have but hazy notions on methods of balancing. In fact, they seem to associate vibration with the sudden rise in pressure due to explosion within the cylinder, as if the shaking of the frame were due to the shock of explosion. That vibration results from motion of the masses, and that it would be practically the same even if the cylinder heads were removed and the engine were motored around by power supplied at its shaft is a new idea to them. Examples are common of this lack of appreciation of physical principles among men whose knowledge and experience in all other branches of design and operation of small engines is very broad. For instance, a certain motor was recently built for aerial propulsion, with an arrangement of cylinders making it virtually impossible to secure good balance or a good sequence of explosions. On trial, much to the builder's surprise, the engine shook so that it could not safely be driven at rated speed even on a heavy testing block, let alone upon the light framework of a flying machine.

Crank-shafts for six-cylinder engines of the four-cycle type are built with cranks in three pairs at 120 degrees; and a particular arrangement of pairs is chosen, resulting in a favorable order of distributing and firing, and giving almost perfect balance. In a certain instance, however, failure to realize the forces involved, combined with a fancied advantage to be gained by a different crank sequence, led to the design of a shaft for a large engine, in which the cranks were not correctly paired. As a result, the best possible order in which the cylinders could be set to draw and ignite their charges was unsatisfactory, and the engine shook so badly that a reduced speed was necessary until finally a new crank shaft had to be obtained.

There are many problems which arise in the design of machinery which cannot be solved even approximately until after the machine is built and tested. The experience gained by operation of the first few imperfect machines then furnishes the information required for modifying and improving existing forms, in varying sizes and powers, and thus the machine is gradually perfected without the application of purely theoretical reasoning. This was the case with the steam engine. Nearly all the radical improvements were invented and used long before they were systematically tested to find out just how efficient they were or how they could be made to give better results. This history is being repeated in the development of gasoline engines. The application of scientific methods of investigating them is only just beginning.

CONCRETE IN HOUSE BUILDING

By JOHN UPTON

LET us suppose that we are to erect the forms for a cellar wall eighteen inches thick, for a house 24 x 30 feet. We will assume that the wall is to be seven feet high and that the excavation has been made about three and one-half feet deep with straight sides and square corners; the earth being fairly solid. Of course in a sandy soil this would not apply.

The sides of the excavation being sufficiently straight and true so that outside forms are not needed for the lower half of the wall, the first step is to erect those for the inside. Begin by nailing a short piece on to two boards so that they make one board just twenty-one feet long, this being the length of one end of the inside. Place this at one end, eighteen inches from the bank and drive some stakes in the ground to hold it. Do the same at the other end. The sides must be cut as much shorter than the wall as the thickness of the ends. Assuming that inch lumber is used, cut them in this case thirty (30) feet, less three feet two inches, equals twenty-six feet and ten inches. Put the bottom boards for the sides in place, fastening them by stakes, then see that these boards are level and

that they form a perfect rectangle; that is, have four square corners. In case there are projections for bay windows or a cistern, the forms for these should be commenced at this time.

After making sure that all sides are correct, the boards level and the corners square, you should erect the corner studs, 2x4s or 4x4s, and fasten them by stay laths. Studs should then be set up along all sides. These should reach to the top of the wall and no harm will be done if they come above. The distance apart will depend somewhat on the material used, two feet is generally about right for two by fours used with inch boards. Heavier material can be used and the studs set farther apart. It is not necessary to nail the boards much, as the concrete tends to hold them in place rather than to force them out. After a few boards are on, a line should be stretched at about eight inches from the corners, and the work trued up by measuring from this line. Now is the time to fasten the bottom of the studs and do not be afraid of overdoing this for there will be considerable pressure on them and unless they are well secured, they will start toward the center of the cellar and the wall will become quite thick on the bottom.

One good way to fasten them is to run a stick of 2x4 or a board right across the cellar from one side to the other. Another way is to put a 2x8, 4x4 or similar stick on the inside and drive stakes down inside of this, then running some sticks across also. But in whatever way you fasten them, be sure they are all well secured at the foot; above this they will be wired to the outside forms and there will be as much pressure one way as the other.

In this case, where it will be twenty feet and two inches between studs; sticks twenty-two feet long could be used by letting one end go against the bottom of the stud and the other end come part way up on those on the other side. Continue the boards about half way up and then after raising the guide line, put in some braces to hold the studs. These braces may be fastened to stakes driven in the ground and can be just the proper length to meet at the middle of the cellar. If so, they should rest against a timber so that great pressure on one would be resisted by two or three on the other side. Another row of braces should be put in, at, or near, the top of the wall and there should at least part of them be nailed so as to hold as well as thrust so that the forms neither go in nor out. Sometimes it will be desirable to start filling the forms before they are entirely up, but generally, when they are put up in this way the entire inside forms can be built before any concrete is placed. In case concrete is being placed before the forms are all up, even more care must be used in bracing than would be needed if the inside forms were partly held by the outside ones.

The boards on the inside forms may extend a few inches above the top of the wall and need not be made level, but those for the outside forms should generally be so placed that they serve as a guide in finishing the top of the wall. This can be accomplished by putting them on level and if needed, ripping the last board; or they may be started from the top, although it is generally easier to space down and begin them at the bottom at the right height, filling any spaces there with short pieces.

If the inside forms should get out of position, it would not necessarily affect the work seriously, but the outside one should not be measured from them; but must be made the right length and with square corners, regardless of the thickness of the walls. Frames for doors and windows can be pieced out by nailing two by fours on their edges so that they fill the space between the forms. Spacers, or spreaders, should be cut the right length—the thickness of the wall—and put into the forms to hold them apart. Wires should be put through small holes bored or punched with nails each side of the studs. These should be about eighteen inches apart vertically, and should be twisted up taut.

BIRCH TIMBER

By WARFIELD WEBB

A FEATURE of the building industry that is worthy of more insight is that pertaining to interior finish. Perhaps there is no other portion of a structure, it matters not as to its nature or size, that has demanded more thought from both architect and contractor than the above theme. As we progressed toward a more beautiful and pleasing exterior, so have we come to view the interior of our buildings in a different light. Now we consider the most desirable materials and the most attractive method of making the interior one of real art.

Of the materials for this purpose there are many kinds. Of the lumber there are perhaps fewer kinds suitable for this work, and for this reason there must be more than passing consideration given these by the contractor. To be more explicit, there is in reality but a few kinds of lumber used for interior finish, in any but the most commonplace buildings. This list will include mahogany, red gum, oak, plain and quarter sawed, poplar, birch, maple, pine, cypress and a few others.

Of the list there is reason why the contractor should interest himself more fully in birch. What is most desired today by the average builder of home or office structure is neatness, reasonable cost and still a stock that will prove satisfactory. Mahogany is too costly for the majority. Quarter sawed oak is likewise. Plain oak, maple and pine have all been used to excess. In the demand for some other kind of stock that would meet all the requirements, and still be reasonable in cost, the lumber manufacturers have found birch to be the wood that is possessed of many admirable qualities.

Of birch there is much to be said. Its uses date back for many years, and its purposes have been multiplied so that today this wood is used for a number of varying purposes: Furniture, cooperage, ship building, flooring and interior finish. Birch veneers are increasing in demand, and the number of birch veneered doors is one of the notable features of the industry. Then there are several kinds of birch wood. The ordinary kind is called common birch. The trees attain a growth of from sixty to seventy feet, grow rapidly, and the tree is from 1½ to 2 feet in diameter. The bark is smooth and silvery white. Even the bark is put to many uses. Not varying very materially from this is the black birch. This is more valuable than the common variety, and is used for a higher class of work. Yellow birch is used mostly for ship building, while sweet birch or cherry birch, as it is called by some, is used for interior finish and flooring more than any other species. The wood is tough, fine grained, and very durable.

Much of the birch lumber has a very pretty figure so that when it has been properly finished and stained, it will readily pass for mahogany. In fact, a good imitation mahogany of birch will deceive all but those who are experts in detecting the difference. On this account, there has been an increasing demand for the wood for this purpose. Many who cannot afford mahogany will select birch stained to resemble it, and there is practically the same effect obtained. It is sometimes simply finished in the natural wood, and makes a most pleasing style of interior decoration.

Birch can be compared in price and in some other respects to plain oak, or a good quality. It is equally as hard and when properly kiln dried will make a most excellent wood for flooring and all kinds of interior finish. If it has not been well dried out it will warp, and therefore the importance of this is easily understood. For the manufacture of furniture birch has been a standard for years. Only within a few years has it become so popular as an interior finish. This was partly due to the fact that the demand for varying kinds of interior finish was not so urgent and because it was not generally known as a desirable wood for this purpose. Within the past few years its gain has been steady. Now the architects specify it on many costly structures, and it will grow in favor in the future. While not as desirable for flooring purposes as oak and maple, not being quite as hard as either, it makes a most pleasing floor.

It is a very durable wood. Its compactness makes it comparable with the better grades of hard woods, and for this reason, and that of its price and the possibilities of its finish, have forced it prominently to the forefront. The average constructor of buildings today desires to make his abode as attractive as possible. Nothing adds so wonderfully to a structure as a pleasing interior, and this of some style of wood, often in the natural color. There is a growing desire always for something just a little different, and the average builder is desirous of noting this fact, especially when the cost is nearly the same as soft woods.

Somehow birch seems to fit in this nook most admirably. We have seen so much oak and pine and poplar and other kinds of interiors that the newer style of finish will not be unwelcome. For birch there is a pleasing future. It has the durability, the quality, the finish and the surface to make it a desirable wood for all kinds of interior work, even where there is more than ordinary art demanded.

BRICKS AND THEIR HISTORICAL INTEREST

By H. T. F.

IN THE antiquity of the brick as a building material it is needless, nor is it indeed our intention, to insist. The great national collections of Europe, the British Museum foremost in the number, shows us bricks, sun dried and backed, from the ruins of Nineveh, and from the days of that city to the present moment bricks have never ceased to be an important material in the hands of the builder. That throughout Asia Minor they were largely employed we have seen, only very recently, shown in these columns. M. Rayet, in his work on Miletus, shows that the far-famed palace of Croesus was built of no more costly material than honest bricks. What these bricks were, and their quality, are even to this day appreciated by the natives, who for many centuries, have plundered the ruins to build, or to patch up their own even more ruinous houses. The use of bricks among the Romans, who largely employed them as building materials, as we see in the familiar instance of the Temple of Concord, has been more than once the subject of the inquiry of industrious antiquaries, for the Romans were not content with producing the flat, tile-like brick which is so often to be met with in the lower portions of antique structures scattered over the Empire, and that are known in England, but their bricks were indelibly stamped with the mark of their maker, the names of the reigning consuls, and sometimes the year. From this source, then, more than one patient archæologist has gathered a rich store of information. But few inquirers have ventured far on the apparently arid and difficult road, which has hence remained less explored. Some curious information has, however, been lately thrown on the question by the researches of the French antiquary, M. Descemet, who has published in a recent number of the Bibliotheque des ecoles d' Athens et de Rome—an excellent publication, founded in 1877 and now at its seventeenth number—an article on the "Inscription doliaires latines" on Roman brick-marks, more especially relative to the gens Domitia, in antique Rome the most renowned brickmakers.

From an epigraphical point of view the brick marks of the Romans have aroused the attention of more than one archæologist, but the difficulties which have stood in the way of procuring the stamps, added to the enigmatical nature of the inscriptions themselves, have led the inquirers to fields where the results were more showy and more easily obtained. M. Descemet has long been known to the antiquarian world: as far back as 1857, his "Fouilles de St. Sabina," attracted no little attention, as also, in 1876, his study "Sur quelques Regels de Briques antiques," published in the Bulletin de Correspondence Archaelogique. In possession of a valuable collection of stamps of his own, together with copies from the brick stamps of the Vatican Museum, M. Descemet had at his disposition more than ordinary sources of reference, and the result of his study has been the work the title of which is above given.

The Italian antiquaries of the seventeenth and eighteenth centuries, Nardini, Ciampini, and their contemporaries, had not largely drawn on the store of historical information afforded by the Latin brick inscriptions; Fabretti was, indeed, the first to set into any order the more remarkable of these, but his efforts were merely tentable; his collection of inscriptions was unclassified and incomplete. It was reserved to the worthy Abate Gaetano Marini, the curator of the Vatican Museum, at the close of the 18th century, to put together in a methodical manner the stamped bricks of the choice collection under his control; this task he admirably performed, preparing a learned catalogue which, however, remained at his death in an incomplete and manuscript form; but, such as it is, this manuscript preserved in the Vatican library, has proved a mine of information to all subsequent writers. Marini's catalogue was arranged with admirable order and carefully classified, each brick of the collection being the subject of numerous commentaries.

In spite of Marini's method, M. Descemet has adopted another system more suited to the requirements of the day, as rendered necessary by the considerable addition made to the list of brick inscriptions since the recent excavations. In his introduction, M. Descemet has carefully shown the importance of the study of these brick inscriptions by which the date of the erection of a building may be approximately ascertained. But as the author hastens to add, the fact of the bricks bearing dates, or stamps being found in certain spots, is not, of course, conclusive evidence to the archaeologist. Thus, in 1844, at Aix, in Provence, a brick of the year 123 was found, stamped with the work of a Roman workshop, but the presence of this brick can alone be accounted for by the effect of accident, as it was scarcely possible that a town near Marseilles, so long famous for its pottery, should receive the bricks from Rome. On the shores of the Adriatic, at Pola and Zara, and in other towns of Istria and Dalmatia, the existence of a large number of bricks bearing the stamp of Rimini would tend to show that the brick trade, which still exists on both sides of the Adriatic, can be traced back at least eighteen centuries.

But apart from the geographical information these stamped bricks afford, the inscriptions they bear throw not a little light on an ill-known state of Roman society—the education of the slaves, who though we have classic evidence proving that they were placed under schoolmasters, would seem to have little profited by their education, as the inscriptions it was their duty to stamp could only have had their letters placed upside down or transposed (as they are often found), by persons unable to read, who copied as well as they could a model under their eyes.

How these stamps and brick inscriptions were made is a point of some uncertainty. Had the ancients moulds, or did they use movable type? This latter method would suppose a great invention of the fifteenth century to have been forestalled. M. Descemet, who devotes some pages to the discussion of the question, concludes in favor of the moulds, such as we see examples of in more than one national cellection. The stamp was cut in relief, or incised, and then—like the butter-print of the present day—made use of. As for the character of the spelling to be met with, this would naturally arise from the want of education on the part of the workmen.

Among the various other points considered by M. Descemet, the reason why the Roman bricks bear the date of their production is not the least curious; but when Pliny's advice to the architect is remembered, only to make use of the bricks when two years old—"aedificiis nonnisi bimos probant,"—an explanation may perhaps be found. A point has been omitted by M. Descemet—to one of which attention is drawn in a recent able article in the Revue des Questions Historiques—in his neglecting to refer to the palms, pine cones, and animals so often found stamped on the Roman bricks. It is now known that with the potters whose name represented or recalled any object or animal, this object he stamped on the pottery or brick of his make. Thus, where we meet with the stamped images of a wolf we may be sure that the workman's name was Lupus.

As the title of the work shows, it is alone to the brick inscriptions relative to the gens Domitia that attention has been paid. Why this gens has been chosen the author explains. It would appear that the gens Domitia possessed the largest and most important of the brick manufactories of ancient Rome; in the person of the virtuous Marcus Aurelius, it ascended the imperial throne. From the brick inscriptions gathered, the wealth of the emperor would appear to have been enormous, as we learn by the large number of workshops his gens employed, in company with those of the gens Aria which he inherited through his marriage with Faustina.

The interest of this quiet and apparently little-inviting study would be thus seen to be great. Its historical value is no less appreciable. We are comparatively far from the days when the history of ancient times was merely gathered from former texts; the aid afforded by numismatics and epigraphy is largely called into requisition by the more serious modern historians. This little work of M. Descemet shows us how, even from the humble sources of the brick inscriptions important facts may be gathered. The careful and beautifully cut Roman stone inscriptions, so easy to read, are not sufficient; the research can be carried further, as we see for instance, in the study by M. Dumont on the ceramic inscriptions of Greece, and even more strikingly in the delightful study which M. Dressel published some time since on the shattered débris of Monte Testaccio. M. Descemet's inquiry into the brick-marks of ancient Rome has already yielded some curious information; it is to be hoped that his success will encourage him to further study in this yet far from exhausted field of archaelogical research.

PAINTING TIN ROOFS

By A. ASHMUN KELLY

Much has been said concerning tin roofing, defects of manufacture have been pointed out, and the causes of tin roof deterioration, particularly as regards the painting thereof, have been discussed until there would seem to be nothing more to discuss. Yet it is evident that there has not been a right understanding of the matter, nor a correct knowledge of the true cause of tin roof failure, even though experts have told us all about it. First, then, let us ascertain why tin roofing does not wear as it formerly did. This point I believe is well settled, in the fact of the newer method of sheet iron manufacture, whereby the product inclines to rust, no matter what paint may be used upon it. It is well known that sheet tin will rust under the best paint, and in the absence of all the usual agencies for iron deterioration, such as vapor, or dampness, and so on, under the tin roofing, and while the surface tin has been well painted. That rusting will go on, in spite of anything we can do. Some tin will stand up longer than certain other tin, this due to quality, which is governed by price.

It being settled, then, that tin roofing will rust in defiance of any paint or care, let us see what can be done to make the surface resistant to the weather, etc., as long as possible. Taking a new roof we may find it damaged by scratches from the shoes of workmen, and here the rust will start first. The paint then should be applied as soon as possible, before rust starts. Many say that a new tin roof should stand until it rusts slightly, which will give the paint tooth or holding surface. This is a grave error, as the rust will continue under the paint.

The working specifications adopted by the National Association of Master Sheet Metal Workers call for the cleaning off of the surface and immediate painting. The under side is to have a coat of paint, kind not stated, before laying. The paint for the upper side is to be of pure metallic oxide of iron, or Venetian red, mixed with pure raw linseed oil. No driers or turpentine to be used in this paint. The paint is to be applied by hand, with an ordinary paint brush, and the paint is to be well rubbed in. Two weeks after the first coat give a second coat. A year later apply a third coat. Some advise two coats of paint on the under side, and no doubt the extra cost would be amply repaid in the longer wearing of the tin roof. Tin roofers, as a general thing, paint the under side with a thin mixture of asphaltum and benzine, and they might as well use whitewash, for all the good the cheap benzine mixture does.

Asphaltum is injurious to tin roofing, and it is advised never to use any paint on a tin roof that contains tar, pitch, or bituminous compounds. This point has been tested by the Association of Sheet Metal Workers.

In mixing roofing paint it is better to use raw linseed oil than the boiled oil, excepting in the case of graphite paint, when boiled oil will be found better suited.

Regarding painting an old tin roof, first let the tinner repair any possible damages. In case this is not done, or cannot conveniently be done, then scrape and clean the tin, and where a leak is found or suspected take a strip of linen toweling and dip it in the paint, and lay it smoothly on the broken part. Then paint the roof with a good paint, iron oxide or graphite, as desired. Linen material is advised in this method, for the reason that cotton will rot from the action of the oil, while linen will not.

If a tin roof can last from 30 to 40 years, as it did in times past, it might safely go without paint for a long time. Many an old tin roof has gone without painting for intervals of six to eight years. It has been said by some one that the interval between painting an old tin roof is about equal to the average life of a tar-and-gravel roof, but such endurance cannot be looked for from ordinary modern tin. Good, hand-made tin has stood exposure on roofs for years without paint, and without showing any rust. As a matter of fact, tin itself cannot rust. Still, it is best to paint a tin roof.

The proper paint for tin roofs, old and new, is that made from metallic brown, or oxide of iron, Venetian red, or silica-graphite paint. Each has its champion, and all are good. Paint the roof as soon as possible after it has been laid. Give it two coats, with a week between, and after the lapse of two or three years, depending upon local conditions, apply another coat, always using one kind of paint.

A writer says he knows of nothing better than red lead ground in raw, cold-pressed linseed oil, applied the day it is mixed, which is a wise precaution, for red lead settles in the pot quickly, and should be used dry, and be mixed just before beginning the job; if ground in oil, as the writer describes it, it would be hard and difficult to mix. For this reason red lead is very seldom bought ready ground or mixed. He states that after painting a roof with the red lead he applied iron oxide paint, being persuaded to do so, he adds, with the result that the brown paint peeled, and even the red lead paint came off in places. Doubtless the brown paint failed to hold on the hard surface of the red lead paint. I would not advise the red lead priming coat. There can be no advantage gained over the use of a simple iron paint.

As to silica-graphite paint, a master painter tells me that he did a tin roof with it, and that it did not require repainting in 18 years. Another painter calls attention to a roof that he painted with the graphite paint, and after 12 years it looked good and apparently would not need repainting for several years more. This paint has been known for many years as a roof paint, it having a strong affinity for iron and adhering well to tin. Being a carbon, it would naturally protect the tin from rust, whether from water or from air. It may cost a little more, but as it covers more surface than mineral brown paint, pound for pound, to the extent of 58 square feet, and wears probably five times as long, its economy is apparent. It sheds water like a duck's back, and is not affected by heat, cold, acids, alkalies, or any known chemical solvent; it fuses only at a blow-pipe heat.

But there are many testimonials also in favor of the oxide of iron paints, such as the well-known brown and Venetian red. Tin roofs are known to have stood as many as eight years without repainting, after being done with brown paint. But it must be remembered that a roof may seem to be in good shape as regards the painting, and yet not be. Here is where some make a mistake, and rush into print with it. The roof ought to be carefully examined, in various parts of the surface, and its true condition noted. I make these remarks in view of the conflicting testimonies of painters upon this subject.

Some of the oldest and most expert painters prefer Venetian red paint for tin roofs. There are at least two kinds, one a pure iron oxide, and the other having a base of gypsum, which is made red with a pure iron oxide of a bright color. The English Venetian red is generally supposed to be the best of the class. Red lead may answer, but it is costlier than the browns and harder to mix and apply. In the thinning of red lead paint some advise linseed oil and turpentine in equal parts, while others use two-thirds turpentine. This is claimed to form a hard and durable cement.

Never place tarred paper under tin roofing. It will surely corrode the tin. Sheathing paper is all right.

Whatever kind of paint you may use, see to it that the tin is perfectly dry before painting, and if the work can be done in the early fall, in dry weather, it will need no driers in the paint, and the work will last much longer than when done in warm or hot weather. The best work can be done with a round paint brush, not with a wide brush fixed to a pole. Get down to it, rub the paint in and brush it out evenly. Avoid runs along the seams, as a run or excess of oil in any place will eventually cause the paint to peel off. Be sure that every part is perfectly coated.

An inexpensive paint may be made for old gutters, etc., by the following method: Place all the old paint skins, the cleanings from paint pots, bits of dry putty, and any old paint on hand, into an iron kettle with some raw linseed oil, and boil the mass until all is dissolved. Then strain, and add fine dry sand until the mixture is about like average paint consistency, so that it will spread well under the brush. It is best applied hot, or at least warm, and a quite heavy coat should be given. It can be used around flashings, chimneys, etc. When dry it has a hard, enamel-like surface, and it may be colored to suit any surrounding color. If it has been properly prepared it will be as smooth as glass.

Mrs. Newlywed Again

Mrs. Newlywed(to clerk)—"Have you any wax for polished floors?"

Clerk—"No, we only have sealing-wax."

Mrs. Newlywed—"Well, that will do. If it's for the ceiling, I suppose it will do for the floor just as well."—Suburban Life.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

WORKING DRAWINGS

BEFORE the student makes a working drawing there are a number of things that he must understand and apply to his work, some of which will now be given.

The first floor plan is generally the first to be drawn as it is, without doubt, the most important floor of the building. The second floor and the basement are easily worked in after the first is completed.

WALLS.—In laying out any floor plan, first draw the outside walls complete, regardless of door and window openings. In a frame building such as we have taken as an example, these are drawn 6 inches thick. The inner partitions in this case are the same, but where sliding doors are used the partitions are 12 inches thick.

STAIRS.—After the walls are drawn in to scale the stairs should be planned. They are a very important part of the building and great care should be taken with their design. That no terms may be used that are unfamiliar to the student, a few definitions will be given.

The TREAD is the top of a step.

The RISER is the vertical face of a step.

The LINE OF TRAVEL is the path that a person would naturally follow when using the stairs. It is within easy reach of the handrails or the walls, about 18 inches, and its length is the run of the stairs.

The RISE is the whole height of a flight.

WINDERS are the steps where the stairs turn. The treads on the line of travel on winders must be the same width as the treads on a straight flight.

The height of a riser must be an exact divisor of the rise of the stairs. We must know the rise of the stairs in inches and divide this number by an assumed height of the riser. This gives the required number of risers. For example, let us consider the house we are planning. The rise here from first floor to second floor is 10 feet, or 120 inches. Let us assume 8 inches for a riser height; 120 divided by 8 gives us 15, the number of risers. This would give us 14 treads to plan on.

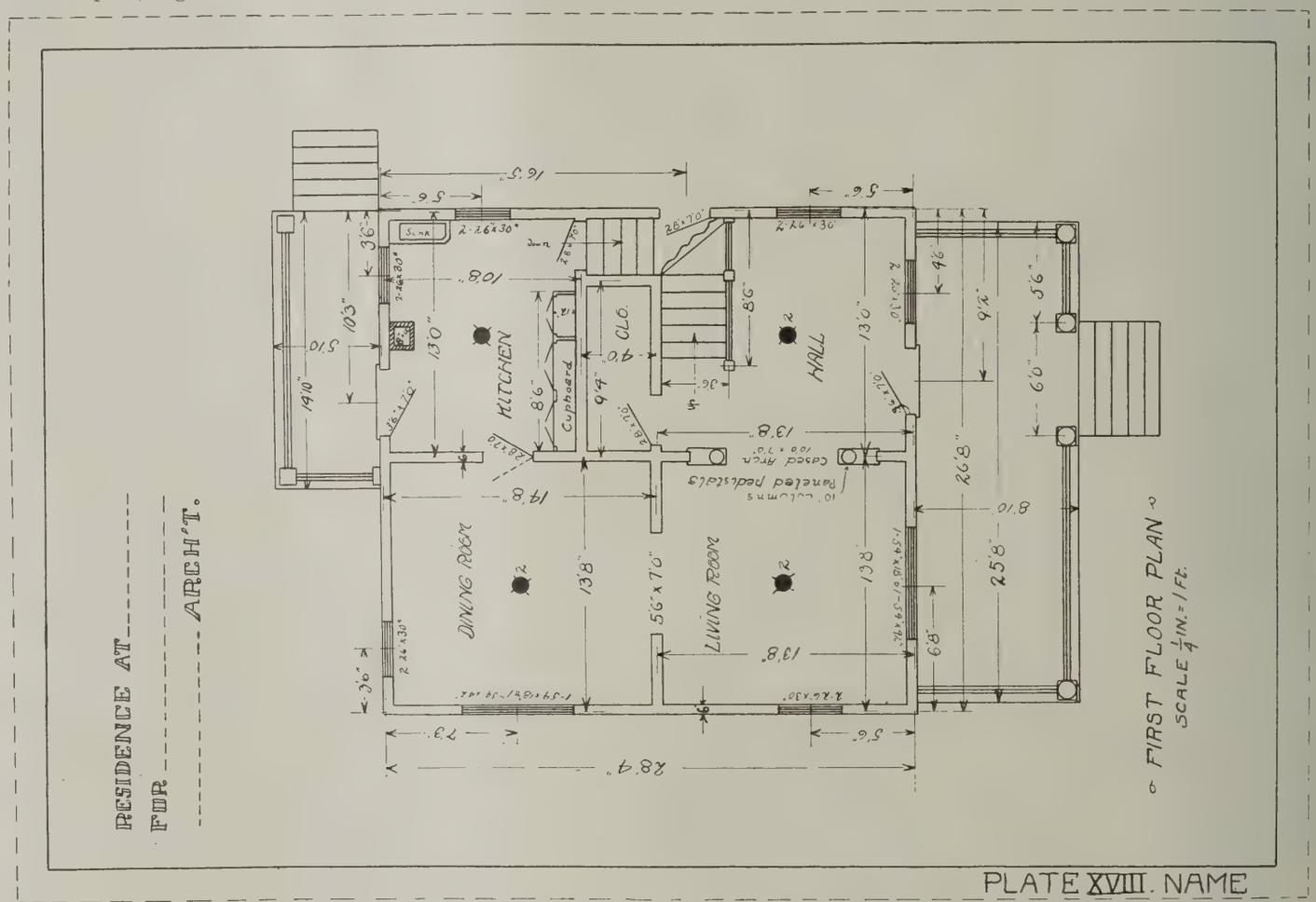


PLATE XVIII. NAME

As was stated in a previous lesson, the treads must be in proper proportion to the risers. With an 8-inch riser such as we have used, a tread of about 9½ inches will make an easy traveling stair, as the sum of the two should be 17 or 17½ inches.

For cellar stairs limited space may require the risers to be higher and the treads narrower than on the main stairs.

To lay stairs out, first lay down the travel line. Lay off on this the exact number of treads, to scale. The travel line in our problem is nearer the inner wall than to the handrail. Remember that the tread on the winders must be the same as on the straight flight.

In planning stairs care must be taken to supply ample head room for the flight by figuring on the overhang of the upper floor.

WINDOWS AND DOORS.—Next, plan the wall openings. Be sure, if possible, to have these, on the different floors, centered on common vertical axes, or the exterior appearance of the building will be bad, even though the openings be unlike in width. Do not

have too many different sizes of windows, as this brings the cost of the building up. Exterior doors should be wider than interior, at least 3 feet wide. A swinging door should be used between the dining room and the kitchen. All door swings should be shown on the plans. The opening on our plans between the living room and the dining room should have a sliding door, or doors, if used in a higher cost building. The cased arch shown consists in a wide opening with two columns supporting the arch. It should be shown in detail, as will be explained later on in the course.

CHIMNEYS.—The chimney interior should be 8 by 12 inches for the heater and the range. This is also the proper size for a fire-place flue. The walls of the chimney may safely be 4 inches thick. It is a good plan to use flue tiling in all flues.

DIMENSIONING.—All floor plans should be completely dimensioned. The length and the breadth of the building all over should be given, the length and breadth of each room and the same for the porches. The center of each window and door on the outside walls should be located from the corner of the wall nearest to the said opening. The size of each window and door should be given on each plan. For example: a door marked 3 feet 6 inches by 7 feet 0 inches means a door 3 feet 6 inches wide and 7 feet 0 inches high. A window marked 2 feet 26 inches by 30 inches means two lights 26 inches wide and 30 inches high.

Notice that the arrow heads do not end on the wall line, but are about 1 inch inside of the outside of the wall line, and in the center of the partitions. The sill line of the house is about 1 inch inside of the outside of the wall line. The dimensions being given in this way, it is very easy for the carpenter to run his measuring stick between the outside studding and against the outside boarding, and to measure across, thus locating the center of an interior partition or the center of a window or door opening.

MISCELLANEOUS.—The cupboards, sinks, bath fixtures, etc., must be located and drawn to scale. Common cast iron kitchen sinks run in the following sizes: 16 inches by 24 inches, 18 inches by 24 inches, 16 inches by 30 inches, 18 inches by 30 inches. Bath tubs are about 30 inches wide outside, and vary in length as follows: 4 feet, 4 feet 6 inches, 5 feet, 5 feet 6 inches and 6 feet. Water closets take up floor space of about 2 feet by 2 feet 6 inches. Corner wash bowls about 16 inches by 16 inches. The ordinary oval bowls are 12 inches by 14 inches or 15 inches by 17 inches. The gas fixtures are located as shown.

PLATE XVIII. FIRST FLOOR PLAN.

If the student thoroughly understands the information given above, few directions need be given for this plate. It is advised that he draw a vertical and horizontal center line through the center of his working space, and lay out his dimensions from them. The scale given upon the plates here reproduced is the one by which the student is to work. All house plans should be drawn at a quarter-inch scale, with details at a half-inch, three-quarter-inch, or full size. Notice that there is a great difference between "quarter-inch scale" (¼ inch equals 1 foot) and "quarter scale," or one-quarter full size (3 inches equals 1 foot).

It is not necessary for the student to ink this plate in unless he so desires for the practice afforded, as he should make a tracing of it and all the rest of the working drawings he makes. But do not make the tracings until ALL of the working drawings are completed. Pencil drawings that are to be traced must be complete in every respect and drawn with a rather soft pencil, about a 3H or 4H. All working lines and lettering should be traced in with full black lines, but dimension lines should be inked in with red ink, but with black arrow heads and figures. From these tracings blue prints are made, which will be talked of later.

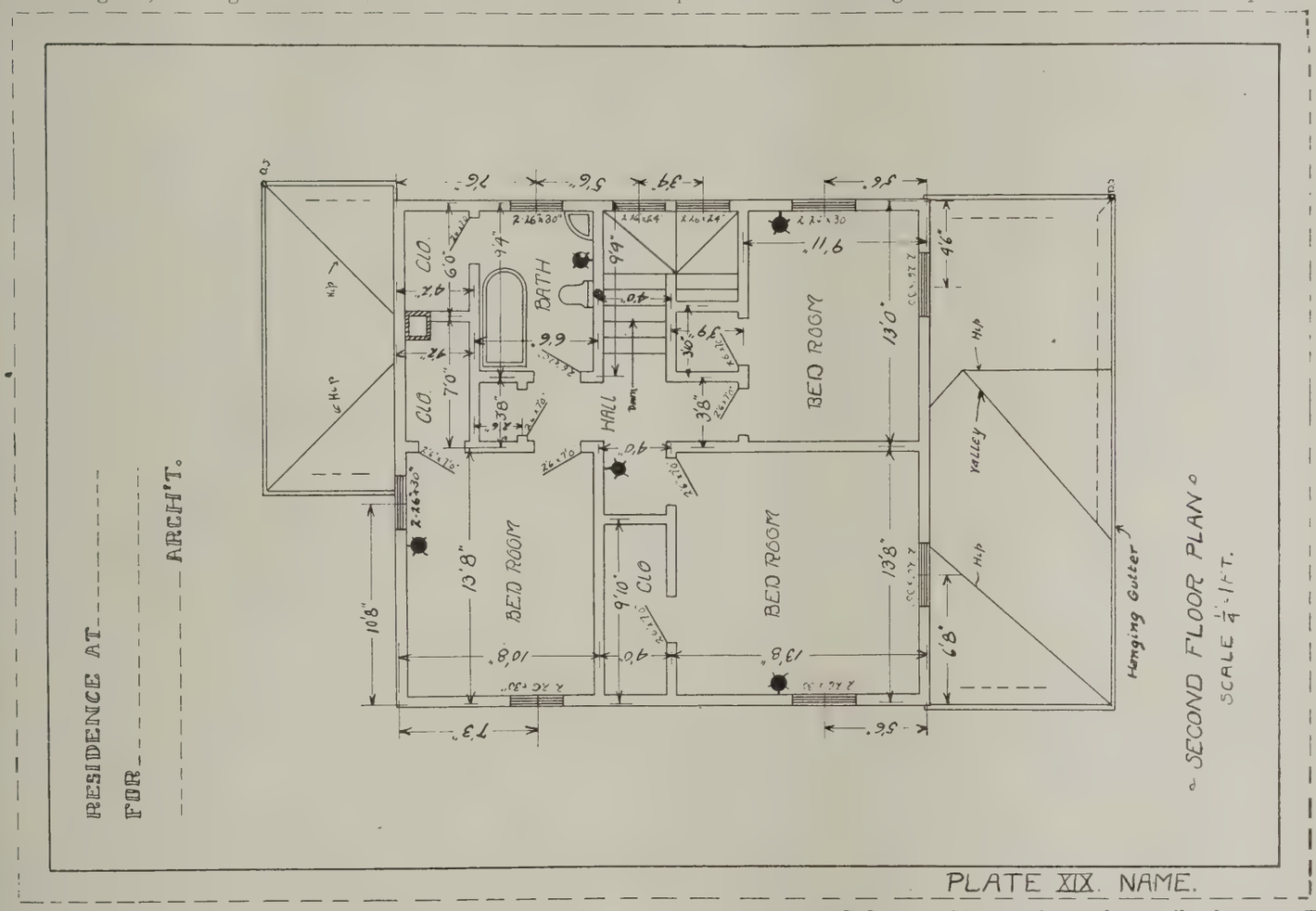


PLATE XIX. NAME.

PLATE XIX. SECOND FLOOR PLAN.

The outside dimensions of the second floor plan are the same as those of the first floor plan.

The main partitions should be directly over those on the first floor, if possible. Hall space should be provided so that all the bed rooms have easy access to the bath room and to the stairs.

The bath room is planned directly over the kitchen so that the service pipes may all be in the same part of the building.

Notice the small closet off the front bedroom on the right. It had to be cut off so as to allow sufficient head room to pass under. Notice from the first floor plan that this closet obstructs the view of four risers. This means 32 inches to take from the ceiling height of the first floor to give the proper amount of head room. The ceiling height is 9 feet 2 inches, which would leave 6 feet 6 inches for head room, which is ample. Of course, this was all figured out before the closet size was determined.

The roof plans of the front and rear porches must be shown on this plan. A hanging gutter is used on them and the down spouts should be shown.

(To be continued.)

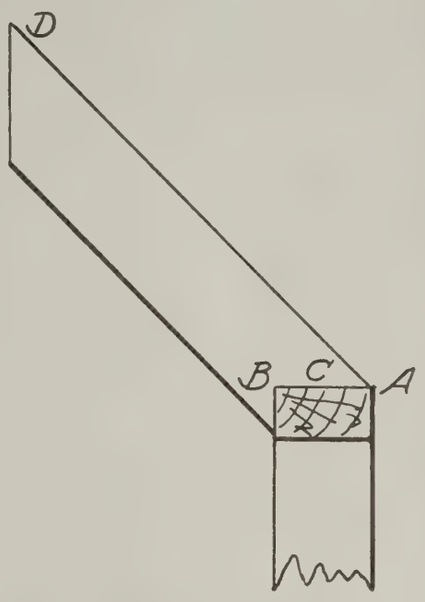


OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS



RAFTER NAMES.

From F. T. H., in reply to L. M. H.

"A" is the toe, "B" is the heel, "C" is the foot and "D" is the point.

SILO DOORS.

In answer to R. R. D., Fillmore, N. Y., the following is taken from Bulletin No. 21 of the American Portland Cement Manufacturers: The cut shows an inside view of a continuous door opening in the concrete silo. Note the rods across the opening. The doors consist of grooved plank, resting in a rebate in the concrete walls, and depend on the pressure of the silage to keep them in place. It is to be noted that the doors must be air and water tight in order to preserve the silage.



SILO DOOR RUNNING FROM BOTTOM TO TOP.

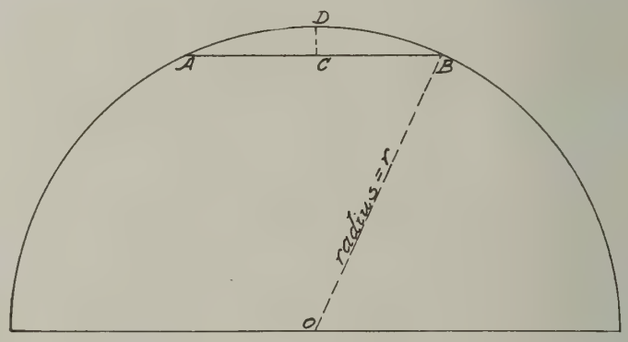
In reply to V. A. McC., St. Ignatius, Mont.:

In regard to maple floors, the best way to nail these floors is to use 6d cut flooring nails, nailing about every sixteen inches. For the very best work it is advisable to bore a hole for the nails, as the kiln-dried maple splits very easily. Some grades of maple are bored at the mill. When laid over sleepers it is often necessary to cut every piece to bring the nail hole over the sleeper, or else bore them, but laying on under floors it is not necessary. For the best work the material is end matched. The flooring must be well driven up with a block and well nailed. The material should be selected and graded for color and length. For the best work the long pieces should be used in the center of the room, the shorter being used on the sides and ends. This applies particularly to ball rooms, etc. To prevent dampness, it is best to lay maple flooring over heavy rosin sized building paper.

LENGTH OF CIRCULAR ARCS.

From G. F. H.

In answer to the question from the "Young Bricklayer," of Dayton, Ohio, will say that there are two methods in finding the length of the arc of a circle; one when the angle contains degrees, minutes and seconds, while the other just plain English feet and inches, the language that nearly all bricklayers use in making their calculations.



Let us find the length of the arc in the illustration, taking for granted that the "Young Bricklayer" knows the length of the chord AB and the height of the segment CD. (If, however, he does not know the height of the segment when he has the length of the chord and the radius given, he may find the height of the segment by the formula $H = \frac{1}{2}\sqrt{4r^2 - c^2}$.)

Let r = radius of arc.

l = length of the arc = length of ADB.

c = length of the chord = length of AB.

h = length of segment = length of CD.

Then $l = \frac{4\sqrt{c^2 + 4h^2} - c}{3}$

Example.—If the span, or chord, AB is 6 ft., or 72 inches, and the rise CD is 8 inches, what is the length of the arc ABD?

Solution.—Here the span AB is the chord, and the rise is the height of the segment. Applying the formula,

$$l = \frac{4\sqrt{c^2+4h^2}-c}{3} = \frac{4\sqrt{72^2-4\times4^2}-72}{3} = \frac{4\times73.76-72}{3} =$$

74.35 inches, or 74⅜ inches nearly.

REMOVING PAINT.

From B., Chicago, Ill.

Regarding paint removers, Mr. A. A. Kelly in American Paint and Oil Dealer says: "There are several substances that will decompose oil, the principal ingredient in paint and varnish, but the trouble is that they contain alkalis, and hence are always more or less objectionable.

"Ammonia will do as well as potash and soda, and any discoloration may be bleached out with oxalic acid. Ammonia is especially useful on moldings, etc., as it will dry perfectly and not injure subsequent coats of paint or varnish. Soda and potash is apt to come through and injure the paint or varnish, if it is not thoroughly removed with plenty of water. Ammonia is also very good for removing old filler in hard wood.

"A very good emulsion remover may be made by adding one part of turpentine to two parts of ammonia, shaking the mixture well. The emulsion is permanent, and after being applied should have a few minutes to work, when the paint or varnish will be soft enough to be scraped or rubbed away.

"To those who will use sal soda and lime, or potash and lime, or strong ammonia, I would say, be sure to use oxalic acid afterwards, as a bleach, and give it plenty of time to work.

"Here is another formula: Dissolve one pound of potash in three pints of water, and set on the stove to heat. Then add enough dry yellow ochre to make the mass like a roughstuff. Spread this on the old paint that you wish removed, and in a little time the paint will become soft enough to allow of easy removal by means of a scraper. After removing all the paint, wash off with soap and water, to remove all the potash. Let the surface of the work dry perfectly, then sandpaper it and give it a coat of clear linseed oil.

"Creosote or carbolic acid removers have a very objectionable odor, and cannot be neutralized, after using them as removers. That is, their effects cannot be done away with so that the subsequent paint will not be injured. They are also hard on the flesh of the workmen. Fusel oil or amyl spirit removers are objected to because highly inflammable, and injurious to the health.

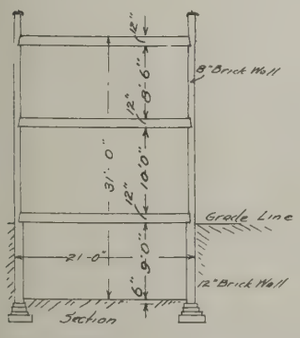
"Alkalies, such as lime, potash, soda and ammonia, when used in their full strength, will injure the fiber of the wood, if in contact therewith. A little care when using them will result in minimizing this danger. The trouble comes where there are large joints or other open parts, into which any and all of these removers will go, and as they are hard to get out, the result is trouble after finishing up."

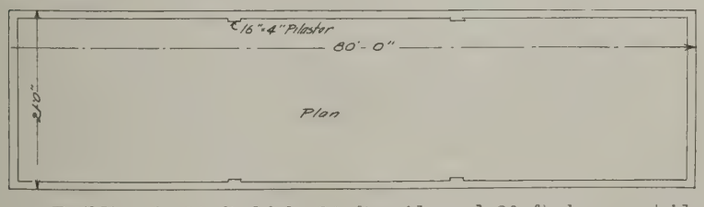
These preparations are for work on a large scale. Where only a small amount of paint is to be removed, any paint store will supply ready mixed remover, which will do away with the work of preparing it.

STRENGTH OF WALLS.

From J. G. C., Flint, Mich.

I shall be glad if through your paper you can say whether you consider the walls of a building shown in this sketch are strong enough.





Building is 31 ft. high, 21 ft. wide and 80 ft. long, outside measurement. It will have basement, store and workroom for upholsterer on first floor, with dwelling rooms on second floor.

At the front the grade line is at first floor level and at rear about two feet lower.

Walls to first floor 12 in. brick wall. First and second stories 8 in. Two pilasters as shown on each side wall, probably two of these will contain flues.

The joists to be 2x12-12 in. on centers. One text book shows New York allows walls of this thickness for building up to 35 ft. high.

QUESTIONS

GILDING AND BURNISHING.

From C. W. I., Chatham, Ont. Can you give me any information or instructions on burnishing? I have done a good deal of gilding but have never had any experience on burnishing.

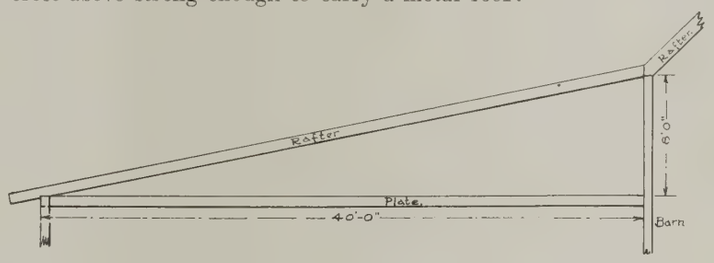
CUTTING WINDOW OPENINGS.

From G. J. R., Syracuse, N. Y. I would like to see an article on cutting openings for windows, especially mullion and triple frames, in frame and brick walls.

ROOF DESIGN.

From Z. R. N., Narvon, Pa.

I have a roof to erect over a shed 40° x 40°. The roof to be a lean to and to be self-supporting; that is, without any posts except in the outside walls. Can some reader give me a plan to erect above strong enough to carry a metal roof?



2. What will take stain off stone, caused by rain on chestnut sheathing running down over the wall?

3. Where an old building is chalky, is it right to paint over it without taking off the chalky substance? If not, please explain why.

PAINTING CONCRETE TENNIS COURT.

From A. P. H., Annapolis, Md.

I have made a concrete tennis court 130x50 ft. It is finished like a good pavement, but is too light in color. I would like to get it very dark green if possible. Can you tell me of any permanent material I could coat it with?

BEVELS OF HIPS.

From "Engineer," Edmonton, Alta.

Wanted, a diagram showing how the top bevels of a hip-rafter are obtained by the steel square, the hip to be cut to fit against the ridge.

BOOK.

From "T. L. W.," Phoenix, Ariz.

Which of Hodgson's Books would be of the greatest benefit to a young and inexperienced contractor just starting in business?

SAWDUST IN PLASTER.

From C. F. C., Buford, Colo.

I should like to have some information on the use of sawdust as a substitute for sand in plaster. How prepared, etc.

CARE OF CIRCULAR SAWS.

From C. F. C., Buford, Colo.

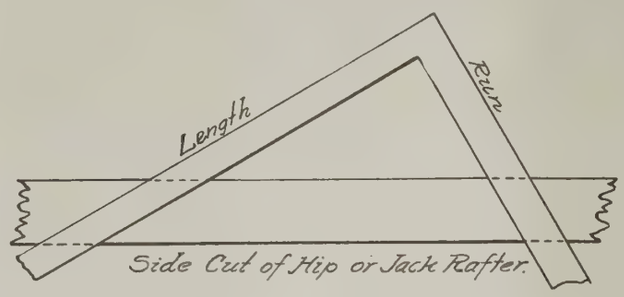
Where can I obtain a work on the care and management of circular saws?

SOME RAFTER PROBLEMS

By JOHN UPTON

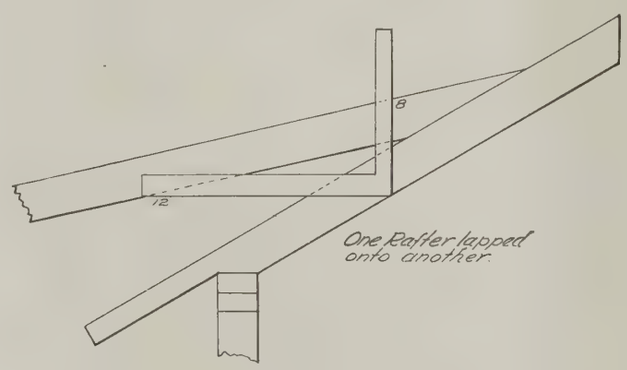
ORDINARY roof framing is not necessarily a difficult subject. Most of us can readily frame the rafters for a common roof of any required pitch, and generally a hip roof or a gambrel presents no great difficulties.

But sometimes when there are two roofs intersecting we get puzzled. I notice in one question department a man says he can



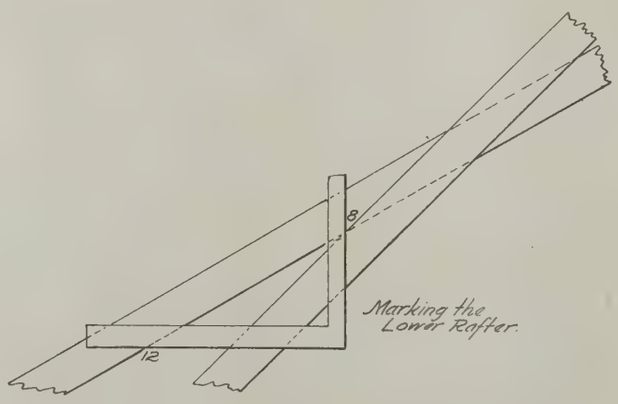
not get the joints of the half rafters to come right with the common rafters. Evidently this is not a pyramidal roof or there would be no common rafters. Perhaps there is no ridge in the center, or it may be joined onto another roof.

Supposing that the hips are at an angle of forty-five degrees with the plates. Then if they are to fit against the common rafters at the peak they should be cut with the same bevel on each side at the top. This would be the same bevel that they would be cut if



four hip rafters were to come together at the top, and is always something less than 45 degrees from the side of the rafter, for it would be this if they lay down flat, and their being raised up make it less. The more raise, the more slant to the cut. To cut them, use run and length of the rafter and cut on the length.

Another and perhaps better way in such a case as this, is to put the hip rafter up first, cutting them on one side only. Then cut the common rafters to match them.

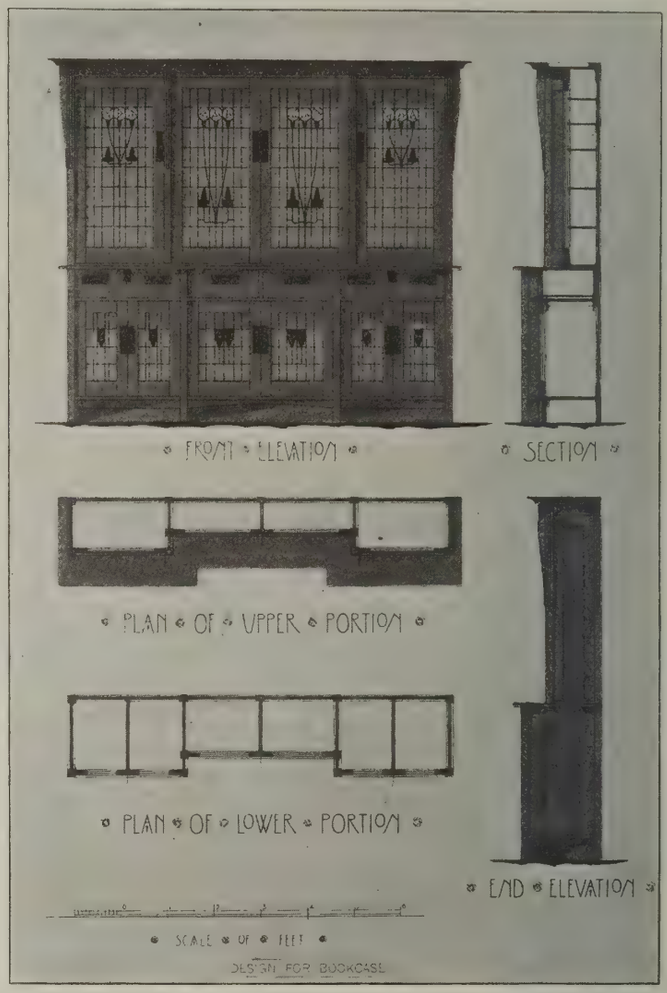


Another puzzling case is where we want to cut the rafters for a lean-to roof which runs up onto a steeper roof; say a one-third pitch lapping onto a half pitch.

Lay the square on the rafter of the lower roof to find the plumb cut. From this lay off the pitch of the upper roof. In this case 45 degrees.

DESIGN FOR BOOKCASE

THE bookcase shown on the full page is published by request of several correspondents, and is intended to hold a large number of books.



This case is quite simple and easy to make, and is quite effective in appearance and not costly, the leaded glass being the most expensive, and the cost of this may be considerably lowered by simplifying the design. The brass hardware is plain and not at all costly. The plans and sections shown will given an idea as to



the construction, and the scale will enable the workman to get the proper dimensions. It may be made of hardwood and polished in the natural, or it may be made of softer woods.

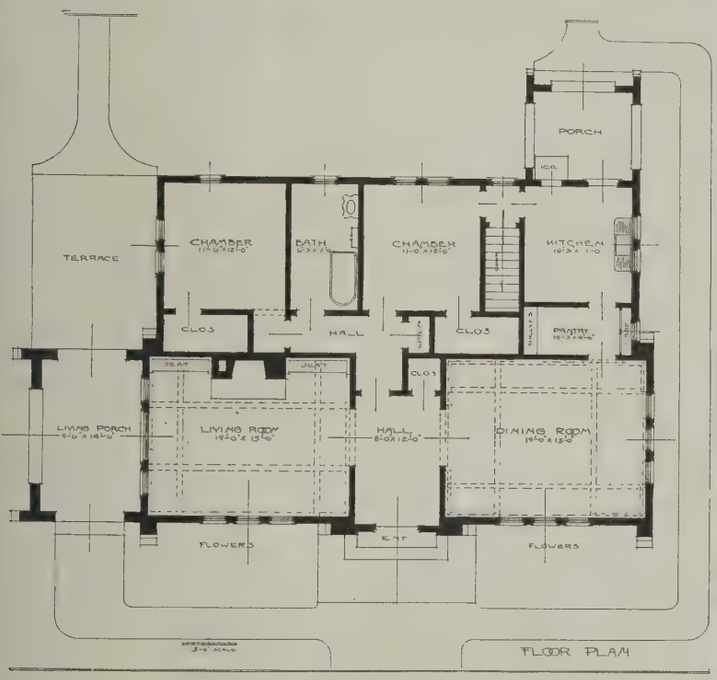
THREE CONCRETE BUNGALOWS

Through the courtesy of the Cement Products Exhibition Company, 72 West Adams street, Chicago, we show on this page three of the designs submitted in their recent competition.

The problem in this competition was to design a 5-room house



Frederick J. Smith, Architect — Indianapolis, Ind.



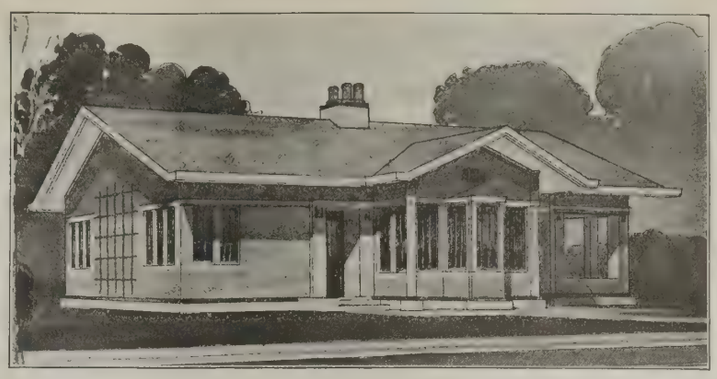


having fireproof walls, roof, etc., for $4,000, not including heating, lighting, plumbing and lighting fixtures.

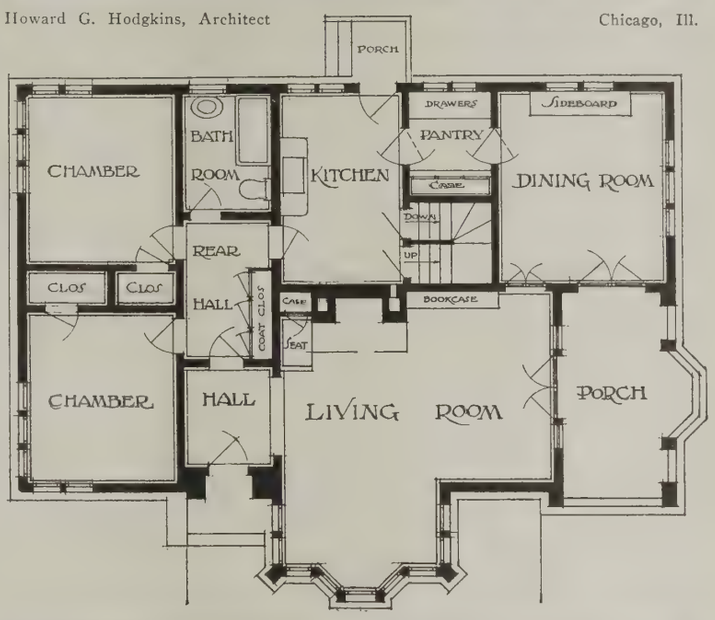
The first design calls for monolithic concrete walls and floors, with red tile roof in front portion and gravel over rear. The interior trim to be stained cypress with birch doors.

The design, by Mr. Hodgkins, also calls for monolithic walls, with variations in color and texture of the interior surfaces to be obtained by using different grades of sand and gravel. The roof to have cement tiles.

Mr. Kusher, in the last design, calls for monolithic walls in the basement with block walls above grade, and tile roof, the support for which as well as the main floors being of concrete. Cypress will also be used for the trim and pergola.

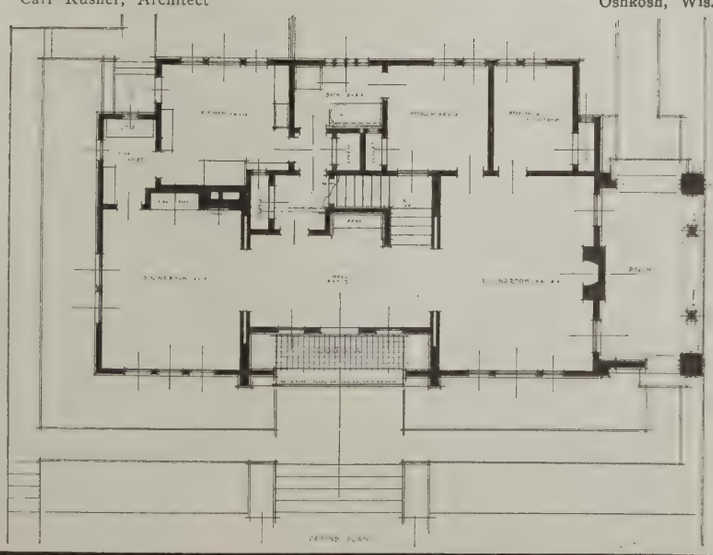


Howard G. Hodgkins, Architect — Chicago, Ill.





Carl Kusher, Architect — Oshkosh, Wis.



NEW ACTIVITY IN LUMBER CIRCLES

There are many indications of "something doing" in the lumber business, and wood has still so many staunch friends among builders, even as against some of its meritorious rivals that we are glad to state that our investigations of the mysterious "yeast" evidently working in important lumber quarters have convinced us that great benefits are shortly to result to builders and investors, as well as a splendid stimulus to general lumber consumption.

The beginning of what seems to be a healthy upturn in the general lumber situation, occurred immediately after the elevation of E. G. Griggs of Tacoma to the presidency of the National Lumber Association last May, and has been developed thus far with energy, grasp and business foresight, said to be characteristic of the man.

It is apparently the intention of Mr. Griggs to make his administration signal from the start, and seemingly his idea is that if wood, as a whole, can be even measurably restored to its former high place in the general public esteem, he will have done more for the industry than had been expected of him.

Substitutes for wood have become so numerous, so varied, and in many cases so meritorious, that the general public inference has almost reached a point where uninformed people seem to think that "anything is better than wood."

Of course, no such broad condition exists. Wood is still plentiful, costs less than its substitutes, and deserves a revival, and Mr. Griggs has designated committees, including several of the biggest operators and broadest gauge men in the lumber industry to help put into effect his tremendous idea of systematic education of the entire public as to wood's real superiorities for countless uses in building and other industries.

We do not know if it has dawned on the big lumber men that, in our opinion at least, one of the most valuable results of such a line of publicity (if wisely thought out and skilfully handled) would be to correct a great many serious errors now in the public mind, as to lumber men, and lumber itself.

The lumber market, even to the smallest sales, has undoubtedly been almost as badly hurt by the public belief that "lumber barons" were abusing their alleged political power, as it has by the vigorous advertising of alternative materials. As a matter of fact the whole lumber industry would seem to have very little political power, judging by the doings of Congress, and from the fact that the Government's activities in lumber, under the Sherman law, have seemed to find themselves restricted to attacking selling groups, rather than any lumber manufacturers.

From our best information, it looks as though the working theory of the lumbermen's new national president was straight-out, up-to-date, commercial in character, instead of with political complications. If this is so, we think Mr. Grigg has hit the one and only cure for the unsatisfactory tendency of the industry, and if the method adopted shall be at once bold, conservative and circumspect, and the actual publicity handled with experienced skill and sure strokes such as have won such success for the Cypress and Red Gum campaigns (the only lumber advertising ever done up to now) we shall expect the lumber world to long remember the date when the president started out to unify it and set it on its feet again.

LONDON CARPENTER 400 YEARS AGO

WOLSTON WYN was a carpenter living in the reign of Henry VIII, and in the parish of St. Mary-at-Hill in the City of London, not far from London Bridge.

Mr. Wyn achieved no notoriety in his life. His name and work live today simply through the fact that the wages paid to him and the work for which they were given were set down in the accounts of the church-wardens of the parish in which he lived. These accounts, which are now deposited in the Guildhall Library, have been for the most part printed by the Early English Text Society.

We first hear of "Carpenter Wyn," as he is often called by the church-wardens, in 1520, when a tenant of the church expressed his willingness to pay such an amount for the "monyelles (mullions) of his bay windowe" as should be judged fair by Wyn. From the fact that the tenant (a Master Clayton) is stated in the records describing the arrangement to be "contented" with this plan, it is possible that Carpenter Wyn on this occasion occupied the position of arbitrator.

We next hear of Wyn in the same year as being employed to mend the paling round the churchyard.

In 1525 he was commissioned to ride on horseback to some wood to select the timber for the repair of the aisles of the church. The job took him two days, and was apparently in every way satisfactory.

Subsequently he assisted "to sett forth the sawyeres work and to helpe the tymbyer to the pyttes." The timber cost for "hewyng," beyond the price of its purchase, 2s., and the sawing into planks employed four men for many days. We do not know whence the wood was obtained, but the cost of making "sawe pyttes," on the spot was 1s. 4d., and the "caryagge in XII cartes of the said XI lodes timbyr, in plankes and bordes, from the wode to the watersyd, X. mylles," cost *li.* 12s.

At this time Mr. Wyn had married and had several children, for the fact of this work of choosing the wood necessitating his "beyng from his house, wife, and children" was considered in the amount paid to him. The payment for ordinary carpenters' work was commonly at the rate of 8d. a day, not at a rate per hour. Apparently, less than half a day, at 4d., was not considered. A boy would be paid at half the wages of a man. Sometimes, however, payment appears to have been made for the job and not by time. Carpenter Wyn had apparently another workman in his employ, and also a "boye."

An ordinary laborer would be paid considerably less than a carpenter. It must be borne in mind that the amount paid, whether for rent or wages, is not to be considered as representing the same money as today. In the Middle Ages the value represented by the penny, shilling, and pound was much greater than it is now. For this reason the sums mentioned in this little sketch are given only for the sake of comparison with each other.

In 1531 Master Wyn was employed to mend a stall and to supply staples for some shop windows, and in the same year a certain amount of money was due to him from the churchwardens. Here, however, at the time arose a difficulty, for the wardens, apparently being unable to pay the bill in full, had to have recourse to making part payment "in Redy monny" and giving, apparently as a pledge, or it may be to be retained entirely, six silver spoons, a salt holder, and a maser.

In 1535 Mr. Wyn had so far advanced in the consideration of the parish as to be made one of the churchwardens, an office in which he so well acquitted himself as to be again elected in the following year. It is not only from this fact that we know that he lived in the parish, but the records tell us that he lived in one of the best houses, one belonging to the church, for which he paid £3 6s. 8d. a year.

Whether Mr. Wyn had a taste for a flower and pleasure garden, or whether he desired to be independent in the purchase of his vegetables, we cannot now say, but we do know that he was sufficiently interested in gardening to induce him to pay a sum of 4s. a year for a piece of land for a garden in addition to that paid as rent for his house.

In 1539 occurred the death of his wife. What that meant to him and his children we cannot tell, the records merely contain the brief statement that the cost of her grave was 6s. 8d.

In 1553 he was still doing work for the church, much of which was entailed through the changes in the furniture occasioned by the Reformation.

In 1553 the King's Commissioners received various parcels of the valuables of the church. These valuables were handed over to those appointed to receive them "in the presence of Wolstone Win" and several other parishioners.

These Workmen Lose No Time

An Industrial Commission appointed by Congress was conducting certain investigations with reference to the operation of mills and factories in various parts of the country.

The investigators were in one mill in a southwestern state when the whistle blew for noon. The operatives put up their tools and vanished as if by magic.

"Do all workmen drop their tools the instant the whistle blows?" one of the commission asked.

"No, not all," the man who was acting as guide answered. "The more orderly have their tools all put away before that time." —Lippincott's.

Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough. C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Omaha, Neb. Corrected by I. P. Hicks.	Seattle, Wash F.O.B. Mill or Yard Corrected by Courtesy F. T. Bradley
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	yp $20.00	yp $27.00	F $11 00
2"x4" to 8" up to 16', No. 2	16.00	25.00	9 00
2"x4" to 8" 18 & 20', No. 1	21.00	28.00	11 00
2"x10" up to 16', No. 1	21.00	29.00	11 00
2"x12" up to 16', No. 1	22.00	31.00	11 00
2"x14" up to 16', No. 1	24.00	*	12.00
Each 2 ft. over 20 ft., add per M	1.00	1.00	up to 32'1.00
Select stock as above, add per M	5.00	*	2.25
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	yp $35.00	yp $46.00	F $30 00
1"x10", No. 1	35.00	44.00	32 00
1"x12", No. 1	40.00	48.00	32 00
1¼"x3" to 1¼"x12", No. 1	42.00	50.00	32 00
1½" and 2" same as above	42.00	50.00	32 00
1" drop siding, No. 1	25.00	32.00	22 00
½" lap siding, No. 1	18.00	30.00	rs 22 00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	yp $18.00	yp $25.00	F $11.00
1 x8" to 1"x10" No. 1	18.00	24.00	11 00
1"x10", No. 1	18.00	24.00	11 00
1"x10", No. 2	15.00	22.00	11 00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.
⅛", T. & G. Flooring No. 1	yp $30.00	yp $40.00	$30 00
⅛" T. & G. Flooring No. 2	25.00	36.00	25 00
Add for ceiling per M	1.00	2.00	M ft 22.00
Add for partition per M	2.00	2.00	22.00
⅝"x4", Ceiling No. 1	25.00	30.00	22.00
	100 ft. run	100 ft run	100 ft run
4¼" Moulded Casing	yp $1.85	yp $2.00	$2.75
4¾" Moulded Casing	2.10	2.50	2.75
7¼" Moulded Base	3.25	3.50	3.50
⅞"x9¼" Moulded Base	3.75	4.00	4.50
1⅛"x4½" Moulded Window Stool	3.00	4.00	3.50
Miscellaneous List.	Per M.	Per M	Per M.
Shingles, No. 1	rs $3.50	$4.25	rs *A*o $2.00
Shingles, No. 2	3.00	3.75	*A*e 2.00
Shingles, fancy	5.00	4.50	2 75
Lath, 4 ft., No. 1	yp 3.60	F 5.50	F 1.75
Lath, 4 ft., No. 2	2.75	5.00	1 75
Pickets, 1"x3"x4' 6", dressed	40.00	30.00	22.00
Pickets, 1 x3"x4' 6", rough	*	*	18.00
	Piece.	Piece	Per 100.
6"x8' Post split	Cdr $0.13	Cdr $0.30	rs $12.50
8"x8' Post split	.20	.35	12.50
8"x8' Post whole	.44	.40	
6"x8' Post whole	.25	.35	
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3.50	$3.00	$2.95
Nails, cut, common	4.00	*	2.95
Nails, wire, fine finishing	1.60	3.50	2.95
Sash Weights, cast iron	1.50	1.50	1.75
Tarred Felt Paper, best 2-ply	Roll. *	Roll $1.00	Cwt $5.00
Tarred Felt Paper, 3-ply	*	1.25	Cwt. 5.00
Red Rosin, Atlas brand	.90	.90	*
Red Rosin, durable brand	.75	.75	*
Black Neponset		*	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	*
Brick, blue, at kilns, No. 1	*	*	*
Brick, blue, at kilns, No. 2	7.50	*	*
Brick, white, delivered, face	7.00	7.50	$45.00
Brick, red, delivered, backing	7.00	*	7 00
Brick, delivered, dry pressed	18.00	18.00	35 00 to 45.00
Brick, vitrified, dry pressed	*	24.00	20.00
Lime, best gray	bbl. $1.30	bbl. $1.25	bbl. $1.65
Lime, best white	1.40	1.25	1.85
Cement, Portland	*	1.85	Cwt. 2.25
Plaster, calcined	2.40	1.80	bbl. 2.50 to 2.65
Hair, 8 lb. per bush	.25	.25	*

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

RECENT COURT DECISIONS

A person may waive his right to a mechanic's lien.—Holm v. Chicago, M. & P. S. Ry. Co., 109 P. (Wash.) 799.

In determining liability on a builder's bond, the building contract must be considered, so far as relevant.—Harris v. Taylor, 129 S. W. (Mo.) 995.

The surety on a builder's bond is discharged from liability, where the owner does any act increasing the surety's risk without his assent.—Harris v. Taylor, 129 S. W. (Mo.) 995.

There is no privity between a subcontractor employed by a general building contractor and the owner, and the liability of the owner is only to the general contractor, who, on being paid, will become liable to the subcontractor.—McNulty v. Keyser Office Bldg. Co., 76 A. (Md.) 1113.

Where a contractor has completely abandoned his contract for the construction of a building, he has no implied authority thereafter to purchase material therefor, and his act in doing so is not binding upon the owner; it not appearing that the same was accepted and used in the building.—Lampert Lumber Co. v. Campfield, 127 N. W. (Minn.) 7.

Where building contract provisions for payments fairly construed afford an element of security inuring to the surety's benefit, any variation by the owner from such provisions which impair such security is a material alteration of the contract of suretyship, discharging the surety.—Harris v. Taylor, 129 S. W. (Mo.) 995.

Where a building contractor, required to provide all the materials and perform all the work called for under the direction of the architect without making any alterations except on a written order of the architect, employed a subcontractor under a contract containing similar provisions, the subcontractor could not recover for alleged extra work without evidence of a written order therefor or proof of a waiver of that requirement.—McNulty v. Keyser Office Bldg. Co., 76 A. (Md.) 1113.

Where a written agreement between the owners and principal contractor fixed the time limit within which the work is to be completed and after which damages shall be allowed if the work is not completed, it is within the power of the parties to change said time limit by oral agreement, afterward made, extending the time, and the courts will respect such change, made in good faith, and refuse damages suffered prior to the date fixed by the change.—Campbell v. Kimball, 127 N. W. (Neb.) 142.

A stipulation in a building contract that, on the contractor being delayed by the default of the owner or the architect or of any other contractor employed by the owner, the time fixed for the completion of the work shall be extended for a time equivalent to the period lost by such default, has no reference to extra work, and does not confer on the architect implied authority to bind the owner by his direction to the subcontractor to do work claimed by the subcontractor not to be within the contract.—McNulty v. Keyser Office Bldg. Co., 76 A. (Md.) 1113.

A subcontractor was informed by his contract with the general contractor that the latter was a general contractor, and that a third person was the architect, supervising the performance of both contracts. He was told by a representative of the general contractor that he could not allow him for certain work, because, under his contract with the owner, he could get no allowance therefor without a written order from the architect. The subcontractor performed the work without any written order from the architect. Held not to show an estoppel by holding out the architect as having further authority than that limited by the contract, and the subcontractor could not recover from the owner for the work on the theory that the latter had held out the architect as possessing authority to direct the work.—McNulty v. Keyser Office Bldg. Co., 76 A. (Md.) 1113.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

996,845. Metallic window-frame, etc. Alexander Fromhold, Rutherford, N. J., assignor to S. H. Pomeroy Company, New York, N. Y.

997,059. Machine for cutting window-frame pockets. Warren B. Harris, Millbury, Mass.

997,433. Hinge for doors. Abraham L. Adler, New York, N. Y.

997,596. Brick or block and wall construction. Francis J. Arbogast, assignor to Standard Glass Block Co., Frankfort, Ky.

997,435. Column or post. William J. J. Bowman, Trenton, N. J., assignor to the J. L. Mott Iron Works.

997,662. Weather-strip. Andrew F. Ewing, Asbury Park, N. J.

997,449. Hinge. William A. Henn and M. D. Helfrich, Evansville, Ind.

997,876. Sash-lock. Warren B. Weaver, Lakeland, Fla.

998,293. Building partition. Louis F. Jackson, assignor to Davis-Jackson Supply Co., Denver, Colo.

998,346. Weather-strip. Levi Knott, Altoona, Pa.

998,584. Door-check. Jos. M. Martin, assignor one-half to H. Burkhart, Bay City, Texas.

999,030. Concrete building construction. Frank B. Hodge, Revere, Mass.

999,051. Floor-scraper. Jno. D. McCurdy, Duluth, Minn.

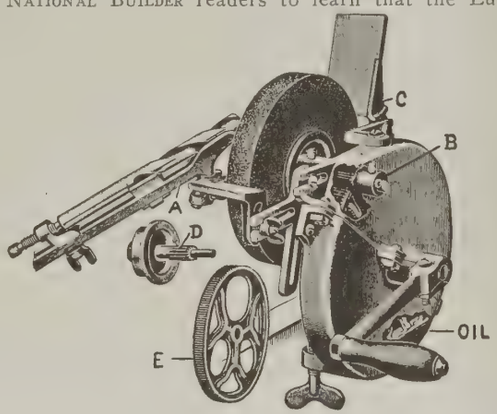
999,126. Collapsible scaffolding and like structures. G. Sisterman, Cologne, Germany.

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LUTHER GRINDERS.

Advance and expansion being the most visible effect of the business-like manufacture of articles of merit it will no doubt be gratifying to NATIONAL BUILDER readers to learn that the Luther Grinder



Manufacturing Co., 1708 Madison St., Milwaukee, Wis., find it necessary to occupy more space, although their factory has over an acre of floor space. They have accordingly taken an entire floor in the Stroh building, one of Milwaukee's newest office buildings, for their general offices, printing plant, etc.

Mr. Luther started to manufacture grinding machines sixteen years ago, at that time the machine in general use was the sand grindstone, which largely through his efforts has been almost entirely replaced by wheels of faster cutting materials. For many years carborundum was used, but recently, after extensive tests lasting a long time, a new substance, "Dimogrit," has been adopted. "Dimogrit" seems to be a perfect material for use with steel tools, where the perfect temper must be kept on the thin edges. It has taken years of persistent work to convince mechanics that a large part of the time spent over a grindstone was wasted. Now the grindstone is practically replaced by much smaller machines which will do the same work in one-tenth of the time.

The policy of the Luther Grinder Mfg. Co. has always been one of extreme liberality toward those unacquainted with the merits of their machines. Their booklets are full of accurate information and can be had for the asking.

PORTABLE SAW RIGS.

During the last forty years, there has been a great change in building, not only in design, construction and detail, but also the materials, methods of erecting and in the personal work of the various trades. At one time practically all the carpenter work was got out by hand, from hewing the sills to the interior finish. The erection of a building of any pretention was a long job, sometimes lasting through several summers. Much of the work was done in the shop in the winter, such as getting out frames, sash, trim, etc., storing it up until the building was ready for it. Very little outside risk was done in the winter, the frame being allowed to "season" and "settle."

Now, keeping up with progress in other lines of business, the progressive builder must prosecute his work actively at all seasons of the year. Cold weather is no longer an excuse for delay. He must have his buildings in shape to keep going until completion. The work on frames, sash, trim and millwork, formerly done in spare time in the shop, is now contracted for at a mill, which is probably getting out a dozen or more jobs at the same time. To a certain extent, this eliminates his "shop," except as a storehouse for left-over material, which, useless for new work, can only be used upon the occasional repair job.

Progress with the mill work has also been followed by new and better hand tools, so that the mechanic is capable of more work than formerly. In fact, it is claimed that a mechanic now does in eight hours what formerly took ten to do.

On the job, we find a number of labor saving devices. Frequently on large work, a steam shovel does the excavating, and a power elevator raises the brick, mortar, and other materials. Every machine installed means less manual labor, as well as a saving in time. The saving in these items constitute actual profit and are often depended upon to secure the contract, not only by the actual saving, but by the prestige the contractor enjoys through using up-to-date methods and equipment.

For saving time, labor and material, it is probable that no one item has more possibilities than the Portable Saw Rig. This machine is made in a variety of forms differing somewhat in construction and variety of work, but in general it consists of a substantial bench, mounted on skids for easy conveyance from place to place or from job to job. The table is equipped with rip and cross saws, boring, sanding and moulding devices as a rule, and various other attachments for doing special work. Power for its operation can be from a self-contained gasoline or electric motor, or when in a shop, from the regular shop shafting if desired.

The variety of work which can be performed on a rig of this character is generally limited only by the ingenuity of the operator. For working dimension material it practically takes the place of a well equipped mill. Some styles allow two or more men to work independently on the machine at one time, doing such work as sawing, boring, grinding, etc. For repair work it is especially useful, as one or two pieces can be made up in a hurry, the change on the machine occupying a very short time.

As generally constructed, the machine is self-contained, furnishes its own power, and can be readily moved from the shop to the job, from floor to floor, room to room, or placed in front of a door or window to accmmodate material in long lengths, or take advantage of the light or other conditions. This portability keeps the entire work on the job and allows a vast amount of work to be done without loss of time or transportation to and from the mill or shop.



Prominent among the manufacturers of woodworking machinery, the Oshkosh Manufacturing Co., formerly the Oshkosh Logging Tool Co., of 414 S. Main street, Oshkosh, Wis., deserves special mention. Since 1843, they have been engaged in the manufacture of tools, appliances and machinery for lumber and wood workers, and now occupy the whole of the building shown herewith. Their experience would indicate ability to design a saw rig to meet present conditions, and their announcement that they considered their Portable Saw Rig the best in the market for the contractor is entitled to serious consideration. On the Eveready Saw Rigs is found every attachment necessary for the most exacting work, the machine being equipped for cross and rip and jig sawing, boring, sanding, mitering, with heads for dadoing and jointing, and an emery wheel to keep the various blades and other tools in condition. The frame of the machine is hard wood, well bolted together and the makers have so much confidence in the outfit that they make their guarantee "for life."

Contractors considering the purchase of a Portable Saw Rig should get the information, prices, etc., relative to the Eveready. The makers court the fullest investigation, both for themselves and their product. Knowing that every reader of the NATIONAL BUILDER is interested, they are offering to send any desired information free, and their terms of sale include, "If Not Satisfactory, Return at Our Expense."

In Training

"Why all this marathon exercise?"

"It's a matter of conscience," replied the real estate broker. "I have advertised some houses as only ten minutes' walk from the station and I want to make good."—Washington Star.

The NORTHWESTERN TERRA COTTA COMPANY

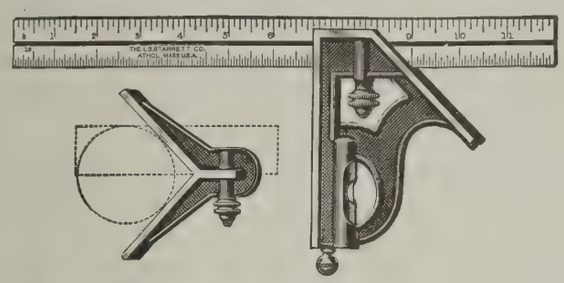
Manufacturers of High Grade

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STARRETT TOOLS for Carpenters are made with just the same superiority in respect to accuracy, workmanship, design and finish as Starrett Tools for Machinists. And that's saying a good deal.

Complete Catalogue No. 18-M sent free

THE L. S. STARRETT CO., Athol, Mass., U. S. A.



The A. W. True Residence, Hinsdale, Ill.

143 Cities USED "Stonekote" ROUGH CAST in 1910

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be: Gray, Silver Gray, White, Buff, Red, Brown.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce, CHICAGO, ILL.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary STEEL Medicine Cabinet



The Recessed Steel Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles—four sizes. To recess in wall or to hang outside.

Send for illustrated circular



The Outside Steel Cabinet

HESS, 907 L Tacoma Bldg., CHICAGO
Makers of Steel Furnaces. *Free Booklet.*



¶ That's what one Carpenter said when writing about his experience with Simonds Hand Saws.

¶ It would be entirely too broad a claim to say that none of them ever did come back, but we believe that dealers have to give "money back" on fewer Simonds Saws than any other brand of Hand Saws.

¶ Here's what one dealer in a large city in Pennsylvania writes: "The Saws I return you by express are the only ones to my knowledge returned for exchange in all the years I have bought your line. We have less exchanges on Simonds Saws than on any other brand and sell twice as many of them."

¶ A Carpenter in Cairo, N. Y., writes: "Five years ago I bought two Simonds Hand Saws, one Rip and one Cut-off. They are certainly the nicest running saws I have ever used. The Dealer said if they were not better than any other make I ever used to bring them back. I never took them back."

¶ Ask your Hardware Dealer for Simonds Hand Saws or write us about the kind of a Saw you are wanting.

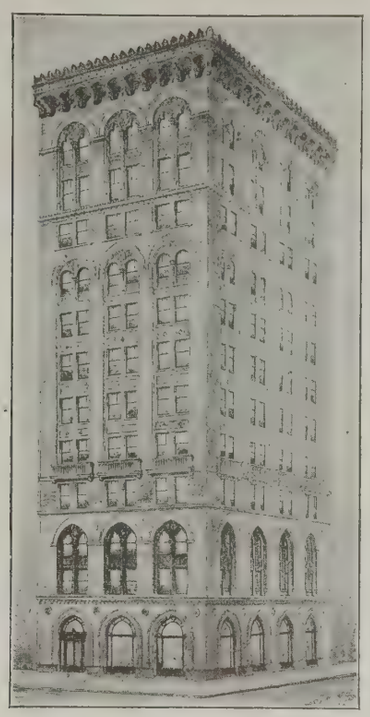
Simonds Manufacturing Company

Fitchburg, Mass.
Chicago, Ill.
New York City
New Orleans
San Francisco
Portland, Ore.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE JOHNS-MANVILLE BUILDING.

Very few concerns in this country do such a volume of business as to require a twelve-story building for their sole use. We are pleased to note that the H. W. Johns-Manville Co. find such a building necessary, and have so far completed it that they expect to occupy their new offices about May 1st.



The exterior of the building will be limestone for the three lower stories, with gray-brown Roman brick and terra cotta above, ornamented with panels of various colored marbles in terra cotta frames. The interior is planned to allow the different departments to occupy separate floors with the executive office on the eleventh floor and the entire twelfth floor for an exhibit and sample room.

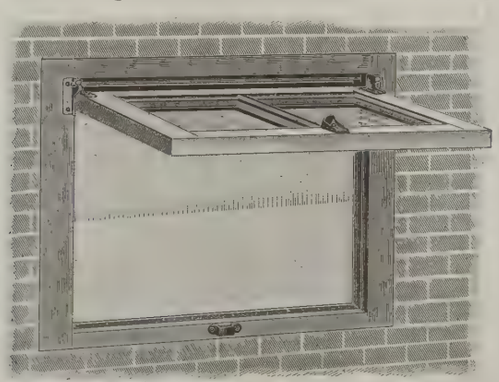
An unusual feature connected with this building will be the fact that the tenant manufactures and will furnish a considerable part of the equipment of the structure. Among the various materials which the H. W. Johns-Manville Co. will install will be the following: J-M Asbestos Roofing, J-M Asbestos Plaster, J-M Linolith System of Lighting, J-M Conduit for wiring, Flushometers, J-M Sanitor Seats, electrical accessories, waterproofing, Keystone hair insulator, J-M asbestos wood, fire extinguishers, J-M Asbesto-Sponge Felted and J-M Asbestocel Pipe Covering, etc.

The name of "H. W. Johns-Manville Co." and "Asbestos and Magnesia" have so long been synonymous, that many will be surprised to learn that this company also manufactures a very large line of electrical goods, plumbers' supplies, building materials, automobile supplies, cold storage insulation materials, railroad supplies, etc.

HARDWARE SPECIALTIES.

Specialties are found in every line of work. In the builders' hardware, there is almost daily brought out some new device, tool or machine, for doing more work, better or faster work, or improving the appearance and usefulness of work now in place.

Among the special places which have not received the attention they deserve, we find the basement window. Too often this is hung on common butts or strap hinges, entirely inadequate and unsatisfactory. It is a pleasure to mention in this connection, Diehl's steel basement window hinge. The makers claim these to be the only self-



supporting or bracket hinges on the market. The sash is held open without the use of ceiling hooks, bolts or other contrivances. By raising the sash up to a horizontal position it is possible to slide it backward and it stays locked in that position until the reverse motion allows it to close. Should it be necessary to remove the entire sash, it is easily done without removing a screw.

This hinge is made in different styles, all, however, having the above good qualities. Besides this hinge, the Diehl Novelty Co., Sheboygan, Wis., make a large number of hardware novelties, such as screen door hinges and catches, sash locks, storm sash hangers, etc. A contractor having their catalogue handy is never at a loss to find a specialty adapted to his particular use.

DISSTON'S INTEREST IN THE CARPENTERS.

When our wise forefathers established the United States Patent Office, the idea foremost in their thoughts was to protect the originator of a new idea. The question was of the form and arrangement rather than the quality of the article. In granting protection it was left to the patentee to establish the quality independent of quantity. In other words, the patent did not and could not guarantee the quality of the product.

At this late day we cannot tell what the originators of the patent laws would think of conditions at present. It is a fact that many inventors do not now patent their ideas, but depend more on the quality of their product to protect them from infringement. And it seems to be true that the highest quality of product is found in goods on which there is no basic patent. This applies particularly to tools and appliances used in the building trades. The conscientious manufacturer knows that his NAME on an article of merit is far more potent than PAT. No. 999,999, for it means QUALITY, REPUTATION, SINCERITY.

With modern methods of advertising, the market for tools and other building appliances has broadened enormously. Certain trade names become a by-word for quality, and the new manufacturer promptly realizes that the guarantee of the established factory creates a demand which cannot be met with a mere lower price.

It is to such companies as Henry Disston & Sons, Philadelphia, that the newer or smaller concern compares his goods and prices. Few who have an article of merit have the temerity to say their goods are BETTER than the older products, and at equal prices the new goods are at a disadvantage, for no intelligent mechanic will accept goods whose quality has not been proven by years of usage when he can get the articles of established reputation.

The question naturally arises: "How is this condition kept up, and how do the firms like Disston & Sons keep their trade in the face of many competitors?"

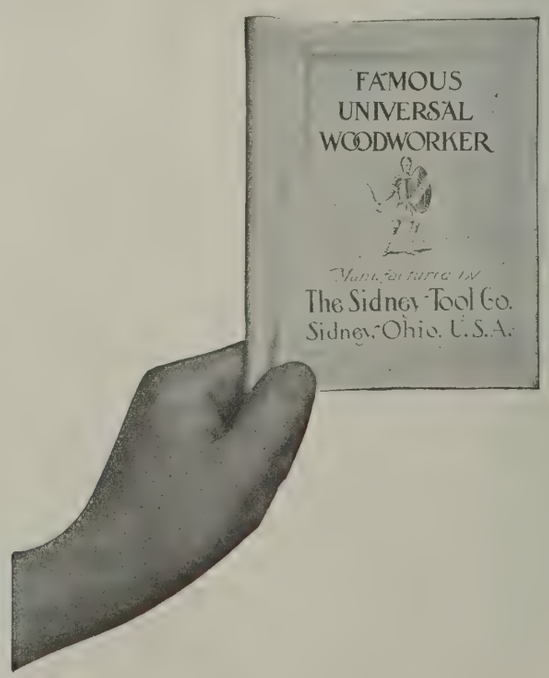
In the first place, the quality must not only be maintained, but raised as fast as improved methods of manufacture and materials can be proven to be of value. The most careful manufacture and inspection will sometimes fail to discover a hidden flaw, and a broad and liberal guarantee must be exercised immediately on the discovery of any complaint. Not all complaints are justified, perhaps, but it gives the manufacturer a chance to see what fault is found.

With the cheaper makes, the "just-as-good-at-half-the-price," this form of complaint cannot be entered, for the maker has no prestige to maintain and only too frequently merely makes the goods **to sell** in **competition,** and is unapproachable either through dealer, wholesaler or direct. The company with a reputation welcomes a complaint; the others avoid them. The established concern follows his goods to the workshop and the job, and advertises the fact that it stands back of the goods and can be easily reached through the dealer or direct. These concerns aid the workman by personal instruction, by circulars, by demonstrations and exhibits. The carpenter today **knows** that the name "Henry Disston & Sons" is a mark of quality intended for him, and a guarantee that the saw, or file, or other tool is what it should be.

FAMOUS UNIVERSAL WOODWORK CATALOGUE.

A very complete catalogue of the "Famous" woodworking tools is now ready for distribution. Most of our readers are acquainted with this class of machinery through the advertisement of the Sidney Tool Company, but the new work contains a great deal of information of additional interest.

The catalogue is of a handy pocket size which covers practically every feature connected with woodworkers. The explanation of the



economic conditions which made such machines possible and the construction of the machines, resulting in the economy of labor, time and floor space, makes interesting reading.

Those of our readers who are not already on the mailing lists of the Sidney Tool Company, Sidney, Ohio, should send their names in and secure this valuable book.



Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

The **Schlueter** will remove all joints or warped edges, and oil, wax, lime stains, or the "muck" from skate wheels, in a most satisfactory manner.

Earning Capacity, $20.00 to $35.00 per Day

Send for prices and Free Trial Proposition

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101 N. Canal St., CHICAGO, ILL.
1001 Flatiron Bldg. NEW YORK.

Made in three sizes: 8x18, 8x15, and 8x12 in. Roller Edge Roller easily adjusted to either side

Acme Floor Surfacing, Laying & Finishing Co. Not Inc.

WHEN YOU GET TO **SASH CORD SILVER LAKE** USE

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.

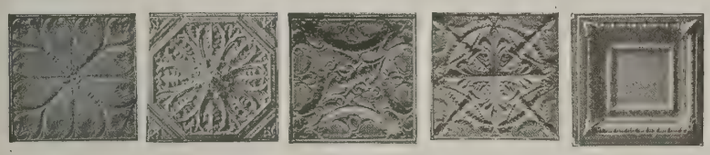


SILVER LAKE BRAIDED SASH CORD

Was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869



"BERGER'S Classik" METAL CEILINGS

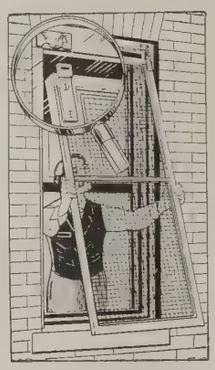
Mean Business for You

They have a prestige that wins trade—good, sound, substantial trade—for dealers all over the country. Are you getting this business—these dollars? If not write this very day to the nearest Berger Branch House—ask for the *steel ceiling catalogue* and the *co-operative agency proposition.*

Boston, Chicago, New York, Philadelphia — **The Berger Mfg. Co.,** Canton, Ohio — Atlanta, St. Louis, Minneapolis, San Francisco

Also manufacturers of Black, Galvanized and Painted Roofings, Eaves Trough, Hangers and Conductor Pipes, Metal Lath, Tin Plate, Cornices, Brick and Stone Siding, Ridge Roll, etc.

PHENIX HANGERS and FASTENERS



Provide the easiest, surest and best manner of hanging storm sash. It's as simple as picture hanging. For ventilation or clean windows swing them out.

You can profit in small amounts many times multiplied—constantly multiplied by stocking Phenix Hangers and Fasteners and pushing them. Hangers retail at 10c, Hangers and Fasteners at 15c and 25c.

A request for our catalog, prices and discounts is the first step. Write for them today.

PHENIX MFG. CO., Center St., Milwaukee, Wis.

Brick Mantels and Face Brick

"Bradford Reds"



"Bradford Ruffs"

"Trade Mark Registered"

Brick Mantels Made of Really Red Red Pressed Brick from

BRADFORD'S

Peculiarly Warm Colored Shale. A1 Standards, Romans, Ornamentals in all shapes, Circle Brick, Pilasters, Panels, etc.

Directions for setting the Complete Mantel are so explicit that the assembling is simple, resulting in Fireplaces at once satisfying to good taste, everlasting in material and at a cost acceptable to the home builder.

BUILDERS AND CONTRACTORS

are invited to correspond with us. Get the facts and keep the round profits that are legitimately yours.

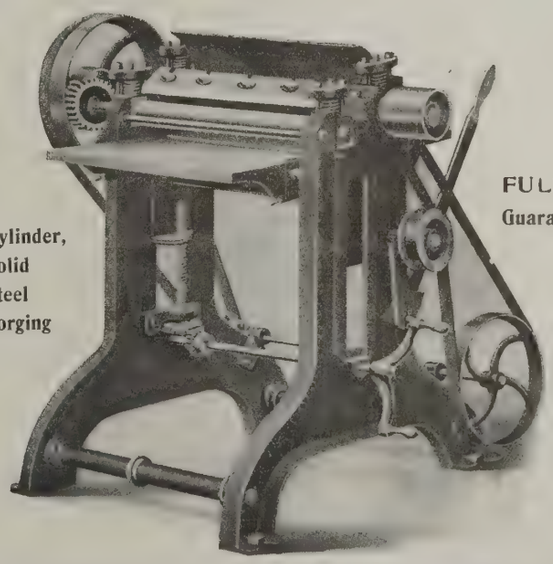
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BRADFORD, PA.

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A 16-inch Planer

$84.00



Cylinder, Solid Steel Forging

FULLY Guaranteed

Just the Machine for Contractors' and Builders' Use

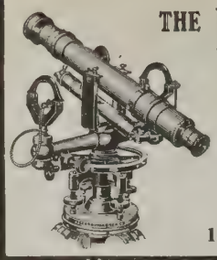
Write for Descriptive Circulars

THE FRANK MACHINERY CO.

Manufacturers WOODWORKING Machinery

BUFFALO, NEW YORK

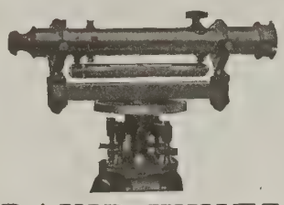
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THE **New Gun Metal Finish**

Makes the "STERLING" Builders' Levels by far the most Durable Instrument in existence—1912 Models now on sale. Write today for Catalogue and special prices.

ISZARD-WARREN CO., Inc.
Makers
136 No. 12th St., Philadelphia, U. S. A.

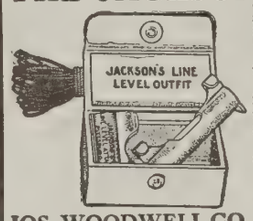


WHITE'S IMPROVED LEVEL

combines Simplicity with Accuracy and Durability. Three features to be found only in the White's Level. We will ship this regular $45 Improved Level for the next 30 days at $40 prepaid to any address. Examine it upon receipt and if found other than we represent it return it to us and your money will be refunded.

DAVID WHITE COMPANY, 421 E. Water St., Milwaukee, Wis.
Write for Catalogue and complete price list.

THE JACKSON ALUMINUM LINE LEVEL



Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

This is possible because the Aluminum Line Level weighs only one-fourth ounce and is easily and quickly attached to a line. Levels thus taken are guaranteed to be accurate on a stretched line from one to forty feet. Besides, from its construction, it can be used as a Pocket Level.

This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

PRICE $1.00, POSTAGE PREPAID

It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

JOS. WOODWELL CO., Sole Agents, 201 Wood St., PITTSBURG, PA.

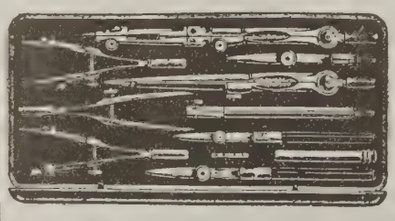
Drawing Materials **Surveying Instruments**

Drawing and Blue Print Papers, Architects' and Builders' Levels, Drawing Instruments, T Squares, Triangles, Scales, Inks, etc. Steel and Metallic Tapes, Builders' Levels. Repairing promptly executed.

Catalogue on Application

127 Fulton Street, New York — **KEUFFEL & ESSER CO.** — General Offices and Factories, Hoboken, N. J.

CHICAGO, 111 East Madison St. — ST. LOUIS, 813 Locust St. — SAN FRANCISCO, 48-50 Second St.



ALOE THE STANDARD FOR 60 YEARS

FREE! FREE! FREE!

Our new catalogue of Civil Engineers' and Surveyors' Instruments, Architects' and Draughtmen's Material, Draughting Room Furniture, Blue and Black Print Papers, is now ready for distribution, and will be mailed on receipt of request.

A. S. ALOE CO., : 511 OLIVE STREET, : ST. LOUIS, MO.

$15 SAVED ON EVERY FRAME HOUSE YOU BUILD

Wheeler Safety Scaffolds

Use no lumber or nails—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

Write today for our trial offer

AMERICAN STEEL SCAFFOLD CO., 62 McGraw Bldg., **Detroit, Mich.**



Rockford Bolt Co. — Strap & T Anchors, Truss-Rods

100 Ruby Street, Rockford, Ills.

BARS FOR CONCRETE WORK
Bolts, Lag Screws and Forgings to Order

Scaffold-Bolts, Plates, Stirrups, Turn-Buckles

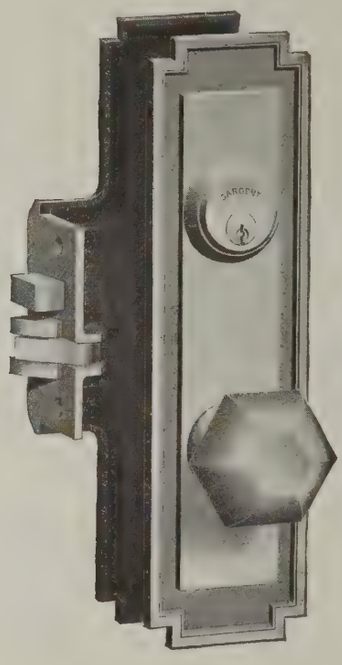


WASHERS Cast, Wrought, Malleable

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UNION LOCK SETS.

A well-to-do farmer walked into the Rehm Hardware Company's place of business a few days ago and instead of buying the cheapest locks and builder's hardware he could get for a new residence he was erecting, placed an order for the very latest designs and best finishes, which amounted to about three times what the average farmer would have placed in his building four or five years ago. This incident goes to show that many property owners outside of the large cities are really putting better materials into their homes and buildings than their city brothers. It is a well known fact that fine builder's hardware with good interior finish makes a combination that is both pleasing and substantial. It adds far more to the value of the building in proportion to the actual cost than some people would suppose. The up-to-date contractor and builder is today in a position to select the latest designs and finishes and get them at very reasonable prices.



One of the few big concerns publishing a well illustrated catalogue on builder's hardware is the Rehm Hardware Company, 1503 Blue Island avenue, Chicago. About the first thing brought to the attention of the reader in the Rehm catalogue is a union lock set, shown here. It has become decidedly popular with architects, contractors, builders and property owners, and is described as follows:

The wrought steel working parts of the lock set are machine made and are exactly uniform as to size; they will not break, and the construction is such that they cannot fall apart or get out of place; they are carefully fitted, insuring a perfect action and great durability. They are on the inside of the door, so that it is impossible to get at them from the outside, and there is nothing to bind or get out of order or jar out of place and interfere with the proper working of the lock set. The two parts of the lock set telescope together and are quickly applied and securely attached by the two machine screws for the escutcheons and the two wood screws for the face of the lock.

They leave the factory fitted, adjusted, inspected and complete, ready to put on the door. They are adjustable for doors from 1⅝ to 2¾ inches thick and can be furnished to order for other thicknesses.

The appearance of the Union Lock Set is that of the knob and escutcheon used with the familiar type of cylinder locks, except that there are no screws on the outside of the door. The cylinder is in its usual and most convenient place, where people are accustomed to look for it.

Both bolts are operated from the outside by the key. The dead bolt is operated from the inside by the thumb knob. The latch bolt is operated from both sides by the knobs. The outside knob is set by the knob stop on the inside of the door.



Union Lock Sets are easily applied by using the template as packed with each set. Simply bore four holes in the door with a ⅞-inch auger bit and make a few cuts with the chisel. Only a small part of the wood is cut away, consequently the door is not weakened.

It will be seen from the illustration shown here that the placing of this lock on the door is a very simple piece of work. The idea of not being obliged to cut out a large part of the door for a lock set of this kind is an exclusive feature of the Union Lock Set.

The Union Lock Sets not only give a door a very substantial appearance, but on account of the design and the fine finishes in which they are made, add greatly to the beauty of any door.

Many other late designs in fine builder's hardware are to be found in the Rehm Hardware Company's catalogue No. 5. For those who are looking for special bargains, when writing for the catalogue, it would be well to ask to receive copies of the Rehm Hardware Company's Bulletin. This Bulletin is sent out on request to anyone located outside of Cook County. It shows a fine line of builder's hardware, sash weights, chain bolts, cupboard turns, sash locks, door handles, etc., at some very interesting net prices. The fact that these prices are low does not detract from their quality as the Rehm Hardware Company have always been known for their high-class line of goods. They buy and carry an unusually large stock and are, therefore, able to give the readers of THE NATIONAL BUILDER the best in builder's hardware at the lowest prices and this, coupled with prompt shipments and fair dealings, has won and held for them a great many customers among the best class of builders.



Asbestos "Century" Shingle Roof—Residence of George Jacka, Calumet, Michigan; Architect, Paul Humphrey MacNeil, Calumet, Michigan; Contractor, Edward Ulseth, Calumet, Michigan.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

EVERY cent your client puts into an Asbestos "Century" Shingle roof buys wear and service—protection against fire and weather—insurance against bills for repairs and painting.

You can't say as much for any other roofing on the market.

Asbestos "Century" Shingles are practical, lightweight shingles of reinforced concrete — made of hydraulic cement reinforced with interlacing asbestos fibers.

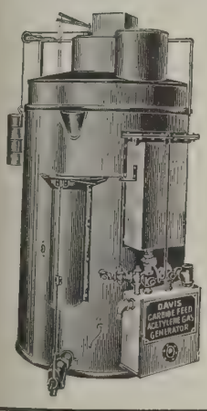
They are absolutely indestructible by weather and time. Fire cannot burn them, melt, chip or flake them. Their first cost is about what the property owner would expect to pay for a first-class roofing—and there's the end of the expense.

No repairs—no painting.

You can get Asbestos "Century" Shingles in three colors—Newport gray (silver gray), Slate (blue black) and Indian red—in numerous shapes and sizes. Write for booklet "K & M 1911."

THE KEASBEY & MATTISON CO., Factors
Ambler, Pennsylvania
Branch Offices in Principal Cities of the United States, and London, England

Mr. Contractor and Builder



Why not equip the home or other building you are erecting with

Acetylene Lighting?

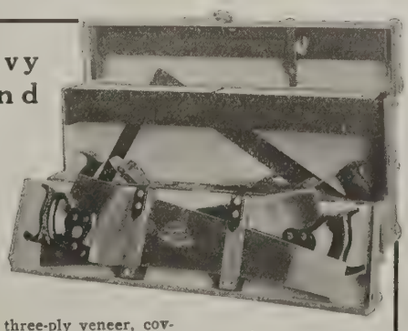
You can greatly increase your income by selling Davis Acetylene Lighting Plants, for new buildings, and during dull seasons for buildings already erected.

Write us for cost of equipping a building and for our terms as salesmen.

Davis Acetylene Company
35 Prospect St., Elkhart, Indiana

Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO CARPENTERS' TOOL CASE



It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges can not be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

Agents Wanted

WEDELL & BOERS, SOLE MFGRS., 157 Jefferson Ave., Detroit, Mich.

Strength, Beauty and Service

The three necessary elements required in a material of QUALITY

For **ROOFING** and **SIDING**

Buildings of any kind of construction—*be they new or old,* are combined to the greatest extent in

Ready-To-Lay

Burmite

(REG. U. S. PAT. OFF.)

A FLEXIBLE-CEMENT-BURLAP INSERTED MATERIAL

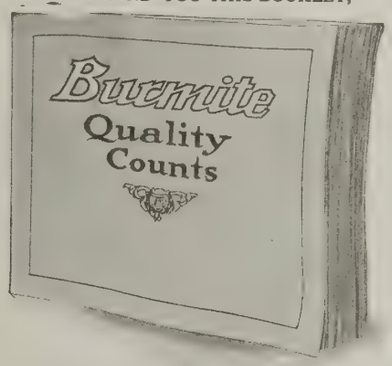
Recognized and acknowledged to be the most **Durable, Practical** and **Inexpensive** for use as a Roofing and Siding. **GOOD Shingles are Out of the Question.** Metal and Slate are too expensive to use on the average building, and for these reasons the time has come when you must look for something else to cover your roofs with besides shingles.

"BURMITE" lasts longer than shingles—*costs less, lays smoother, looks nicer and requires no paint to preserve it. Can be laid over old shingles or tin;* is odorless, will not "run" on steep roofs; and on account of its unusual flexibility is especially well adapted to **flat or uneven surfaces.** **"BURMITE"** *positively makes good* and is **Guaranteed for 10 years without Coating or Painting.** ¶ We couldn't afford to make these statements were they not facts, any more than you could afford to recommend or use an inferior article for a customer of yours. We know that **"BURMITE"** is an **honest value for discriminating people,** and invite your closest and most critical investigation of our claims and severest test of our Samples. Made to meet **Extreme Weather Conditions** in two separate and distinct surfaces, i. e.,

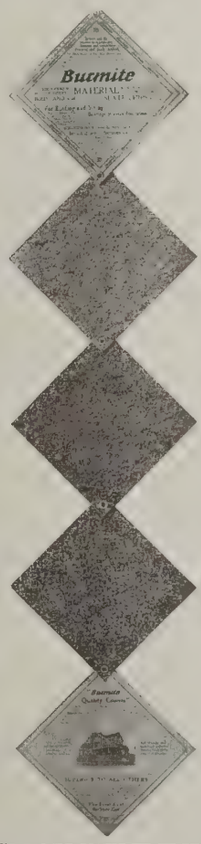
BIRD-SAND and "*Twolayr*" Slate Chips

Cheap roofing is expensive at any price—must be painted at least three times in the course of from seven to ten years. **"BURMITE"** requires no paint—hence is the most economical to buy. It can be used in any climate—does not dry out—remains flexible always.

LET US SEND YOU THIS BOOKLET,



illustrated with buildings beautifully printed in colors showing effect of **"BURMITE"** applied as a Roofing and Siding on **Residences, Summer Homes, Cottages, Bungalows, Garages, Barns, etc.,** and **THIS SET OF SAMPLES,** so that you can compare roofings you've handled—apply and then let us explain our **"BURMITE"** with other your own tests in your own way **Special Service to Build-**ers which will help you to ntroduce it in your locality.



"Stoddard" SLATE-GREEN *"Burmite"*

IS UNEQUALLED FOR ATTRACTIVENESS IN COLOR AND LASTING QUALITIES

SLATE-RED *"Burmite"*

Used with or without the Green, is another winner for the Architect, Contractor, Builder or Dealer, as a Roofing and Siding.

BIRD-SAND *"Burmite"*

For Residences, Business and Factory Buildings, Elevators, Warehouses, Barns, etc. It is easier to lay, more handy and superior to other roofings.

PERMANENT AND DURABLE

ARTISTIC AND INEXPENSIVE

USE THIS COUPON

Bermingham & Seaman Co.
Roofing Manufacturers
General Offices: Tribune Bldg.
Plant: 56th, Armitage and Grand Aves.,
CHICAGO.

Bermingham & Seaman Co., Tribune Bldg., Chicago
Mail to my address, as above, Samples and Booklet. This places me under no obligations. NAT'L BLDR., 9-15-11

Name .....
No. and St. .....
Town ..... State .....

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CONTRACTOR'S TRANSITS AND LEVELS.

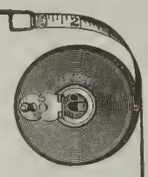
We are advised by the David White Co., 421 E. Water street, Milwaukee, Wis., that they have several new models of instruments for contractors' and architects' use and are making the prices and terms such that no contractor needs to be without these necessary instruments of precision.

A good instrument saves its cost on even a small job, by doing the work at the right time, and there is the added satisfaction of knowing that the work is absolutely correct. A building out of square or level, or not correctly laid out, often means costly delay and trouble, and it can be easily avoided. Levelling with a straightedge and carpenters' level permits too many errors, besides taking too much time, and the time of several men, while with a WHITE'S IMPROVED LEVEL OR TRANSIT, the work is done accurately and quickly and with every appearance of good workmanship.

The David White Company are planning to place one of their instruments with every contractor in the United States. If you are in need of an instrument write to them, get their full particulars and prices. We understand that they have special terms for readers of the NATIONAL BUILDER.

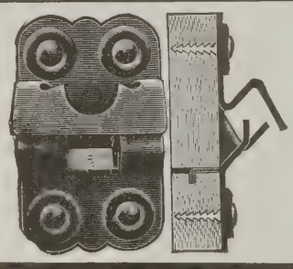
LUFKIN

Steel Measuring Tapes



With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor



THE WATROUS No. 18 SAFETY SASH HANGER

EASIEST AND QUICKEST TO SET

Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.

E. L. WATROUS MFG. CO., Des Moines, Iowa

ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO



The Window Chute

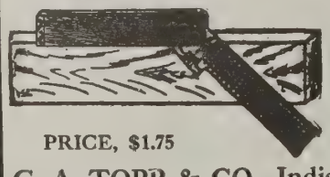
FOR BUILDERS OF MODERN HOMES

Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

HOLLAND FURNACE CO.
HOLLAND, MICH.

Topp's Framing Tool

A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS

It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.

PRICE, $1.75

G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.



The Ackermann Floor Scraper

saves its cost on the first job. With the Ackermann patent sharpener (free with the machine) any man can sharpen knives. Send for Catalog and our FREE TRIAL offer.

The Monarch Concrete Mixer

produces 4 to 6 cubic yards of concrete per hour with 2 men to do all the work. Saves its cost in less than a season's work. Send for catalog of complete line of concrete machinery.

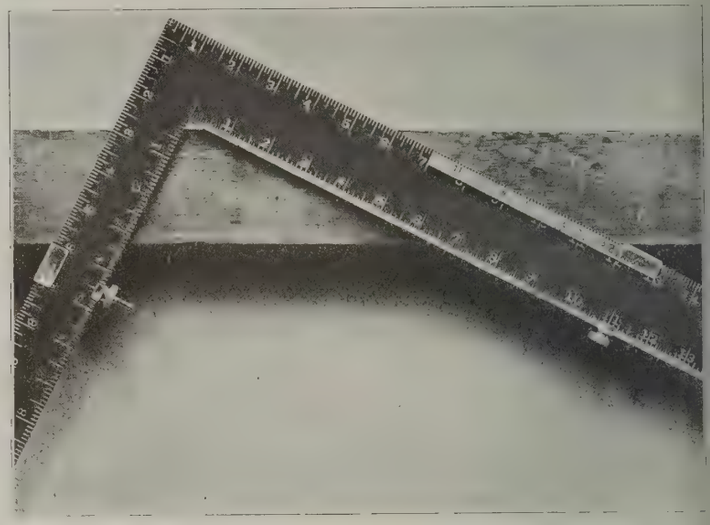
Monarch Mfg. Co., 259 Shepard Building Grand Rapids, Mich.

THE NEW PARKHILL PITCH GAUGE FOR ROOF FRAMING.

Probably no one tool or instrument is more useful to the carpenter or builder than the steel square. By its use the most difficult problems in framing are easily and accurately solved. The modern steel square is for this reason found in every tool kit, and its owner usually understands the principals on which it should be used in framing or laying out his work.

Complete as the square may be, there are certain manipulations necessary in laying out even the plainest work. To lay out a common rafter with a rise of 6 in. to the foot for instance, we know it is only necessary to use 12 in. on the blade and 6 in. on the tongue and the line across these marks will give us the length per foot to run. This is shown in the illustration. But it is a more difficult matter to hold the square exactly on these marks while we mark off for one foot, and this is one of the chief limitations of the steel square.

For many years Mr. John Parkhill of Rochester, Minnesota, has studied along the line of greater accuracy and rapidity of the work



with the steel square, and the results of his efforts are embodied in his New Pitch Gauge patented last December.

As will be seen by the illustrations it consists of two parts which may be clamped to the square at any point on either the tongue or blade, thereby forming a perfect "fence" for laying out any class of work.

It will be noted that one of these pieces—the gauge proper—has a long extension arm or strip which is graduated with a special series of numbered marks. These marks are the most essential feature of the tool, and serve to eliminate all calculations thus enabling any one to quickly mark with mathematical accuracy for any roof pitch, all rafter lengths, cuts, bevels, and backing, also sheathing, facia, plancher, hopper bevels, etc.

While it might seem that this is too much for such a simple instrument to do, the patentee and manufacturer, Mr. John Parkhill, Rochester, Minnesota, will be glad to explain its use in more detail. The terms on which it is sold permits its return within thirty days, but we believe the gauge is so useful that there will be repeat orders rather than a request for a refund.

THE ALDINE FIREPLACE.

While there has been a steady change in style and fitments in the modern house, one item still remains which no one wishes to, or can, dispense with. The fireplace with its cheery welcome is the constant reminder of hospitality.

During all the years there has been a constant effort to improve along all lines. We now have large sheets of plate glass where formerly we had only small frames of very inferior glass. In steam and hot water heating we have advanced from crude systems to vacuum systems and thermostatic control with corresponding fuel economy and ease of operation.

In fireplace design, some of the manufacturers have shown equal genius in keeping up with the advance in ideas, while others are still making and using the patterns of forty to fifty years ago. Probably no concern has shown more originality in design than the Rathbone Fireplace Manufacturing Company, 6208 Clyde Park avenue, Grand Rapids, Michigan. In the Aldine, the continuation of improvements can be understood from the numerous patents which have been allowed, the last dated April, 1908.

As at present constructed, the Aldine Fireplace can use any form of fuel, including natural and artificial gas, with the best heating results at the lowest fuel cost. The highest development is shown in the sanitary, ventilating, and heat distributing principles. While with other fireplaces it is necessary to replenish with fuel every few hours, in the Aldine a coal fire will keep all night without attention, giving off a good heat all the time. The construction is such that a constant circulation of air is maintained in the room, thereby warming the otherwise cold corners.

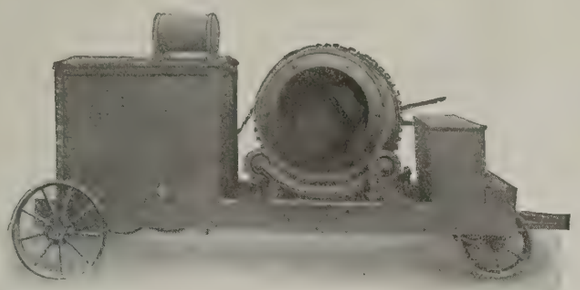
The Aldine can readily be installed in old houses, to take the place of otherwise unsatisfactory heating apparatus, and, as it required no special chimney or mantel construction, can be placed in any room. The use of an Aldine for six weeks in the fall before a furnace is actually needed and in the spring during the cold days and evenings, will warm comfortably two or three rooms, which otherwise would be chilly.

The Rathbone Fireplace Manufacturing Company have some very interesting reading matter which every reader of THE NATIONAL BUILDER should secure concerning the manufacture and advantages of the Aldine Fireplace.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"Northwestern"

"The Largest Line of Concrete Machinery in the World"



Northwestern Contractors' Power Batch Mixer

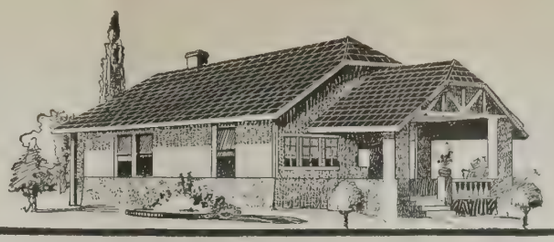
This machine combines all of the features which every contractor or concrete worker desires in a mixer. It has such a low intake that the material can be shoveled in from the ground or a small platform built and the material dumped right into the mixer with wheelbarrows. It has a high discharge and will empty into a wheelbarrow or into the forms. It is light and portable and can be readily moved from place to place. It has automatic watering tank and can be adjusted to discharge any given amount of water each batch. It will hold a full sack of cement with practically any mixture. It can be equipped with a power, stationary loader or low platform. We guarantee that this mixer will cost you $100 to $200 less than any standard mixing machine of equal capacity on the market.

Don't Fail to Send for Our Big Catalog

We manufacture everything in the concrete machinery line, including mixers of every style, size and description and we can furnish everything that you might need in the concrete line. Regardless of whether you are in the market or not you should have a copy of this catalog. Please state what you are interested in as we issue four (4) special catalogs. We are the largest manufacturers in the world and prepared to serve you with machines extremely low in price, simple in design and speedy in operation.

Northwestern Steel & Iron Works

952 Spring St. - EAU CLAIRE, WIS.



The Roof That Never Wears Out

¶ The roof that architects, contractors, builders and best informed home-owners recommend—is a roof of ***solid rock***—slate.

¶ And when you consider its ***value,*** its enduring, imperishable qualities, isn't it only reasonable that you should choose such a roof? Isn't it only fair to yourself or to those who look to you for advice in such matters, to recommend

Sea Green or Purple Roofing Slate

as the one roofing material that ***never*** wears out?

¶ Sea Green or Purple Slate is the only roofing that absolutely resists the action of air, water, sun, fire, or lightning. It is never affected by rot, or rust; it will not crack, warp, blister or decay; it wears many times better or longer than any other roofing and never needs paint or repairing.

Send for Our Free Booklet "Roofs"

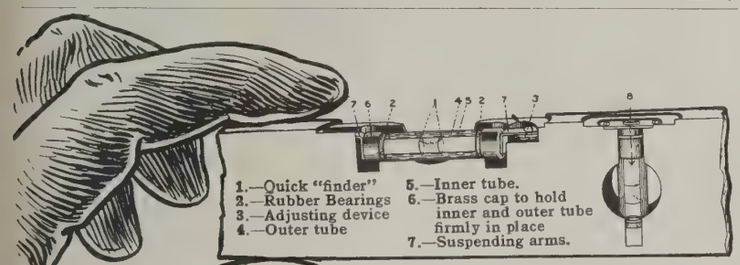
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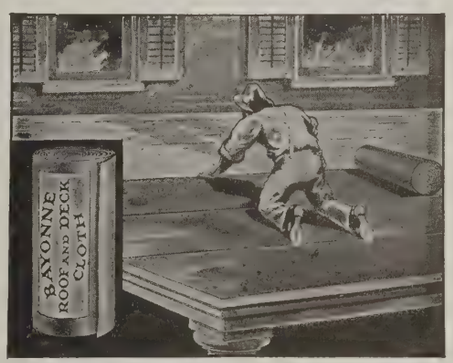
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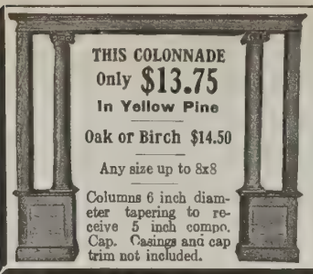
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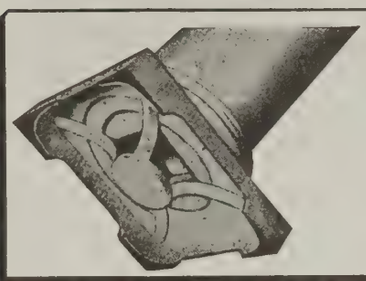
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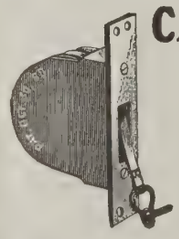
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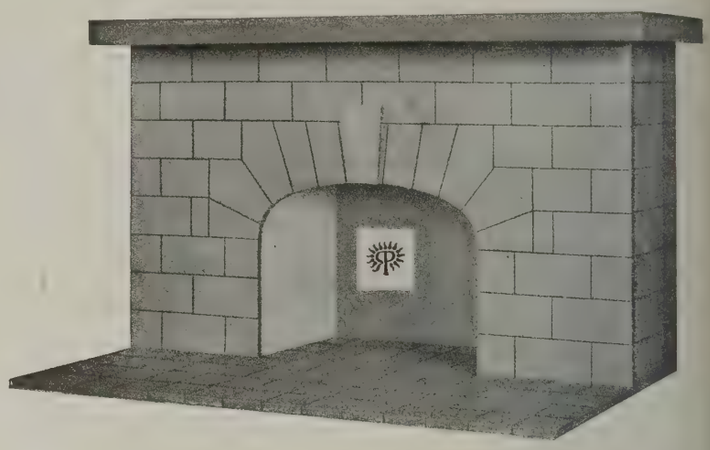
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NEW STYLES IN MANTELS.

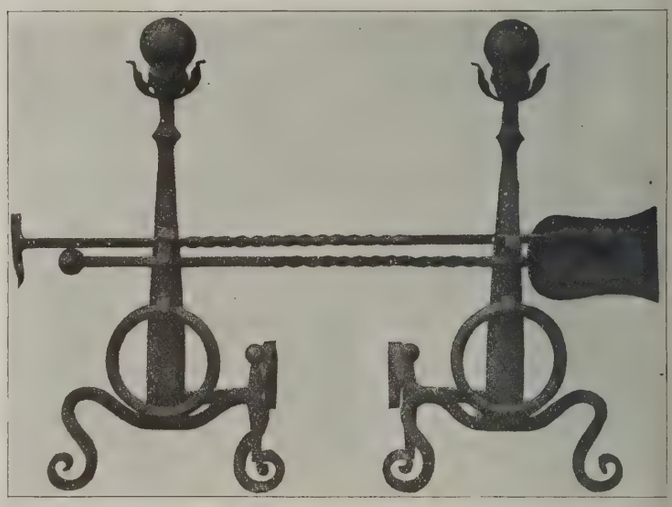
Home building, as a rule, occurs only once in a man's life. The thought expended on location, price, plan and construction are all more or less dependent upon fixed customs. To a certain extent, the design, the personal appearance, is a man's own individuality. Upon no one part is this personality reflected more than in the selection of



the mantel. While the selection made should harmonize with the adjoining woodwork, the mantel should be correct itself, in architectural design, as well as in construction.

Among the newer ideas in mantel construction for homes of moderate cost, Faience Tile has many features of excellence—simplicity of design, soft, pleasing blends of colors and texture, a material not affected by heat or moisture, a style which is particularly suitable for rooms finished in Mission or Craftsman styles, although its use in the older styles of finish is in perfectly good taste.

The accompanying illustration shows a pleasing design in Rock-



wood Faience, which is made in almost every conceivable shade, as well as with decorated panels from stock or special designs.

The complete list of mantels and accessories made by Moormann & Otten, 611-613 Main street, Cincinnati, Ohio, is so large that two catalogues are necessary to fully describe them. Home builders will find so much interest in them that they are urged to send for these catalogues before placing their orders for this part of the home.

CONCRETE AND MORTAR MIXERS.

We learn that the Lansing Wheelbarrow Co., 14 Grand street, Lansing, Mich., has purchased the assets of the Advance Concrete Mixer Co., of Jackson, Mich., and will continue the manufacture of that line of Concrete and Mortar Mixers in connection with their former line of trucks, wheelbarrows, automobile turntables, scrapers, tools, etc. The Lansing Wheelbarrow Co. has enjoyed some thirty years of prosperity, and its well established plant is in excellent condition to properly care for this additional business. To care for their large general trade, they have warehouses in New York City, Philadelphia, Chicago, Kansas City, Minneapolis, St. Paul and San Francisco.

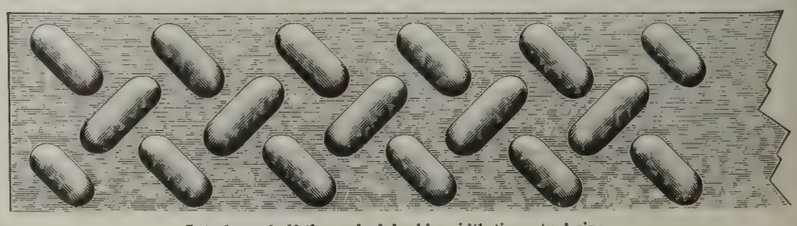
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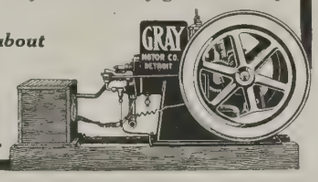
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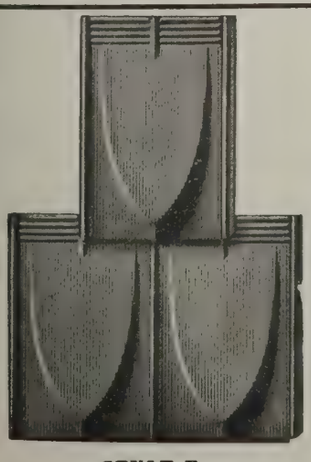
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Showing Method of Laying

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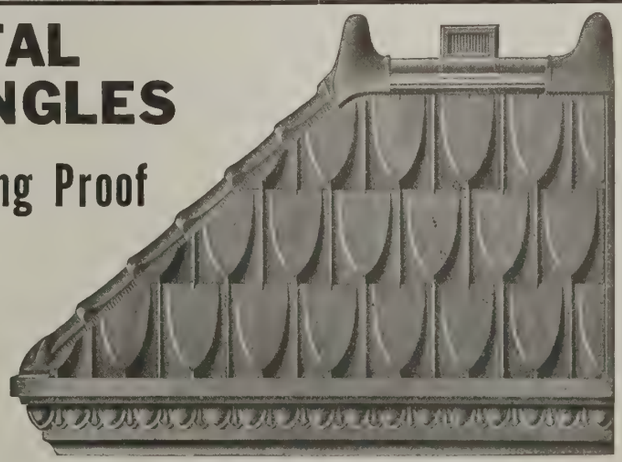
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No Home or Apartment House complete without one. It has a combination lock.

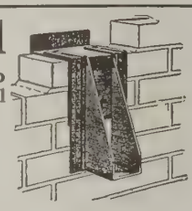
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A NEW SHEET METAL CATALOGUE.

Catalogue No. 6 of the Willis Mfg. Co., Galesburg, Ill., is presented as an anniversary number, it being now twenty years since the Willis company began in a modest way the manufacture of builder's sheet metal goods. The present catalogue is practically an encyclopedia of sheet metal work, every conceivable article of that nature being listed in great detail.

The 180 pages show the highest grade of sheet metal store fronts, cornices, skylights, ventilators, fireproof windows, doors and shutters, fire escapes, ornamental iron work, shingles, metal ceilings, roofing slate, asbestos shingles, etc.

Galesburg is unusually fortunate as a railroad center, for the delivery of material to all parts of the country, and the facilities for manufacture and distribution has had much to do with their success.

NEW TOOLS.

Were it not for enterprising tool manufacturers, who realize the necessity for new tools, we should be still using the old fashioned tools of long past generations. Carried to extremes we should be threshing with the flail, and living without the many conveniences which labor saving machinery places within our reach.

Among the manufacturers who have kept well up with the times, is the Millers Falls Company, of 28 Warren street, New York City. This fall they are introducing a new Bit Guage, which clamps the bit securely at any point. A new hack saw frame designed for cutting steel rails, girders and large work generally, is particularly good in that an auxiliary handle may be placed anywhere on the frame, allowing two to use the saw, by placing the handle on opposite side—or one to steady it by placing the handle on the top of the frame. Drill brace No. 192 is arranged to do a variety of work under difficult conditions, the ratchets being arranged to allow the tool to be used as a breast drill. The gear is attached in such a manner that it can be instantly swivelled around to either side or in front of the brace for working in cramped position, or it can be detached entirely, when the tool becomes a ratchet brace with 10-inch sweep. It seems needless to say it is ball-bearing.

Possibly the greatest interest will concern the automatic star pocket borer No. 8, which possesses all the good characteristics of the regular borers in addition to its compactness. The handle contains 8 drills and a small screw driver, each in a separate compartment, so there is no trouble selecting the size wanted.

We understand that the mention of the NATIONAL BUILDER will secure any desired information regarding these or other tools made by the Millers Falls Company.

MORRILL'S SAW POINTS.

Recognizing the fact that the great majority of carpenters lack a complete understanding of the proper methods of jointing, setting and sharpening saws, but are willing to learn, Mr. Chas. Morrill, 275 Broadway, New York City, has prepared a short, but excellent, booklet on the subject. Probably no one is much better posted on the good points of various makes of saws and what they require to keep them in condition, for his long experience in making saw sets qualifies him to write with authority on the subject of the proper treatment of saws.

The reader finds a carefully written set of instructions which will enable him to sharpen the various kinds of saws, rip, cross, two-man, cross-cut, circular, hand saws, etc., each being treated separately. The illustrations aid materially in the instructions. As an article on saw setting would not be complete without a description of the Morrill saw set, a few pages are added describing this necessary tool.

We are advised that the booklet will be sent free to all mechanics and users of saws, and we would suggest that you mention the NATIONAL BUILDER when sending in your name.

COMPO BOARD.

In the use of natural materials, the builder has much to contend with. Lumber is subject to shrinking and swelling with the moisture, ordinary paper soon becomes worthless when exposed to the frost or dampness. Many cements require special treatment to render them available. Our modern necessities are such that perfect materials are required, and it is only by careful selection of materials and manufacture that they can be obtained.

For the purpose of lining walls, temporary buildings, and garages, covering old plaster, partitions, trimming windows, displaying fixtures, making portable booths, packing boxes, shirt-waist boxes, furniture, show cases, book cases, bulletin boards, and a thousand other places where a thin, light, durable surface is required, Compo-Board seems to be especially adapted. As it is built up of five layers, there is little or no tendency to be affected by moisture or the weather, and as it can be obtained in sheets much larger than lumber, it is available for every place where thin boarding could be used, and many others which readily suggest themselves.

In the manufacture of Compo-Board, the Northwestern Compo-Board Co., 5776 Lyndale Ave., Minneapolis, Minn., have eliminated as far as possible every tendency of the materials to deteriorate. The core is built up of narrow strips of thoroughly seasoned wood, the grain arranged indiscriminately, which overcomes the tendency to shrink, swell, warp or twist. This core is given a heavy coat of cement on both sides, which keeps all moisture and air from the wood, and the whole faced with a specially prepared moisture proof paper. The assembled layers are then subjected to a very heavy pressure and intense heat, making a straight sheet four feet wide and eighteen feet long.

While Compo-Board is sold through dealers generally, the manufacturers are sending out very interesting reading matter describing some of the many uses to which Compo-Board is adapted, and it would be well for all really interested to write them.



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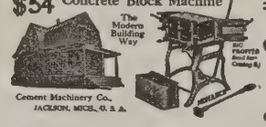
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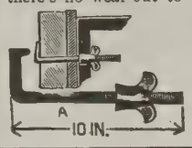
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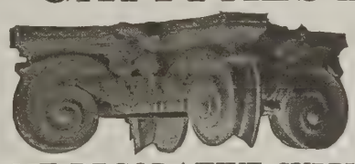
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add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

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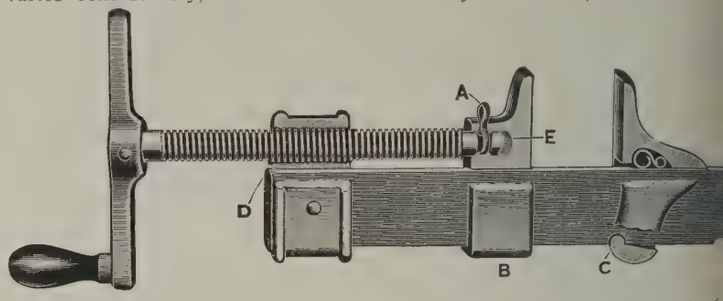
It contains many beautiful designs of Consoles, Columns and Grilles.

NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

CARPENTERS AND CRAFTSMEN CLAMPS.

The manufacture of tools, and appliances for shop work calls for the highest grade of workmanship. A little glue, a few extra bolts or screws might patch up a piece of work going to a distant state when the article is one in which appearance is the main object. With tools and shop appliances, however, the material must be the best and the workmanship the most skillful to produce apparatus which will stand the wear and tear of continuous service, abuse at times, and do the work for which they are designed, quickly, economically and satisfactorily.

In no line are more exacting conditions met with than in the assembling manufacturers of woodwork. The quality of the material varies considerably, conditions are not always the same, and inaccuracies of workmen must be contended with. In assembling woodwork, such as doors, benches, furniture, etc., clamps are almost indespensible. Upon their pressing power depends the neatness of the work, and when once screwed up there must be no slipping, sliding, or twisting out of place.



When the E. H. Sheldon and Co., 321 N. May street, Chicago, Ill., commenced the manufacture of benches for manual training and craftsmen, they realized the necessity of a better grade of clamp than was then in the market. From their own designs, they made clamps which proved peculiarly efficient in their work. The constructive features appealed so strongly to all who saw them that they have added a number of patterns designed for special work. We show two forms of these clamps, from which a clear idea of their efficiency may be obtained. Among the features of the first, the following will be noted:

A steel collar entirely surrounds a groove in the end of the screw, making it impossible for the head to become detached from the schew. See "A."

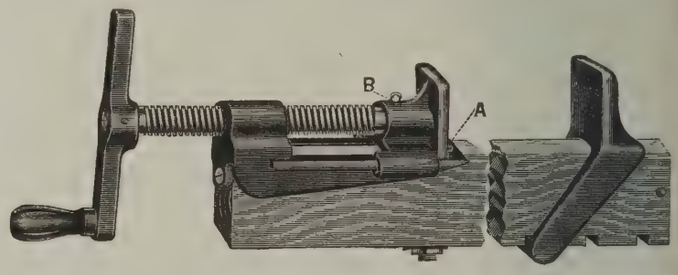
The wide sleeve enveloping the bar eliminates all bending strains on the screw and holds the head rigidly in position. See "B."

An indestructible latch is cast into the saddle and engages in a tempered steel notch in the bar. The clamp may be used in a single position a million times without cutting loose or slipping. See "C."

The screw head is driven and headed on to bar before pinning, insuring absolutely permanent alignment under any pressure. See "D."

These clamps are made for the heaviest shop service. For ordinary cabinet work a hard maple bar is used in place of the steel. This model is shown in the second cut.

The prominence given these clamps might mislead one regarding



the class of goods made by E. H. Sheldon & Co. Besides these clamps they are well known for their lathes, manual training benches and vises, now so generally used in making craftsman and Mission furniture and fittings. E. H. Sheldon & Co., will be very glad to send their catalogue to anyone interested, and we believe that includes every NATIONAL BUILDER reader.

SILL AND STEP MOULDS.

Concrete block manufacturers early found that their particular machine was not the panacea for all the ills of building. Various forms of blocks might be made on any number of machines, but there came times when no machine was fitted for the work in question. One



of these cases occurs in the casting of long sills, lintels, steps, coping, etc. The difficulty was generally overcome by making plank frames which answered the purpose fairly well for one job, but another job required another frame.

It was to eliminate this trouble that W. E. Dunn & Co., 4135 Fillmore street, Chicago, Ill., devised the all-steel form shown herewith. The illustration shows its use so plainly that no description is required beyond saying that by the use of suitable plates the faces, top, ends, etc., can be left with any desired ornamentation or finish.

W. E. Dunn & Co. are headquarters for many other ingenious labor saving devices for the concrete worker, and their catalogue explains their line fully.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WE HAVE BEEN ASKED:

"Are you interested in the carpenters and the Disston Saws they buy, even after you have their money?"

This is a question easily answered. Do you suppose for an instant that we could have retained our regular trade, constantly increased it, built up and maintained the largest and greatest works of its kind in the world, over a period of seventy-one years, had we not seen to it that the articles we sent out were "making good" and satisfying the user?

LARGEST PLANT IN THE WORLD.

We want to force home to you the important fact that our plant is by far the largest of its kind in the world, consisting of 58 buildings, covering 50 acres. We employ 3,500 men, and during almost three-quarters of a century—the period we have been in business—very little time has been lost by the employes. You must realize that it requires "some orders" to keep an establishment of this magnitude going.

There surely must be more than ordinary merit in that brand of goods which creates and satisfies the demand over a long period of time.

PROTECTS THE USER.

We certainly do want to know if any **Disston Brand Saw, Tool or File** does not stand up to our guarantee. That guarantee is sufficiently broad to protect the user on every reasonable point. If you have a Disston Saw, Tool or File that has failed you through any cause of ours, let us know, and we will see that you bear no loss on our account.

Each and every article bearing the name DISSTON carries a full warranty as to material and workmanship.

And this guarantee has been in force since the first Disston Saw was made.

There are millions and millions of **Disston Brand Saws, Tools and Files** in practical use all over the world, which are giving the highest satisfaction. Of course, you will appreciate that almost every individual has his own ideas and opinions and it is impossible to cater to each, particularly in cases where there may be prejudice; so our only recourse is to satisfy the majority. And this we have been doing for over seventy-one years—making the **goods of superior quality and after designs which have been demonstrated by practical use to be best adapted for the purpose.**

It is noteworthy, however, that where we have one complaint, we receive thousands of letters voluntarily testifying to the superior worth and durability of **Disston Brand Goods.** This speaks for itself.

Nevertheless, we are always open to conviction, and if a man has complaint to make about any of the Disston Goods, it is but fair and just to us that he enter the complaint; for it is by considering, fully digesting and going into the cause of the trouble, in addition to our constant experimenting and investigations, which enables us to so improve and perfect **Disston Goods** as to bring them up to the highest point of efficiency. When a man has occasion to find fault with any of our goods we do not consider it "a complaint," but a stimulation and a reason for increased vigilance in looking to the safeguarding of the high prestige we have achieved for the name **Disston.**

MOST PRACTICAL EXPERIENCE.

We have the experience—and broad experience at that—extending over seventy-one years, not only in the making, but in the using of tools. Think of the enormous size of our plant; think of its many, diversified departments and their ramifications—Steel making, Saw making, the making of various Tools, File making, Wood working departments, Machine Knife making, Machine Shop. Think of the enormous quantities of tools and materials we buy from the outside, and think of the great quantity of tools of our own make that we use. When you consider all these points, it will give you some idea of our experience in the manufacturing and use of tools. **And that experience we make COUNT in the perfecting of our manufacturing facilities and the increased efficiency of our own brand of goods.**

MADE FOR EFFICIENCY.

In the **Disston Brand Saws, Tools and Files** you have the advantages of the product of a progressive, up-to-date factory, the **largest in the world.** Where the goods are made throughout, from the making of the steel itself—the superiority of which has been demonstrated for the past fifty-six years—to the finishing operation; and each process is performed by mechanics of long experience and highest order of skill.

We want to say to you, and say it positively, that **Disston Goods are made not merely to sell, but for practical use.** All materials used are of highest grade; the steel is properly hardened, tempered, and ground under the Disston exclusive processes; each article carefully inspected at various stages of the work, and finished in a workmanlike manner. **We fully guarantee them to be of highest efficiency and unequaled.**

WE ARE INTERESTED.

Reverting to the question:—Yes, we are interested in the carpenters and all other users of our tools, as well as the tools themselves after they have been bought and put to use. For we take great pride in the successful results they have achieved in the working, and fully realize—have realized for years—that the world-wide reputation we have earned can only be maintained by furnishing goods of the highest efficiency.

HENRY DISSTON & SONS

INCORPORATED

KEYSTONE SAW, TOOL, STEEL & FILE WORKS

PHILADELPHIA

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE COYNE TRADE SCHOOLS.

Truly the poet said, "In the bright lexicon of youth, there is no such word as fail" but just as truly, there are failures, not only in the old age, but middle age and youth. The advantages of education, even if free, are not available to those who must work for their very existence. When a college education is obtained, it is frequently difficult to find a position open to which the long and costly education is adaptable. And anyway, who does the actual work, the man in the office or the man in overalls?

To those to whom a college course is practically impossible through lack of early schooling, there is open the vast field of trades. No trades pay better than the building trades, and on this account bricklaying, plumbing, electrical work, and painting, decorating and paperhanging have been selected by the Coyne National Trade Schools as best adapted to the great army of men who would better themselves.

In the Coyne Schools, every effort is made to obtain natural working conditions. Students are not told what brick, mortar and trowels are, they are given the bricks and mortar and tools, and shown how to lay a neat, strong wall. Actual working conditions are used, the only difference being that, after the work passes critical inspection, it must be torn down to make room for the next day's work.

In plumbing the same general course is followed. Joints are wiped in the most approved manner, fixtures are set up and tested. Master plumbers inspect the installation before it is passed, and the student leaves the school prepared and competent to do any of the work in that trade.







Similar instruction in electrical work is given the student working on actual installations, and the finished work must conform to the Underwriters' Rules. When a graduate leaves the school, he is capable of filling a position as a regular electrician or of starting an electrical business of his own.

The schools also have courses in mechanical drawing, painting, decorating and paper hanging, in which the same thoroughness is followed.

One of the newest trades to be taught is that of moving picture operating. So general have these positions become that the competent operator is scarcely ever out of employment at good wages. As in the other course, the student works with standard apparatus, and is competent to accept a position immediately upon leaving the course.

As instructions of this character cannot be taught by mail, the students come directly under the eye of the instructors who, as practical workmen, can readily see the weak points in each student and so aid him by personal instruction. The nature of the work is such that no regular classes are formed, the student starting at any time and advancing as fast as his individual work allows.

For those who wish to learn a trade, there is probably no better place than the Coyne National Trade Schools. For those who wish to "brush up" and see what new ideas there are in construction and workmanship since their apprentice days, there is ample opportunity. To secure full information regarding the schools, write the Coyne National Trade Schools, 59 E. Illinois street, Chicago.

A visit to the schools is a most interesting trip, as students can be seen doing the actual work of these trades.

Amatite ROOFING

Mineral Surfaced
Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface ***which never needs painting;*** the two layers of Pitch which is the greatest waterproofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.



We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

Every dealer should push it.

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and the first cost is not all important—it's the first cost plus repairs.

"Buckeye Brand"
RED CEDAR SHINGLES
Reduces Roofing Cost

because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

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CORTRIGHT METAL SHINGLES

Many a builder or contractor has had his bid turned down, because he had acquired the reputation of using poor quality material.

This may not always be his fault, for his competition may be so keen, or the owner's funds may be so limited, as to necessitate some sacrifice in the quality of materials.

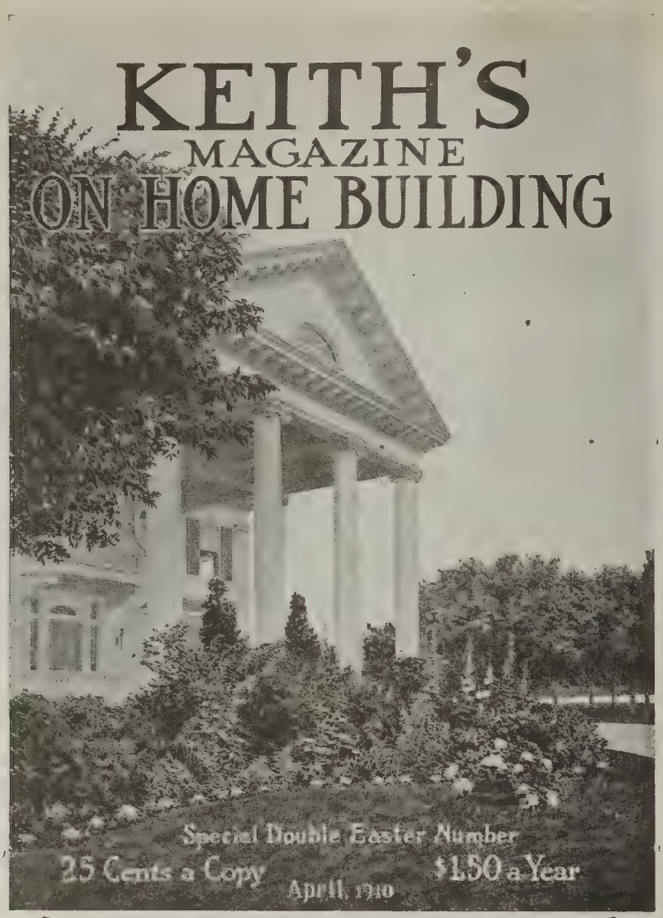
Cortright Metal Shingles are economical enough in cost to enable you to meet competition with superior instead of inferior quality, and at the same time possess so many obvious advantages over other forms of roofing that even should your bid, including them, run somewhat higher than competitors' you have arguments in their favor so convincing as to overcome any such differences.

Another reason why **Cortright Metal Shingles** would help you on competitive work is they are so constructed that any of your ordinary workmen can lay them, saving you the otherwise necessary expense of skilled roofers.

Write today for our special proposition to contractors and builders.

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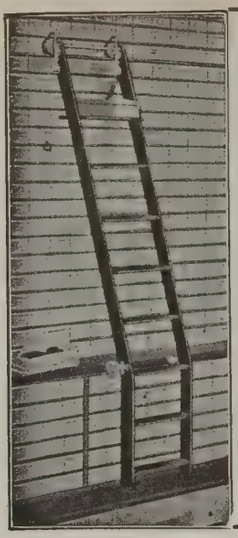
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I accept your Special Offer and enclose $2 for a year's subscription to the well known KEITH'S MAGAZINE on Home Building, with 3 recent sample numbers extra and one of your $1 books. I have selected from your list, Vol. No._____, which please mail to me at once.

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by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

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1442 N. Eighth St., ST. LOUIS, MO.

HARTMANN-SANDERS CO.

Manufacturers of



Koll's Patent Lock Joint Columns

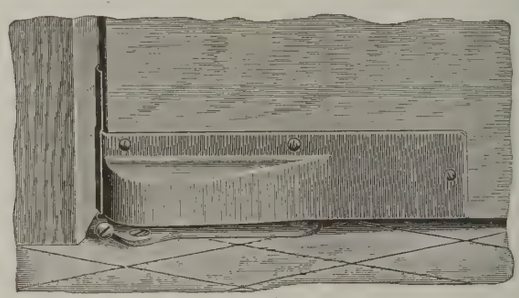
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As the leaders in Architectural Beauty and Quality.
When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.
We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, that's why we are selling more columns today than ever before.
Ask for Catalogue "T"—it's worth having for any Home Builder.
Send for catalogue T 27 of pergolas, sun dials and garden furniture or T 40 of wood columns.

We manufacture a full line of porch material and Interior Hardwood Columns.

2155 ELSTON AVENUE - CHICAGO, ILL.

1910 "Standard" Floor Hinges



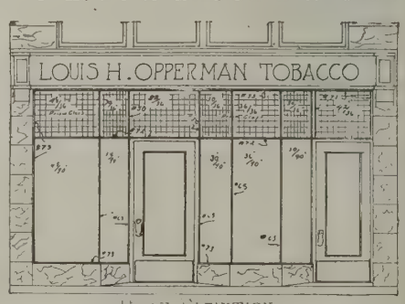
sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio

PERFECT VENTILATION

is given to display windows that are built with the Petz Bar. No more moisture of frost on your window panes. Strongly made, this method of store front construction gives the most pleasing results on account of its strength, lightness, firmness and ease of construction. If you have had trouble with other bars, it will pay you to investigate the Petz. No more broken glass with this bar.

Tell us the nature of the work contemplated and we will tell you the type of bar to use, with prices and full specifications. Write for our book, "Modern Store Front Construction." It will throw new light on this important question.



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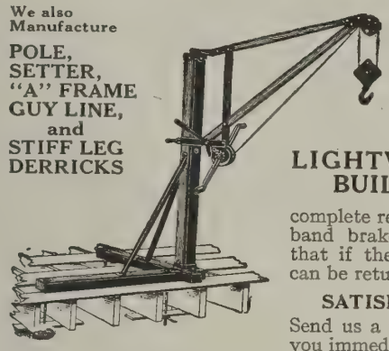
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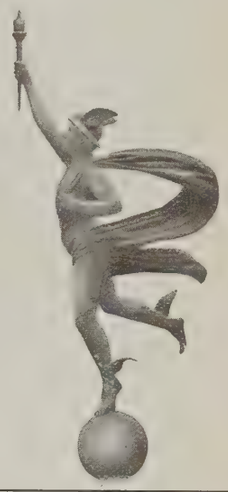
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Our screens are made from kiln dried lumber and have waterproof coped joints and the frames are weather-proofed before the finishing coats are applied.

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$1.00 Good For $1.00

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The SELF-SETTING PLANE

(As long as this Ad appears.)

Any dome in this paper is good for one dollar, in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our planes are not sold.

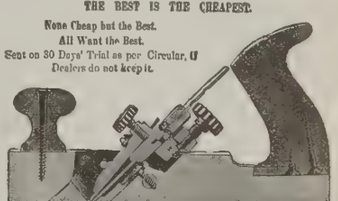
If you want more than one Plane and they are not sold in your town we will allow you dealer's cash discount with order, which is 35 & 2% off list.

List price of **Beach Wood Planes:** Smoother $3.25, Jack $3.50, Fore $4.00 and Jointer $4.50

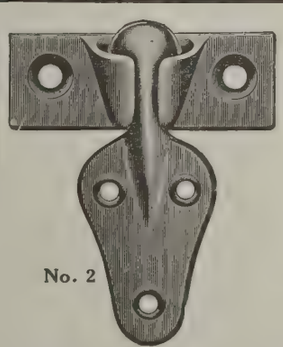
Do not say the price is too high until you try it, then if the Plane is not **worth to you, twice its cost,** return it at **our expense** and the **trial won't cost you a nickel.**

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

If you don't want a **Self Setting Plane** now, **send us a dome and the addresses of ten carpenter friends, no matter where they live, and we will send you a hard, tough, carpenter's pencil and circulars.**



Gage Tool Co. VINELAND NEW JERSEY



No. 2

Storm Sash and Screen Hanger No. 1 and 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.



No. 1

Manufactured by the

Diehl Novelty Company, SHEBOYGAN, WISCONSIN

Send for Catalogue

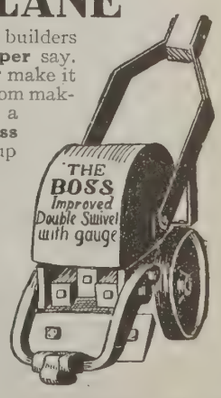
IT'S A SCRAPER BUT IT WORKS LIKE A PLANE

That is what the many satisfied contractors and builders who are using the **Boss Improved Floor Scraper** say.

The **gauge** on the front and wheels at the rear make it like a plane. This gauge, which keeps the knife from making a depression in the floor, gives the knife a double support. It can be set for **any thickness of shaving,** or **instantly removed** for working up into corners.

Deep Cutting is prevented by the pear shaped wheel in front, which lets the knife down gradually to make the cut.

Poor work is **impossible** as with the simple but positive adjustment of this gauge and wheel attachment the knife leaves no mark. The standing attachment cleans the wheel and takes off the rosin when working hard pine.



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FIREPROOF — NO PAINTIN
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Proof against action of fire, snow, ice, lightning and wind. Cannot crack, warp, split or decay. Made without tar. Impervious to water, cold and heat.

Can be laid over old shingles or tin on either steep or flat roofs.

The heavy coating of natural colored red or gray crushed slate is firmly imbedded in a 3½-ply fabric of long fiber felt, from 10 to 15 per cent heavier than any other rubber felt roofing manufactured. In its composition, weight, thickness and quality it is the same superior fabric we have sold for years and which has been tried and proven in every climate from Alaska to Texas. But the surfacing of slate in permanent colors is better than any surfacing heretofore produced, as durable and handsome as slate tile.

To secure a handsome color effect use Red Slate Surfaced Roofing for the roof and the Gray Slate Surfaced Roofing for the siding, with or without battens. The house thus finished will appear to be walled and roofed with stucco or cement.

Substitute This Better Roofing For Shingles and Double Your Profits

Or you can cut in half the cost to your client of his roof and at the same time furnish him a roof that is guaranteed to outwear shingles and is far more attractive in appearance.

The illustration shows our Modern Home No. 144, roofed with Red Slate Surfaced Roofing and the second story sided with Gray Slate Surfaced Roofing. Cost of roofing (21 squares) for the second story and roof of this house, $47.25; cost of labor for laying, $6.30; total cost, $53.55.

A Grade Cedar Shingles (21,000) for the roof and second story of this house would cost $73.50; cost of laying shingles, $31.50; total cost, $105.00. Remember, our Red or Gray Slate Roofing will outwear shingles.

Total saving on material and labor through the substitution of this better roofing for shingles, $51.45.

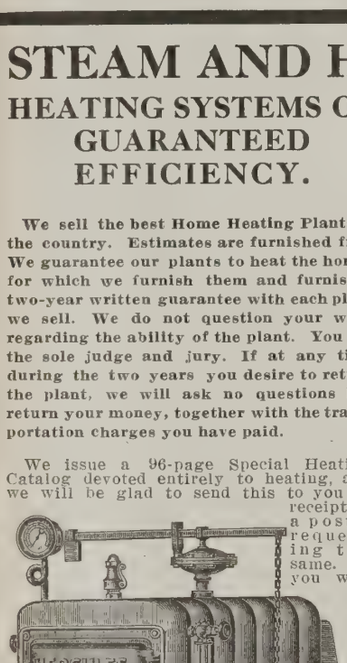


STEAM AND HOT WATER HEATING SYSTEMS OF GUARANTEED EFFICIENCY.



We sell the best Home Heating Plants in the country. Estimates are furnished free. We guarantee our plants to heat the homes for which we furnish them and furnish a two-year written guarantee with each plant we sell. We do not question your word regarding the ability of the plant. You are the sole judge and jury. If at any time during the two years you desire to return the plant, we will ask no questions but return your money, together with the transportation charges you have paid.

We issue a 96-page Special Heating Catalog devoted entirely to heating, and we will be glad to send this to you on receipt of a postal requesting the same. If you will kindly make us a rough sketch of the building you intend to order a heating plant for, we will be pleased to furnish you an estimate on the boiler, radiators, all fittings, pipe and accessories for the complete installation of a steam or hot water heating plant.



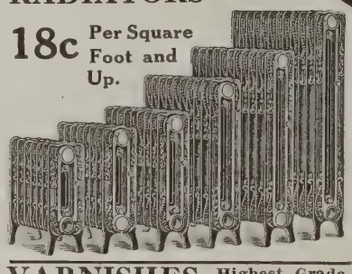
$200.00 is what you would pay elsewhere for a high class guaranteed steam heating plant for the six-room house shown below as our Modern Home No. 103. We equip this residence with a complete steam heating plant, equal to any plant made in economy of fuel consumption and in heating capacity, for only $125.80, or we offer to furnish this same building with a complete hot water heating plant for only $158.36.

For the big eight-room house, also shown below and designated as our Modern Home No. 163, we furnish a complete steam heating plant for $193.64 or a complete hot water heating plant for $238.07.

We will make you the same proportionate saving on heating plants for the buildings you are erecting, no matter what their size.

COMFORT RADIATORS

18c Per Square Foot and Up.



VARNISHES, Highest Grade, One-Third Less.

We carry an enormous stock of Varnishes of every kind as well as paints, kalsomine, whitewash, wire and waxing brushes and other painters' tools. Thousands of painters and builders will not buy an ounce of varnish or paint elsewhere. Our prices for the very best qualities of varnish possible to produce are from 50 cents to $1.50 lower than retailers' prices.

Every ounce of paint and varnish material we sell is guaranteed to wear and give perfect satisfaction, or your money will be returned.

We have space for but three examples of our hundreds of cut prices in this line.

Seroco No. 1 Hard Oil Finish, pale, free flowing, durable. Per gallon.....95c

Seroco Interior Varnish, fine gloss; lasting finish. Per gallon.....$1.20

Seroco Durable Floor Varnish. The best floor varnish made. Per gallon.....$1.70

Send us a Trial Order. We take all the risk.

Our Paint and Varnish Color Samples and our big Special Paint Catalog is yours for the asking.

Use the Coupon Below.

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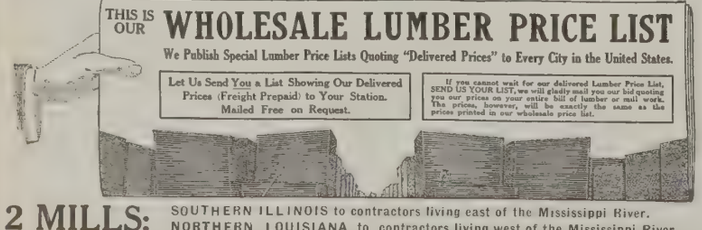
Halftone illustrations with first and second floor plans in reduced size of more than 100 dwellings of every modern style—country, tow and city residences, cottages, houses, flat buildings and bungalows.

OUR $100.00 PLANS FURNISHED FREE. When your client has selected fro the Book of Modern Homes the house he desires to build, write us designating it by i number and enclose $1.00, merely as a temporary deposit.

We will immediately send a complete set of plans, blue prints, specifications and typewritte bill of materials together with a certificate for $1.00 which we will redeem as cash on any orde for $10.00 worth or more of mill work or building material which you send us later. The plan thus cost you absolutely nothing.

Have You Got Our September Lumber List?

Do you know we can save you $100.00 on a carload of lumber and furnish you absolutely the best grades, grades far better than are now furnished by your dealer? Give us a trial. Write for this Wholesale Lumber List. Let us ship a car on approval with the understanding that we save you all we claim, and our quality surpasses the kind you are now buying. MAILED FREE ON REQUEST.



2 MILLS: SOUTHERN ILLINOIS to contractors living east of the Mississippi River. NORTHERN LOUISIANA to contractors living west of the Mississippi River.

We will furnish all the material to build this six-room house, consisting of lumber, lath, shingles, mill work, ceiling, siding, flooring, finishing lumber, building paper, pipe, gutter, sash weights, hardware and painting material and excepting only cement, brick and plaster.

FOR $711.00

This is a popular design two-story house with dormer, affording a great deal of room for the amount of money required to build it. An open stairway in the reception hall with cased opening between the reception hall and living room and cased opening between living room and dining room. Two large bedrooms, four large closets and bathroom on second floor.

Artistic front door glazed with sand blast design glass. Five-cross panel yellow pine interior doors, clear yellow pine trim for both first and second floors. Clear yellow pine flooring for entire house and porches.

Painted two coats outside, choice of color. Varnish and wood filler for interior finish.

Excavated basement under entire house, 6 feet 6 inches from floor to joists. First floor 9 feet from floor to ceiling; second floor, 8 feet 6 inches from floor to ceiling.

For floor plan refer to the Book of Modern Homes. Mailed free on request.



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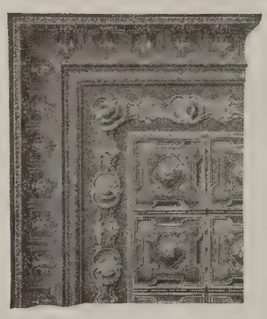
Flint Sand Coated Rubber Roofing. Unequaled Value at Our Low Price.

Many a roll of Composition Roofing identical in quality with ours has been sold by others under some fancy label at two and three times our price.

While our Composition Roofing has not the durability or the handsome appearance of our Slate Surfaced Roofing, and other more expensive grades, it will fully meet the requirements of the builder who desires only a temporary roofing to last for a few years. Our Composition Roofing is made of standard felt, saturated with an asphaltic composition and is finished on one side with a smooth asphalt rubber coating and on the other side is coated with fine sand. It may be used with either side exposed to the weather.

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$25.11 AND UP

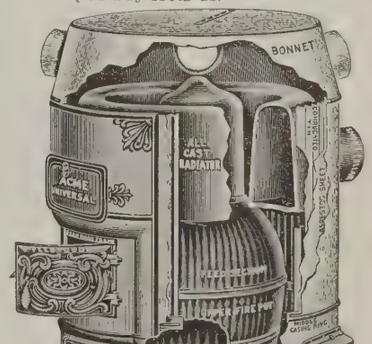
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So large is our business in heating plants that we are able to maintain a corps of heating and ventilating engineers whose services are at your command without cost.

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DON'T BREAK GROUND for your next building till you get your copy of the Book dern Homes. We can enable you to build the average $3,000.00 house for about $2,000.00. aving we make you on any item is equal to one-third and often one-half.

Remember that among the 100 attractive homes in the Book of Modern Homes there is one that uilt your client, no matter how particular he may be or what kind of a dwelling he desires.

FOR

,260^{00}

We will furnish all the material to build this eight-room house, consisting of lumber, lath, shingles, mill work, flooring, ceiling, finishing lumber, building paper, pipe, gutter, sash weights, hardware, mantel and medicine case, and excepting only cement, brick and plaster.



MODERN HOME No. 163

Has two full stories and attic. Stair hall contains open oak stairway to second floor, under which is an inside cellar stairway; also a stairway from kitchen leading to second landng of the main stairs. Outside cellar stairs under rear porch. Colored leaded Art Nouveau sash at each landing and one half way up the stairs; also in vestibule at front door. Mantel in dining room.

Beautiful front door, veneered oak, 3x7 feet, glazed bevel plate glass. Two-panel veneered birch interior doors; clear birch casing, baseboard and trim throughout the house. Two bevel plate glazed front doors on second floor, one opening from each chamber on to balcony. Clear oak flooring for main rooms on first floor; maple flooring for kitchen, pantry and second floor. Varnish and wood filler for two coats of interior finish.

Built on concrete foundation with cement blocks above grade line. Frame construction, sided with stonekote and roofed with cedar shingles.

See the Book of Modern Homes for detailed description of this and over 100 other up to date residences.

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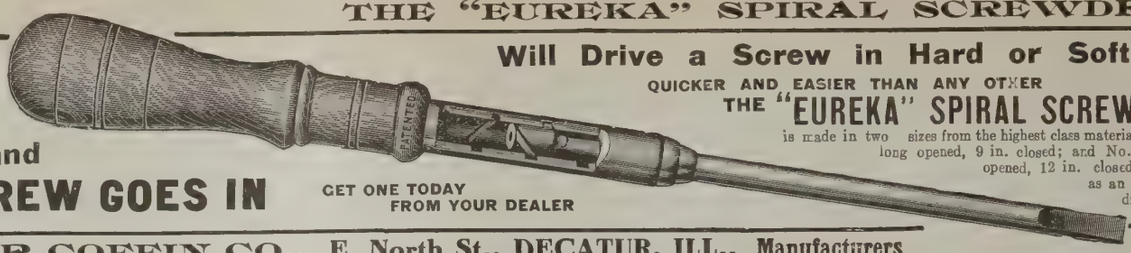
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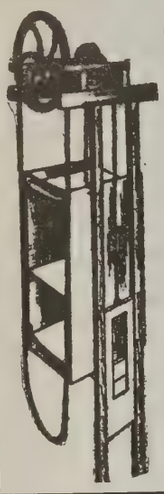
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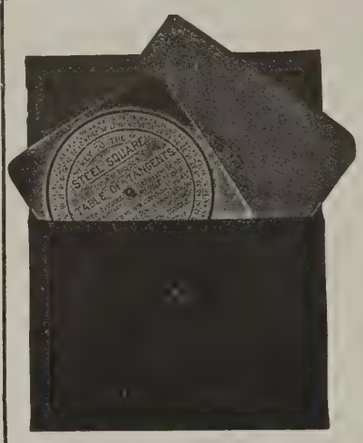
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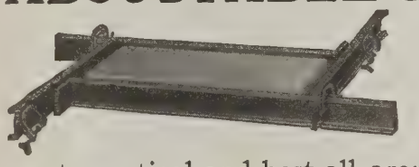
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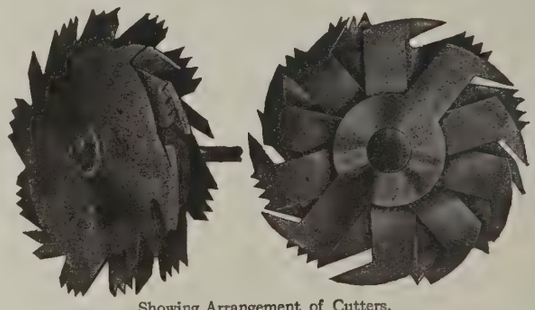
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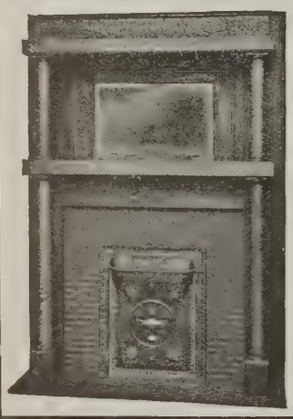
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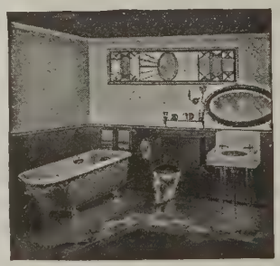
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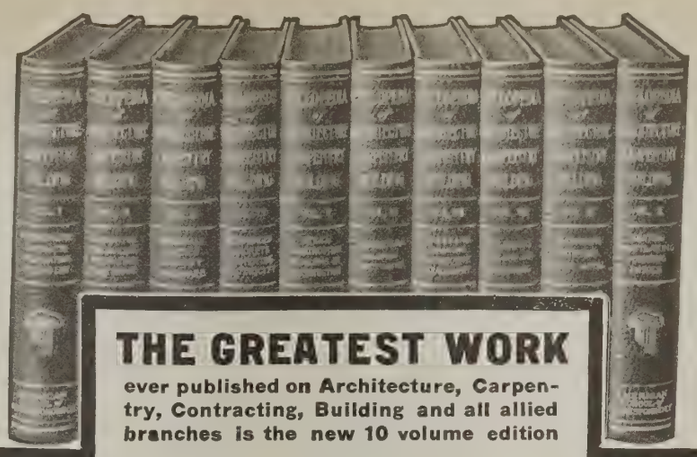


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Grand Trunk Railway System

Most Direct Route to the "Highlands of Ontario"

Orillia and Couchiching, Muskoka Lakes
Lake of Bays, Maganetawan River, Algonquin National Park
Temagami, Georgian Bay, Kawartha Lakes

Spend Your Summer Holidays at One of These Delightful Spots

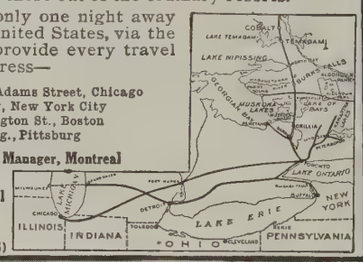


Finest summer playgrounds in America. Good hotel accommodations at moderate cost. The lover of outdoors will find here in abundance all things which make roughing it desirable. Select the locality that will afford you the greatest amount of enjoyment and send for **free** map folders, beautifully illustrated, describing these out of the ordinary resorts.

All this recreation paradise only one night away from the leading cities of the United States, via the Grand Trunk. Palatial trains provide every travel luxury to your destination. Address—

J. D. McDONALD, 112 West Adams Street, Chicago
F. P. DWYER, 290 Broadway, New York City
E. H. BOYNTON, 256 Washington St., Boston
W. ROBINSON, 506 Park Bldg., Pittsburg

W. E. DAVIS, Pass. Traffic Manager, Montreal
G. T. BELL
Asst. Pass. Traffic Manager, Montreal
H. G. ELLIOTT
Gen'l Passenger Agent, Montreal



(8)

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

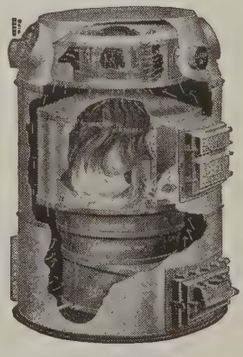
Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D.R.BARTON 1832. ROCHESTER, N.Y.

MACK & CO., Sole Makers
Brown's Race Rochester, N. Y.

BOVEE FURNACES at MANUFACTURER'S PRICES

SAVES 50 PER CENT OF COST; 40 PER CENT OF FUEL



Most Durable, Most Economical Furnace Sold
Has a Perfect Ventilating System for Every Part of the Building

RESIDENCE HEATING PLANT

Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 20-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

Special Price, $65

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54-in. Furnace, 32-in. Fire Pot, 40-in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

Bovee Grinder & Furnace Works, 60 8th St., Waterloo, Ia.



BIG SAVING

Our new catalog mailed free



Will Convince

It contains a complete line of HIGH GRADE sash, doors, frames, blinds, mouldings, grilles, colonnades, stair and porch work, art glass, rolling partitions, etc., etc.

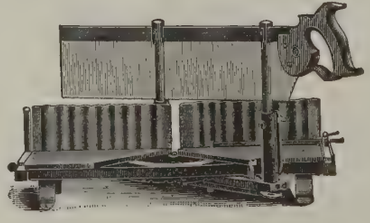
Special

Write today for booklet of GREATEST BARGAINS ever offered in HARDWOOD MANTELS AND FIREPLACE FIXTURES. Don't delay as these prices are for the purpose of reducing our IMMENSE STOCK.

THE HUBER BUILDERS MATERIAL CO.
39-43 Vine Street, Cincinnati, Ohio

GOODELL MITRE BOX

Made of STEEL - Cannot Break
First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



We Want A Builder In Every Town

We Have an Attractive Proposition for One Carpenter or Builder in Every Community to Take Orders for Our Widely Advertised

EDWARDS' METAL SPANISH TILE

ARE EASILY SOLD BY OUR AGENTS

Home Owners Everywhere Are Reading Our Advertisements in the Leading Magazines

EDWARDS' INTERLOCKING METAL SPANISH TILE

ARCHITECTS EVERYWHERE SPECIFY THIS ATTRACTIVE ROOFING

Edwards' Metal Spanish Tile are stamped out of the highest quality Worcester Grade Terne Plate, size 10 x 14 inches, furnished either painted or heavily galvanized. They are provided with our patented interlocking device, which conceals all nails, makes it possible to get a perfectly moisture proof roof without **soldering** and without danger of having the tile crack open in extreme cold or hot weather.
Edwards' Metal Spanish Tile looks exactly like the best Terra Cotta Tile. They have the decided advantage of being much lighter, easier to apply, longer lived and cost much less.

Write us today about your territory. Here's an opportunity you should not miss. Many carpenters and builders have been so successful taking orders and laying our Metal Spanish Tile that they now devote their entire time to this business. Others have made big profits selling and laying our metal tile roofing "between jobs." We show you how to build up an independent, profitable business in your own community. Write for our proposition today. The territory is going fast. Don't be too late. Send a postal right now.

The Edwards Manufacturing Company

"THE SHEET METAL FOLKS"

430-450 Eggleston Avenue **Cincinnati, Ohio**

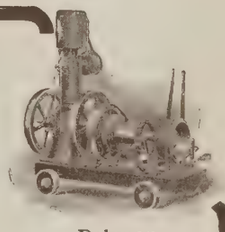
THE WORLD'S LARGEST MANUFACTURERS OF METAL ROOFING, METAL SHINGLES AND METAL CEILINGS.



Little Wonder
Concrete Mixer

Concrete Machinery, Tools and Molds of all kinds.

Gasoline Hoists, Builders' Derricks, Cranes and Material Elevators.



Polygon
Gasoline Hoist

THE GREAT POLYGON LINE
THE LITTLE WONDER LINE

Waterloo Cement Machinery Corporation

111 Vinton Street, Waterloo, Iowa

Stone Crushers, Sand and Stone Screens, and Elevators

Send today for descriptive literature

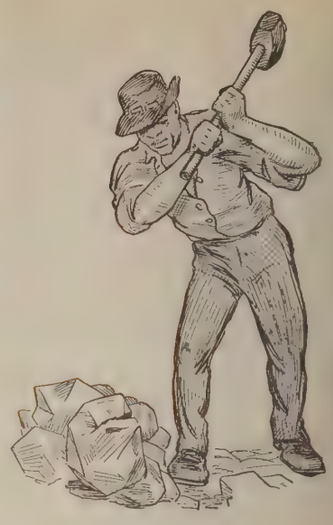


Polygon Junior
Concrete Mixer

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



BRAIN OR BRAWN



YOU EARN your bread with brain and skill rather than with muscle. Otherwise you would be a laborer with pick and shovel, instead of a mechanic with a kit of fine tools.

One day two husky laborers were told to remove a few yards of paving bricks between street-car tracks. They began hammering them to pieces with sledges. Hard work—slow work. Not until they were shown, did they think of loosening the bricks with bars and pulling them out. ALL BRAWN—NO BRAIN.

You use your brain to save your brawn, to save time, to save mistakes, to save you money. And you never make a more profitable use of your brain than in the selection of the saw, for it is the tool that you use most—the tool requiring most energy and most skill in handling. The intelligent mechanic uses

ATKINS SILVER STEEL SAWS

These saws are fully abreast of the times. They embrace the latest and most scientific ideas in saw making. They are so constructed that they run easier than any other saw, and the SILVER STEEL used in the blades will receive that keen, sharp, cutting edge that you high-class mechanics want—and hold it.

How to Get Them

Go to your dealer and tell him that you are a progressive mechanic and you want tools that will save you time and strength. Select a saw with the words SILVER STEEL on the blade. Then you'll be sure of getting a saw representing the highest achievements in saw making. If your dealer does not sell them he will order for you from his wholesale house. If he won't do this, then let us know. We'll help you get the finest saw if you want it.

You Run no Risk

We stand back of every SILVER STEEL SAW with a guarantee so strong that you risk nothing—not one cent. If the next saw you buy is an Atkins saw and if the words SILVER STEEL are on the blade, remember that it is guaranteed to run easier, cut faster and hold its edge longer than any other saw. If it is not absolutely satisfactory, you are authorized to take it back to your dealer and get your money back or a new saw. If he won't refund your money, let us know.

Offer to Carpenters.

We are compiling a list of high class mechanics and if you will send us your name, we'll mail you our book on saws free of charge. If you'll send us ten cents to pay postage, we'll forward you free a strong, durable nail apron, our Saw Sense book, monthly time book, and a whole lot of useful information about high grade saws.

E. C. Atkins & Co.

INCORPORATED

Indianapolis, = = = Indiana.

NA

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PRINTED AND CIRCULATED THAN ANY OTHER BUILDING PAPER IN AMERICA.

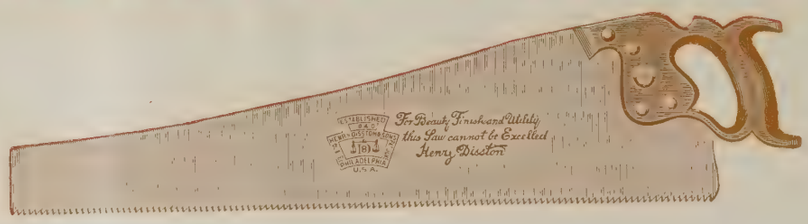
THE NATIONAL BUILDER



PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

OCTOBER, 1911

Disston Saws, Files and Tools



For fifty-six years we have been making Disston Crucible Steel. It is made under the exclusive Disston process. The long life and cutting properties of Disston Saws are due to Disston Crucible Steel and the treatment it undergoes in our shops.

The Disston establishment is the ONLY ONE making steel for its full line of saws and tools—one reason why Disston Saws are uniformly durable and efficient.

Disston Saws are hardened and tempered by the exclusive Disston process.

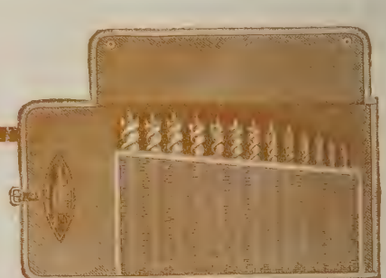
It pays to buy Disston Saws and Tools. For any and every kind of work Disston Saws, Files and Tools are the most reliable.

We have been making saws for over seventy-one years.

Henry Disston & Sons, (Incorporated)

Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, PENNSYLVANIA

ANNOUNCEMENT



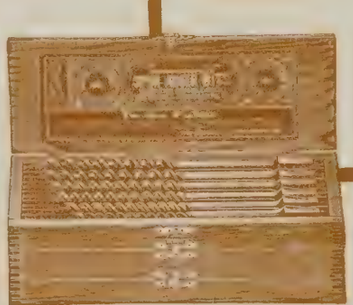
4 ADDITIONAL SETS
"RUSSELL JENNINGS"
AUGER BITS
NEW SETS

22½ quarters— 11 bits
Standard thread ¼ to ¾ inch, quick boring thread 8 and 10 sixteenths.

18 quarters— 9 bits
4, 5, 6, 7, 8, 9, 10, 11 and 12 sixteenths.

20½ quarters— 9 bits
4, 5, 6, 7, 8, 10, 12, 14 and 16 sixteenths.

17½ quarters— 7 bits
4, 6, 8, 10, 12, 14 and 16 sixteenths.



RUSSELL JENNINGS MFG. CO.

CHESTER, CONN., U. S. A.

All sets are put up in either Hardwood Tool Box or Canvas Roll.

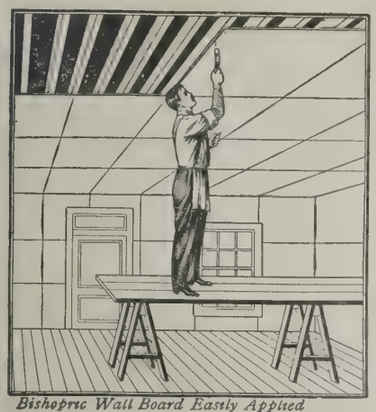
2141

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

BISHOPRIC Wall Board is cheaper and better than lath and plaster. It is the ONLY Wall Board COMBINED WITH LATHS and Asphalt Mastic. Laths are necessary in a Wall Board, just as they are in plaster walls, to prevent warping and to insure solid, rigid, stiff substantial

WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

Bishopric Wall Board also is the only Wall Board with a waterproof body. The Asphalt Mastic in which the laths are imbedded affords absolute protection against dampness. Does away with delays in building. Applied winter or summer. Is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

Bishopric Wall Board is made of kiln-dried, dressed laths imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut in the factory into 4x4 ft. sheets. Shipped in crates ready for immediate nailing to studs. It is guaranteed not to swell, shrink, warp, crack, flake or blister. It is clean, sanitary and odorless; proof against moisture, cold, heat, and vermin; saves fuel and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

T. W. Hanes, Carpenter and Contractor, Mounds, Ill., wrote August 15: "I have used 13 crates of Bishopric Wall Board, and the waste could be put in a hat."

Wm. Cooper, Taxidermist, Milo, Me., March 9, wrote the Philadelphia Farm Journal: "Your interesting paper has been a real bonanza to me. I wanted a cheap, warm method of lining my new work room. An advertisement in your paper gave me the very idea and material at a price that suited my pocket. I wrote to two firms who advertised with you, but selected 15,000 ft. of sheathing from the Bishopric Wall Board Mfg. Co. of Cincinnati. If the stuff was made on purpose, it could not suit me better; and a most prompt, obliging firm they are, too."

Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.



Wall Board and Sheathing are shipped in crates

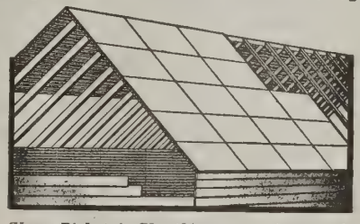
The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

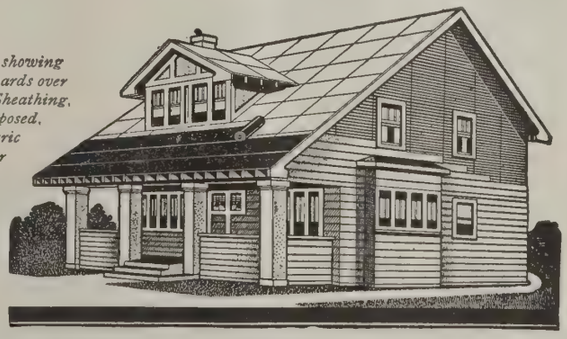
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PAINE LUMBER CO., LTD.

OSHKOSH, WISCONSIN, U. S. A.

These Plants Produce TWO-THIRDS of A



We Make Everything in M

OUR SPECIALTY

Korelock Veneered Doors

Cost but a little more than Pine

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Whenever You See a Korelock Joint Thi

PASTE THIS DOME ON LETTERS
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IT WILL HELP.

PAINE LUMBER CO., LTD.

OSHKOSH, WISCONSIN, U. S. A.

e Standard Veneered Doors Used in the World



ork in Any Kind of Wood

OUR SPECIALTY

Korelock Veneered Doors

Birch and Oak Doors Ready to Ship

WRITE FOR CATALOGUE C

Paine Lumber Co. — The Originators

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



No Rubbing Needed for a Beautiful Flat Finish

Johnson's Flat Wood Finish, applied with a brush, produces the soft, velvety effect of the hand-rubbed finish at one-third the cost for labor. All that is necessary to obtain this beautiful flat finish on any woodwork, new or old, is to brush on a coat of Johnson's Flat Wood Finish. It dries in an hour without a suggestion of gloss.

Architects, Contractors, Painters and Home Owners everywhere are enthusiastic over the results obtained with it and the big saving it makes possible.

Johnson's Flat Wood Finish

is a liquid—an easy spreading preparation—manufactured especially for finishing interior woodwork of new residences and buildings—as well as furniture—and equally valuable for refinishing old surfaces.



This flat wood finish opens a new field for the painter. He can now give his customers the beautiful, artistic, flat, hand-rubbed effects that have always been so high-priced on account of the labor—at prices that are within the reach of everyone.

By the use of Johnson's Flat Wood finish, you can make figures on hand-rubbed effects that will land the contract every time—give your customer perfect satisfaction and make you a good profit besides.

For giving this rubbed effect to new woodwork, apply Johnson's Flat Wood Finish over Wood Dye, Paste Wood Filler, or Varnish—for old woodwork or furniture having a gloss or varnish finish, simply apply a coat of Johnson's Flat Wood Finish. It is not necessary to remove the old finish before applying the new—and one coat *thoroughly brushed in* is sufficient.

Prices of Johnson's Flat Wood Finish

Gallons	$3.00
Half Gallons	1.60
Quarts	.85
Pints	.30

One Gallon is sufficient for 500 square feet

FREE Let us send you free a test can of Johnson's Flat Wood Finish and a copy of our Instruction Book. Edition NB10. We want every painter—you—to know all about this most important development in wood finishing materials. We will send you a free sample so you may try it yourself at our expense and be convinced. Write today or fill out coupon for sample of Johnson's Flat Wood Finish and panels of wood finished with it.

COUPON
for free sample, of Johnson's Flat Wood Finish and panels of wood finished with it

Name .....

Address .....

Street and Number NB-10

S. C. Johnson & Son, Racine, Wis.

The Wood Finishing Authorities

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U. S. GOVERNMENT REPORT

(Dept. of Agriculture, Forest Service, Bulletin 95,)
issued June 30, 1911, says of



CYPRESS:

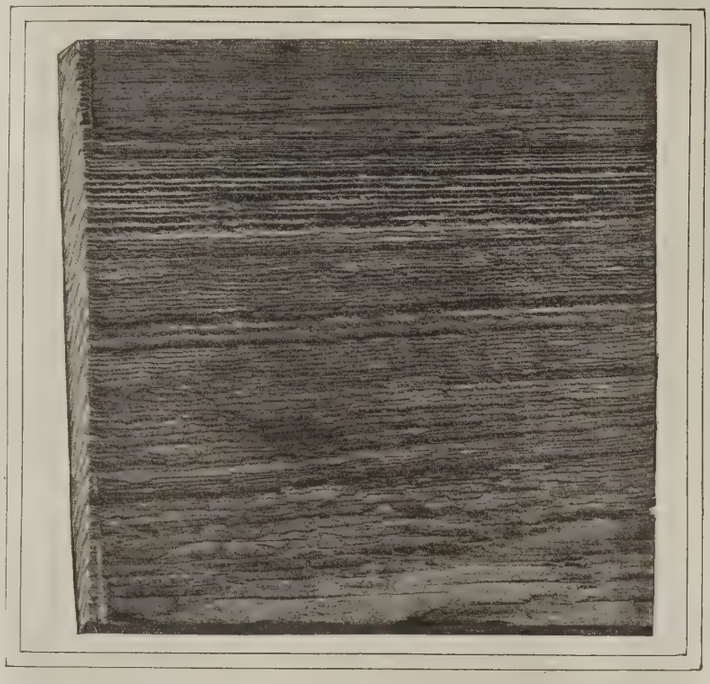
"AS SIDING IT PRACTICALLY WEARS OUT BEFORE IT DECAYS"

(FROM PAGE 44, U. S. GOVERNMENT BULLETIN 95.)

Same report says "CYPRESS shows paint well and holds it for many years, but lasts a long time without it."

(You know the conservatism of Government Reports)

Here's a photograph (straight from the wood) of a piece of *Cypress Siding* taken from St. Charles College, La., duly attested in writing by the president, Father Maring. Built 1819—torn down 1910. *NOT A TRACE OF ROT.* Note that the lower or exposed edge, originally the thicker, has become the thinner by the simple erosion of nearly a century of rains.



CYPRESS SIDING SOUND AS A DOLLAR after withstanding the tempests of a century and willing to start again! *91 YEARS "ON THE JOB," WITHOUT EVEN PAINTING,* on a church in use till the day it was razed to make room for a larger building, and the *CYPRESS LUMBER COMPOSING IT THEN USED AT ONCE* to erect a new gymnasium!

THERE'S INVESTMENT VALUE WORTH WHILE!

WRITE TODAY for VOLUME ONE of the CYPRESS POCKET LIBRARY, with FullText of OFFICIAL GOVT. REPORT as quoted above. (Sent FREE PROMPTLY on request.)

"WOOD THAT WILL STAND THE GREENHOUSE TEST WILL STAND ANYTHING." *ASK FOR VOL. THREE ALSO—FULL OF VITAL FACTS.*

When planning new improvements or repairs to old ones, just remember—"*With CYPRESS you BUILD BUT ONCE.*"

Let our "BUILDERS' HELP DEPARTMENT" help YOU. Our entire resources are at your services with Reliable Counsel.

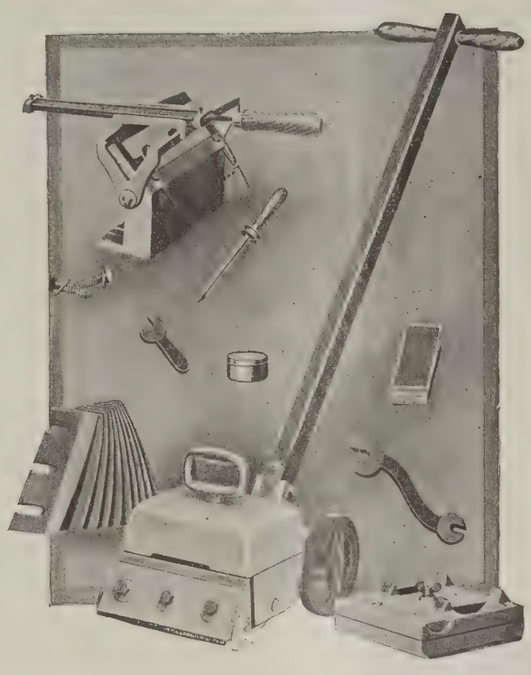
SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 Hibernia Bank Building, New Orleans, La.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

EVERY OBSTACLE OVERCOME



The Acme Floor Scraping Outfit.

No more floor scraping worries. No more unnecessary loss of time or money when the *Acme Floor Scraping Outfit* is on the job. One man and the *Acme* can do the work of four men using hand scrapers. Think of the saving of time this means to you. If you use the outfit on one good sized floor scraping job, you have saved enough in labor to pay for the machines.

This is a fact, and I am ready to prove it by offering to ship the *Acme Floor Scraping Outfit* to you on *one week's free trial* at my expense. You can give the machines as severe a test as you know how and then decide for yourself if you want to keep them or ship them back.

If you want my booklet describing this outfit and further particulars, drop me a line to-day and details will be forthcoming by return mail.

JOSEPH MIOTKE

249 Lake Street MILWAUKEE, WIS.



WE WANT TO SEND YOU A SAMPLE

We want every carpenter and builder and home owner in America to know about and to have a sample of

UTILITY WALLBOARD



It is to your interest to have this sample and to become thoroughly familiar with this remarkable material.

Utility Wall Board marks the greatest advancement that has been made in interior building construction in a hundred years.

It is made of fibre—very hard and tough and durable. It is waterproofed on both sides. Being a non-conductor, it is largely heat and cold and sound proof.

It is very easily put on—nailed right to the studding and takes the place of both lath and plaster.

It is the only wall board on which you can safely use wall paper. At the same time it lends itself admirably to tinting and stenciling, or other forms of decoration. Made in various widths and lengths to meet all requirements of interior finishing.

Write today for the sample and for the new book of interiors.

Utility board is sold through dealers in builders' supplies everywhere.

THE HEPPES COMPANY

4502 Fillmore Street, Chicago, Illinois

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

6 Months' Free Trial



Hand and Foot Power

Mechanics' Special—
will not draw temper

Don't take our word that this tool grinding, buffing and polishing outfit will save money for *you*. We offer you 6 months' absolutely *free use* of this outfit in your own work on your own tools, and let you prove for yourself that it is a money-saving and money-making outfit for any tool user. Use it a whole half year free, and if you don't find it a money-maker for you, send it back. The half year's use will not cost you a cent. If you want to make your own work and the work of the men you hire count for the most profits, how can you neglect this liberal offer? Return the coupon at bottom of page for 6 months' free trial offer.

Luther Tool Grinders

6 times faster than emery wheels
25 times faster than grindstones
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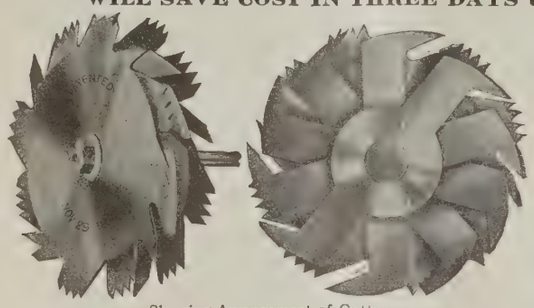
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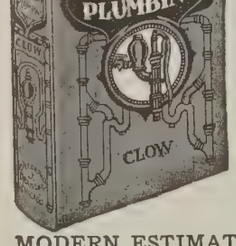
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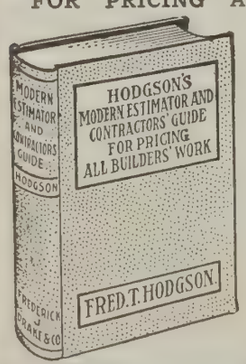
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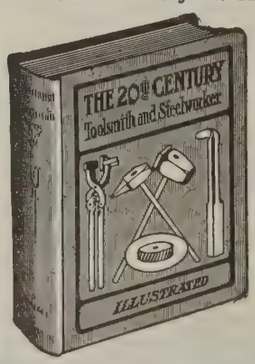
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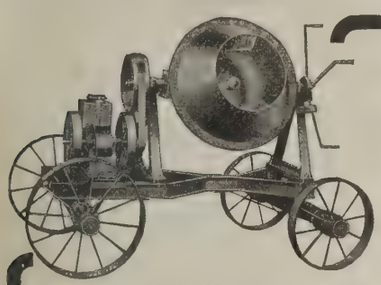
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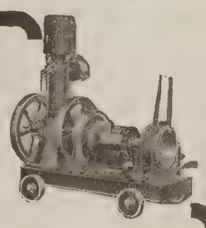
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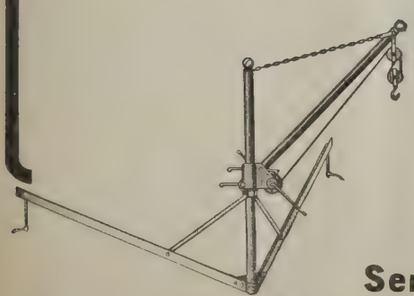


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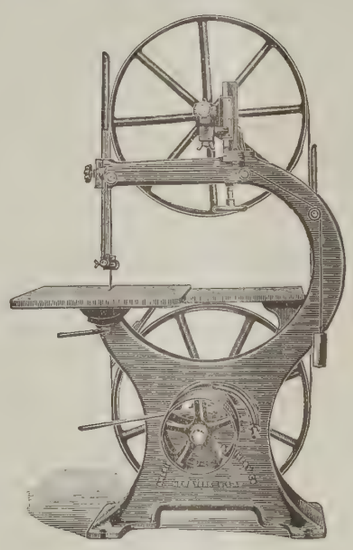
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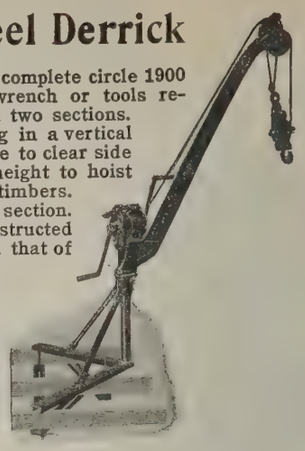
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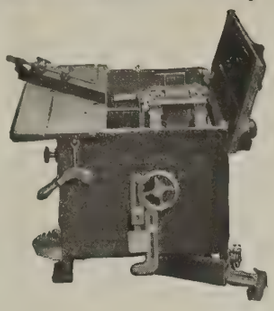


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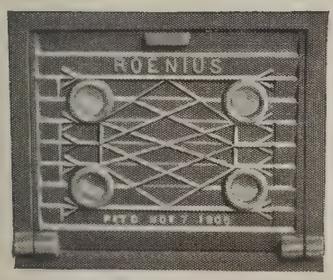
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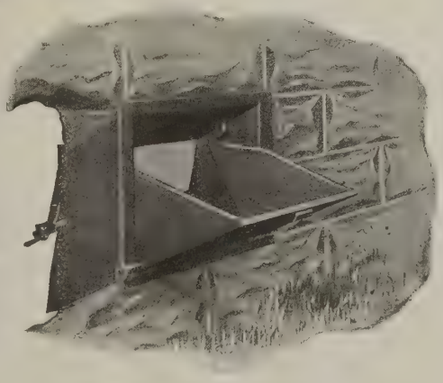


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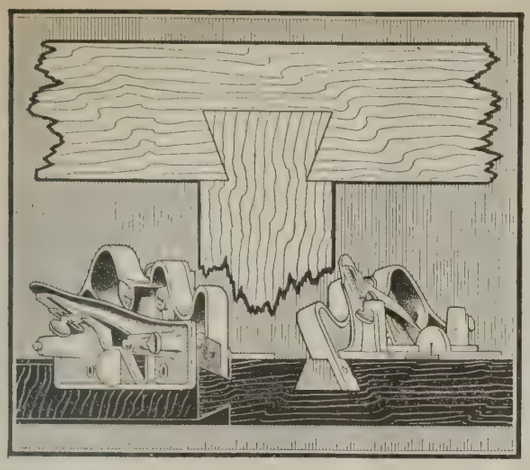
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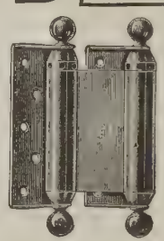
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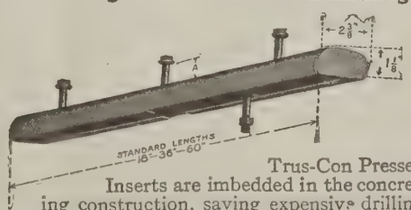
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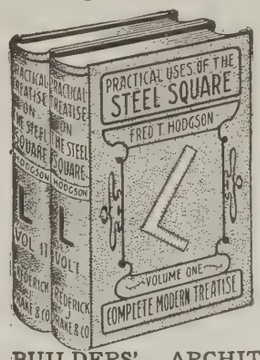
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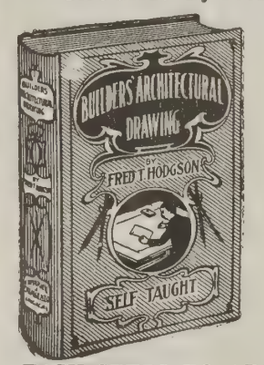
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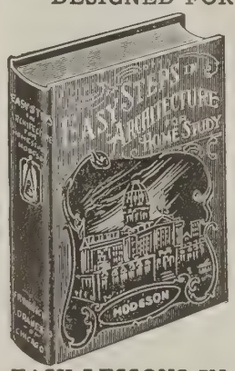
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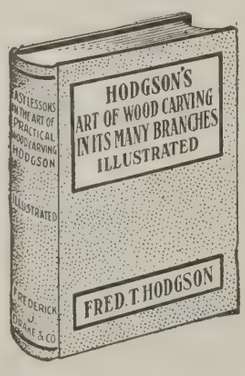
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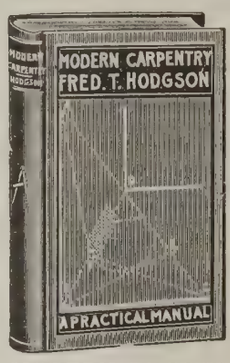
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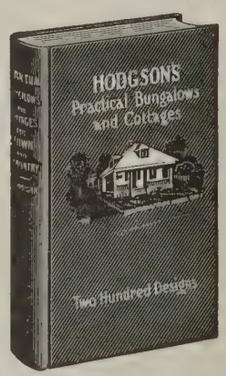
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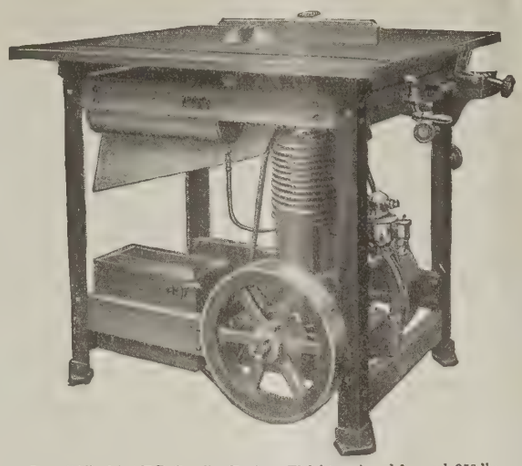
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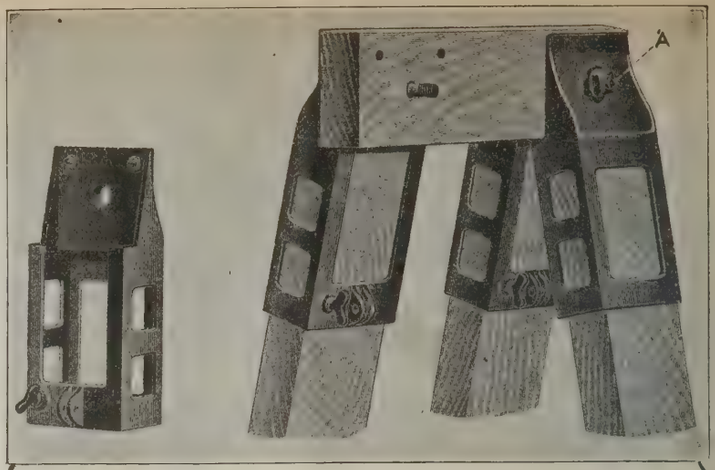
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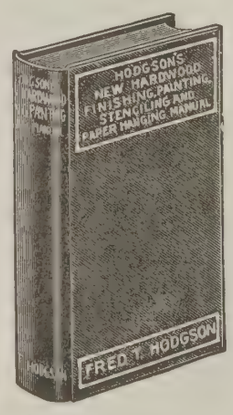
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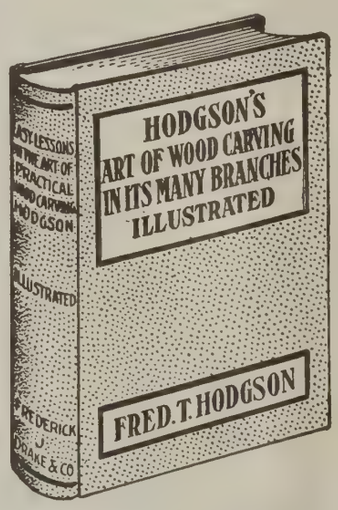
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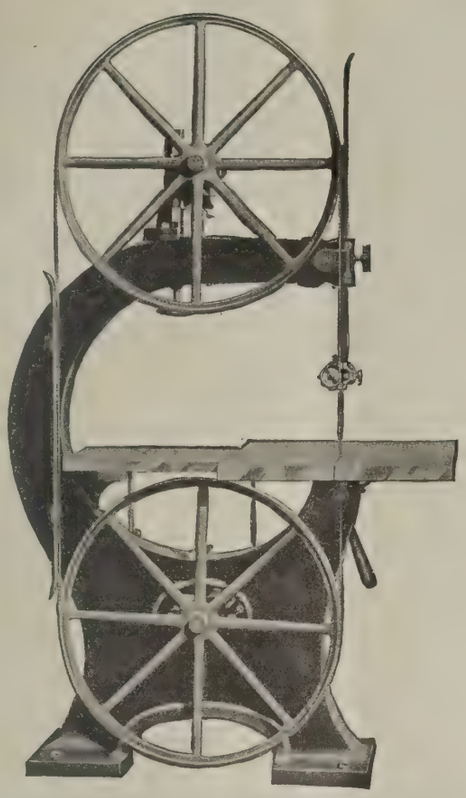
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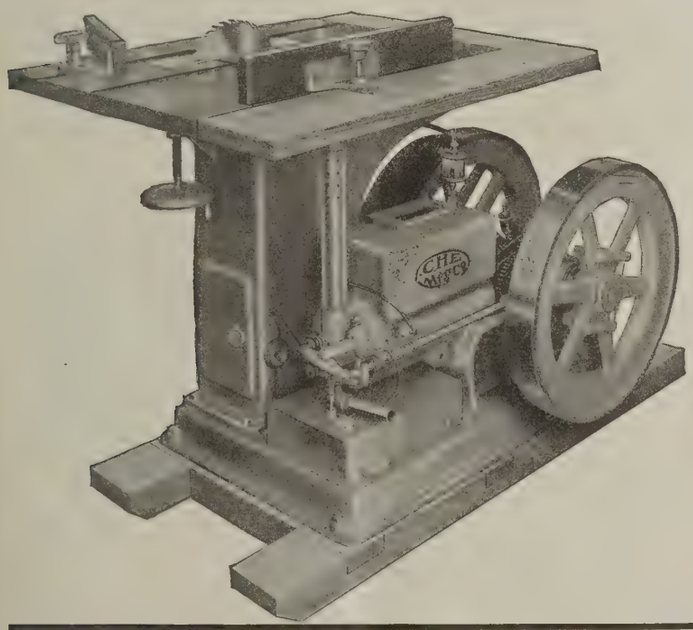
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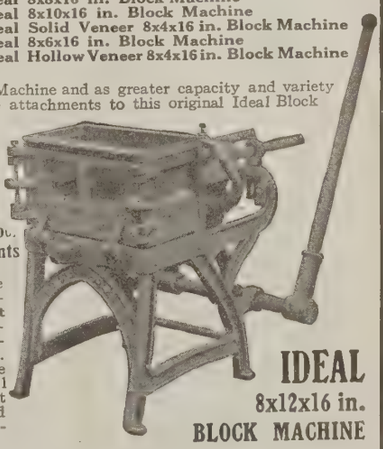
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Ideal 8x8x16 in. Block Machine
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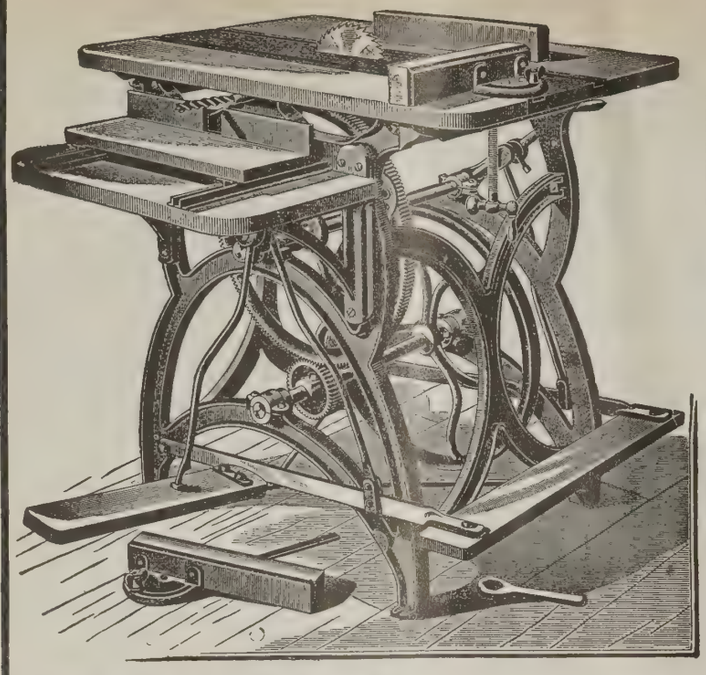
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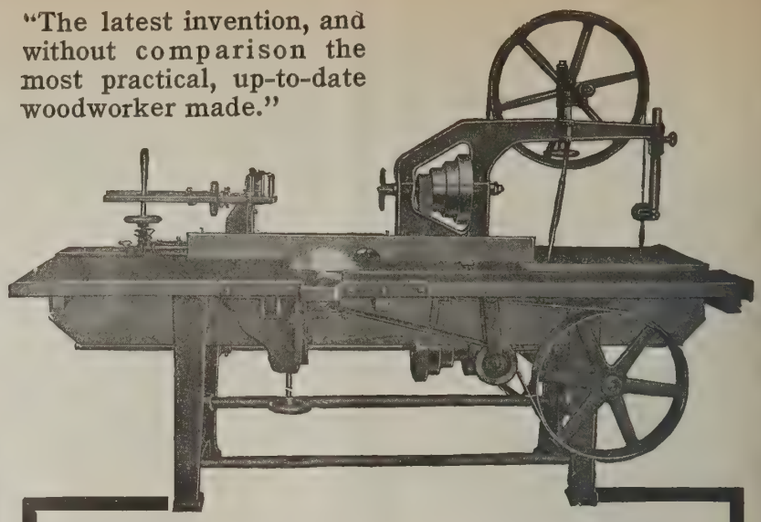
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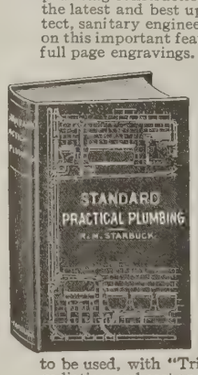
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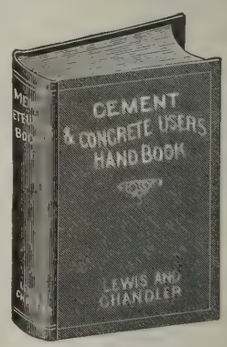
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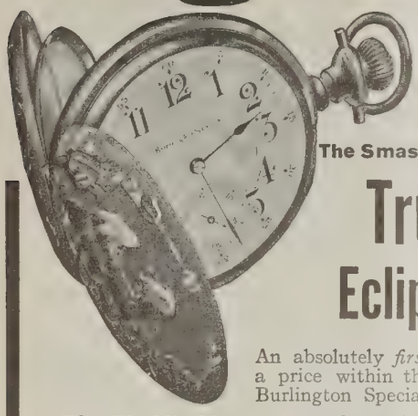
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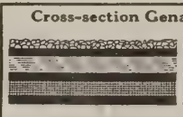
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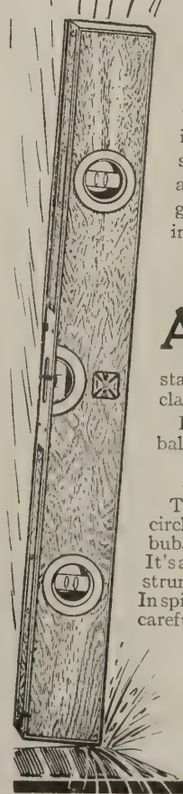
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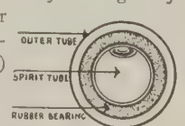
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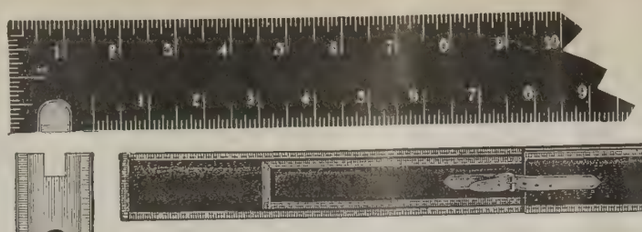


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200 working drawings of bridges, bridge piers and culverts; 60 working drawings of sewers, water mains and reservoirs; 30 working drawings each of retaining walls and dams; 200 working drawings of buildings and foundations, including shops, roundhouses, etc. Every structure illustrated is described, the method of construction is explained and where possible the cost is given. There are chapters telling **how to compute girders, arches, columns, tanks, bins, walls, conduits and chapters on proportioning, mixing and laying concrete,** on **doing concrete work in freezing weather,** on **facing and finishing concrete,** on **waterproofing concrete,** on the **physical properties of concrete,** on **cement testing** and on **concrete block manufacture and construction.**

This book contains more text pages, more drawings and **more tables of test data on concrete and reinforced concrete construction than any other book in the world. It has more new matter**—material never previously published. This work is a combination of several books in one; **it is complete, up-to-date and original. No other book on concrete contains one-tenth as much of the very latest data on tests, theory, and practice.** The cost to publish this book has been more than double the original estimate, but the price will for the present remain at $5 net postpaid. Order **now.**

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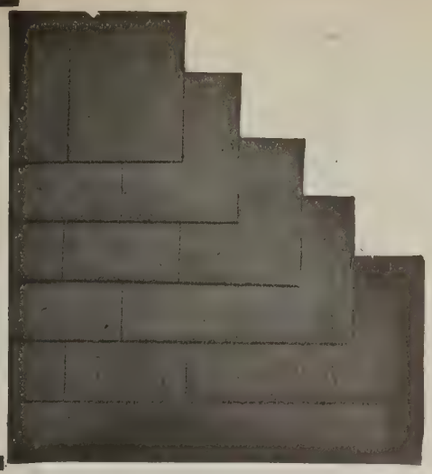
SOLID TAPERED ASPHALT SHINGLES

Are of a Cool, Gray Slate Color

And have the durability of asphalt—the fine appearance of slate and the light weight and low cost of wood shingles. They are fire-resisting—weather proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

Special Inducements to Those Who Apply First Roof in Each Town. Catalogue on Request

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YOU CAN SAFELY RECOMMEND

Compo-Board

It makes the best walls and ceilings. Dry, warm, fire-resisting and moisture proof.

Compo-Board walls will outlast lath and plaster; will not crack, crumble or fall off. Can be easily put on without waste of time waiting for plaster to dry.

They always look well. No ugly blotches where moisture has gathered. No unsightly scars where the walls have been patched. Will take paint, paper or kalsomine perfectly.

In addition to being a perfect wall lining, Compo-Board can be used as a back plaster for partitions, for lining summer cottages, barns and poultry houses. It has many uses around the house and in the office and factory.

Compo-Board is made of strips of thoroughly dried lumber matched together and well glued. These strips are then covered with a specially prepared moisture proof paper, which is cemented under intense heat heavy pressure. This makes a wall lining that will last indefinitely.

Can be had in strips four feet wide and one to eighteen feet long, any length you want in even feet.

SEND FOR SAMPLE AND BOOKLET

Fully describes Compo-Board and its many uses and advantages, and the sample will show you what it is.

NORTHWESTERN COMPO-BOARD CO.
5576 Lyndale Ave. No. MINNEAPOLIS, MINN.

(The border of this advertisement is a cross section view of Compo-Board.)

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.
Pearl and Main Streets
CINCINNATI, OHIO

50 CENTS FOR THIS CLAMP FIXTURE

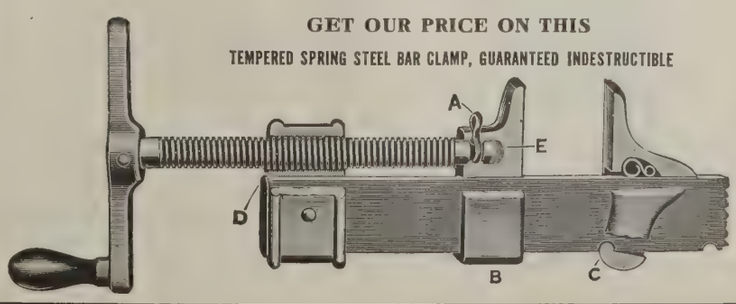


It is Unequaled for Strength, Quick Action and Lasting Qualities

Over 100,000 of These Clamps are Now in Use

GET OUR PRICE ON THIS

TEMPERED SPRING STEEL BAR CLAMP, GUARANTEED INDESTRUCTIBLE



WE HAD TO HAVE EXCEPTIONALLY STRONG CLAMPS

For Our Heavy Mill and Cabinet Bench Department—which were Quick Acting, Tight Holding and Long Lasting—so we made them ourselves.

Woodworkers who Knew Perfect Clamps saw them—and told others. That's why we are now making and selling over 25,000 a year.

Stock up Now and Be Well Equipped.

We Refund Your Money on any Sheldon Clamp returned within a year from purchase, which shows any weakness or wear.

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Strongest, Best and Cheapest Antifriction Butts Made

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FURNISHED IN ALL STANDARD FINISHES

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MODERN PLUMBING AT ½ ORDINARY COST

¶ WATER PRESSURE SYSTEMS, from $42.00 up. ¶ HOT WATER AND STEAM PLANTS. Save $100 to $250 on a Heating System. Plans free with every plant. ¶ PIPE, VALVES, FITTINGS at Lowest Prices. All high grade, strictly guaranteed goods. Catalogue N free.

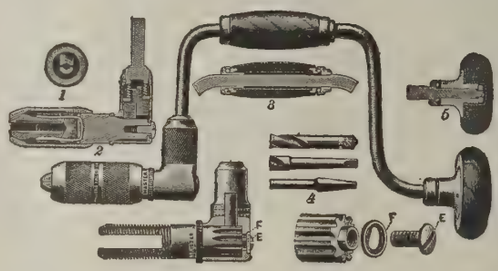
JOHN HARDIN & CO.

Established 1876

4541-4549 Cottage Grove Avenue

CHICAGO

MASTER BRACE



The general appearance of this Brace rejoices the lover of fine tools. The metal parts are handsomely nickeled and the head and handle are of highly finished cocobolo. Both head and sweep-handle are ball-bearing, reducing all friction to a minimum.

All ratchet parts are covered and in that way protected from dust. The ratchet teeth cut directly upon the base of the tail socket, in a manner least likely to get out of order.

It is impossible for the chuck to work loose, whether the ratchet is worked left or right, because of the manner in which it is attached to the sweep by a flat-head machine screw and a patent washer, which is in the shape of a shallow cup.

It is in the chuck, the most vital part of any bit brace, that Millers Falls skill in brace-making has culminated. The sleeve is of a new pattern, just fitting the hand, and is reinforced at the lip to meet the strain at that point. The tail socket is made from solid bar steel, unbreakable under the severest usage. The jaws are so hinged upon a spring as to transmit any strain to the stout sleeve.

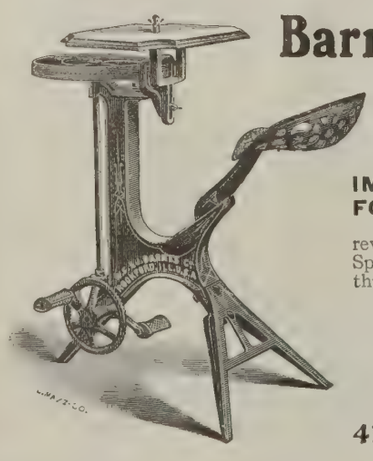
The jaws open parallel and close to conform to the shape of the bit used. Three grooves cut lengthwise in each jaw, making eight points of contact, insure the tenacity of grip.

The Master Brace is made in 4 sizes, with 8, 10, 12 and 14 inch sweep.

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MILLERS FALLS CO.

28 Warren Street NEW YORK, N. Y.



Barnes Hand and Foot Power Machinery

COMPLETE OUTFIT FOR

Carpenters and Builders

IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Warranted to be well made, will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

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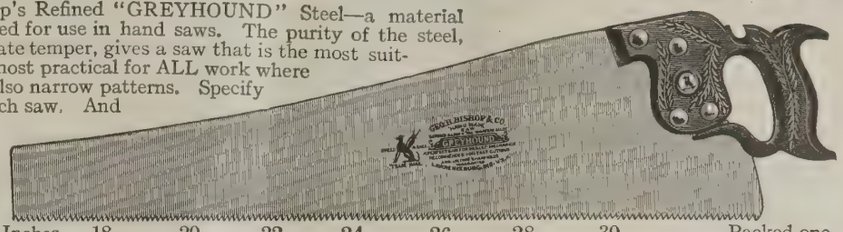
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GREYHOUND HAND SAWS

SPEED & EASE
TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.

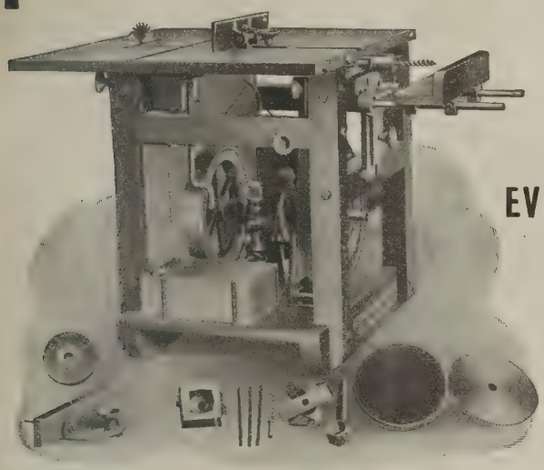


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Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

YOU WANT THE BEST
AT A REASONABLE PRICE



Then write for folder of the famous

EVEREADY

More Power
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Better Attachments
Guaranteed for life

Sold on this condition

IF NOT SATISFACTORY RETURN at our EXPENSE

OSHKOSH MANUFACTURING CO.
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Miller's Two Minute Lever Lock Mortiser

Chisels the opening for Locks and is the greatest time and labor saver



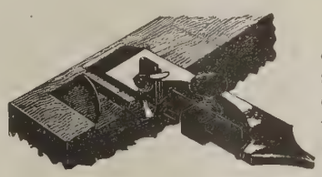
One builder wrote us last month: "You may expect an order for 3 machines as the carpenters are going crazy about my machine. The more I use it, the better I like it."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

are sent on trial to any reliable contracter and builder. Write for circulars and order now for spring work.



We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs and similar work—which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.
Nevada Building, CINCINNATI, OHIO Western Office, RIVERSIDE, CAL.

FOOT, HAND AND LIGHT POWER
WOOD-WORKING MACHINES

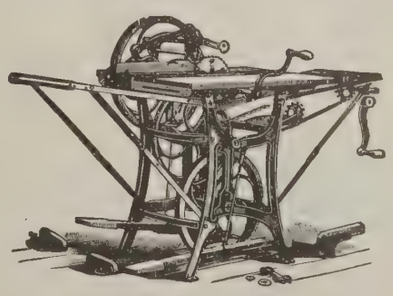


"Victor" Scroll Saw.



"Diamond" Mortiser

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor-saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.



No. 5 "Union" Self Feed Rip and Cross-Cut Saw

Send for catalog "A" describing our complete line

THE SENECA FALLS MFG. CO.
629 Water Street SENECA FALLS, N. Y., U. S. A. (249)

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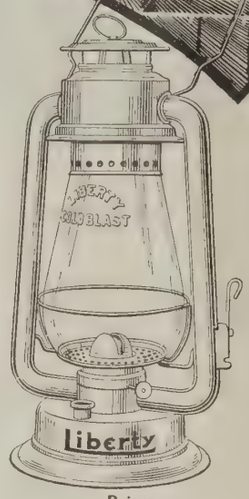
The Right Lamp for a Dark Night

Liberty Lanterns laugh at stormy weather. No matter how strong the wind, a Liberty Lantern throws a clear, strong light ahead, without a flicker—it is an absolutely *wind-proof* lamp.

Liberty Lanterns

meet every-day conditions *best* because they are better made and more convenient than other lanterns.

The frame of a Liberty Lantern is a heavy tin, strongly shaped and with well-closed joints. The globe is of special heavy lead flint glass held in place by strong springs that never weaken. These perfect lamps never "run up" nor jar down. They have bails that stay at any angle—they are oil-tight—they burn longest with one filling—they are worth any man's good money who wants a safe and economical lantern for a lifetime. Prices range from 60c to $3.50, each lamp fully guaranteed.



Prices from 60c to $3.50

"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS.

E. C. SIMMONS KEEN KUTTER CUTLERY TOOLS

If not at your dealer's, write us.

SIMMONS HARDWARE COMPANY (Inc.)
St. Louis and New York, U. S. A.

LEARN ONE OF THESE TRADES

Electricity, Mechanical Drafting, Painting and Decorating, Bricklaying, Plumbing

They Pay Best

Hundreds of our graduates are now earning from **$5** to **$8 per day.** Many are in business for themselves and making big money.



OUR HOME

By the Coyne (Practical) Method you can learn one of the above trades easily and quickly, and at low cost. Living expense can be earned while attending school.

Our instruction is individual and given by experts in these trades. Actual work takes place of books.

Tools and Materials Furnished FREE

You can enter at any age, we have students 16 to 60 years old. We assist graduates to obtain a profitable position. Easy payments.

Write today for *FREE Catalog and Complete Information.*

L. L. COOKE, Director

COYNE NATIONAL TRADE SCHOOLS

59 E. Illinois Street, Chicago, Ill.

"Come to Chicago, the Busiest City in the World. Men in These Trades Earn $6 a Day Here."

The Only Saw Set That Will Properly Set a Saw

There is very little difference in the appearance of Saw Sets. They vary greatly, however, in the quality and mechanical perfection.

There is only one Saw Set that is perfect in construction and that is absolutely guaranteed to set a saw properly.

The Morrill Saw Set manufactured by Chas. Morrill for 30 years is the only Saw Set than can be used with the assurance that it will set a saw properly.

Our booklet No. 7, "Saw Points," that gives information about the care of saws, sent free on request.

CHAS. MORRILL

277 Broadway NEW YORK

STAIN AND PRESERVE YOUR ROOFS

A handsomely stained roof gives distinction to the commonest house, and the rich, velvety moss-green and tile-red shades of

CABOT'S Shingle Stains

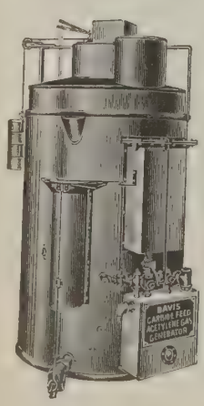
not only beautify the shingles, but thoroughly preserve them. They are made of Creosote, "the best wood preservative known," and the finest and strongest colors, ground in linseed oil. They cost half as much as paint, can be applied at half the labor cost, and are suitable for shingles, siding, and other exterior woodwork. *You can get Cabot's Stains all over the country. Send for samples and name of nearest agent.*



Stained with Cabot's Shingle Stains
Train & Williams, Architects, Los Angeles, Cal.

SAMUEL CABOT, Inc., Manfg. Chemists, Boston, Mass. 350 Dearborn Av., Chicago

Mr. Contractor and Builder



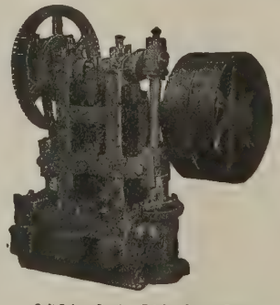
Why not equip the home or other building you are erecting with

Acetylene Lighting?

You can greatly increase your income by selling Davis Acetylene Lighting Plants, for new buildings, and during dull seasons for buildings already erected.
Write us for cost of equipping a building and for our terms as salesmen.

Davis Acetylene Company
35 Prospect St., Elkhart, Indiana

DEMING PUMPS



Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our Power Pump Catalogue

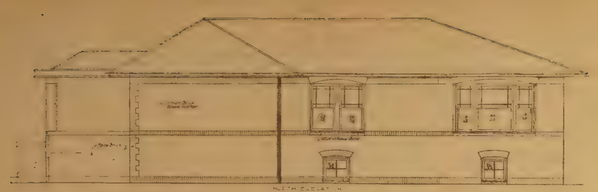
The Deming Co.

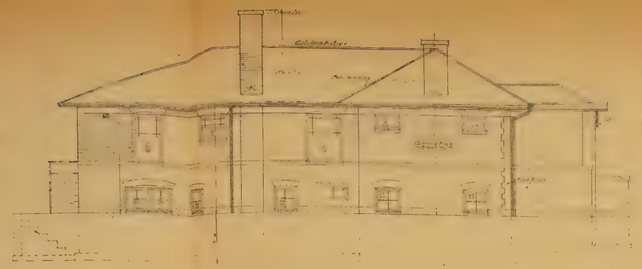
Salem, Ohio

Hand and Power Pumps for All Uses
General Western Agents

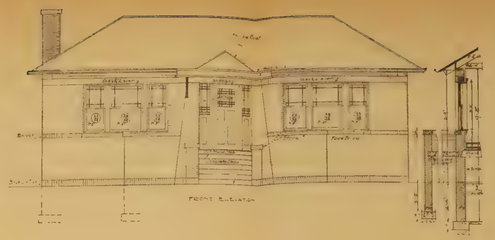
HENION & HUBBELL, CHICAGO
Other Agencies in All Principal Cities

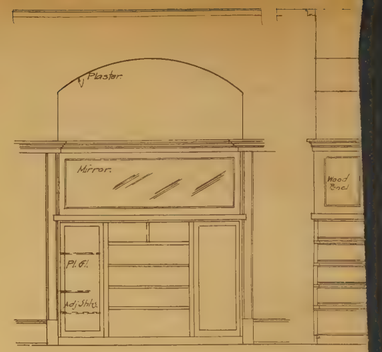
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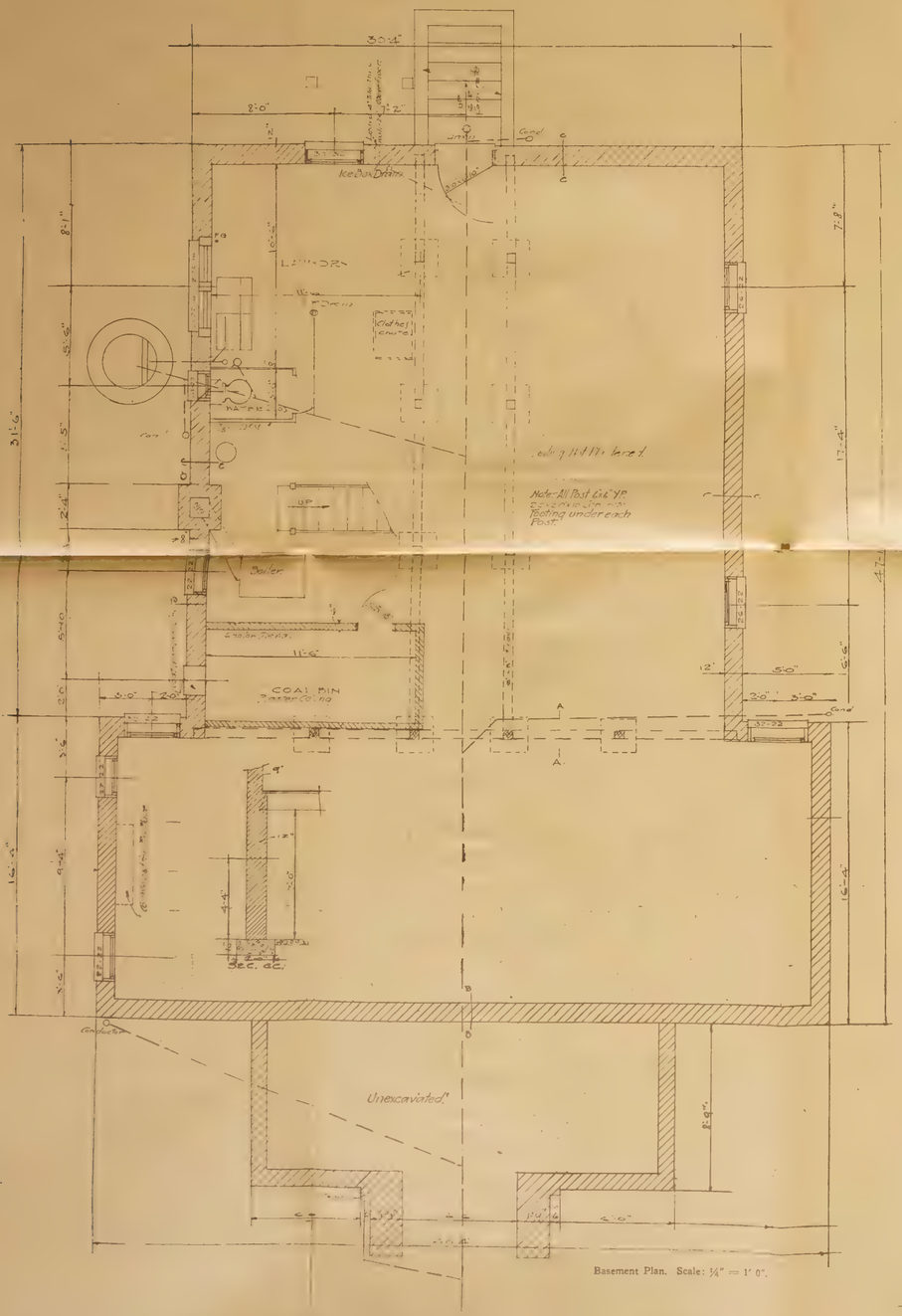


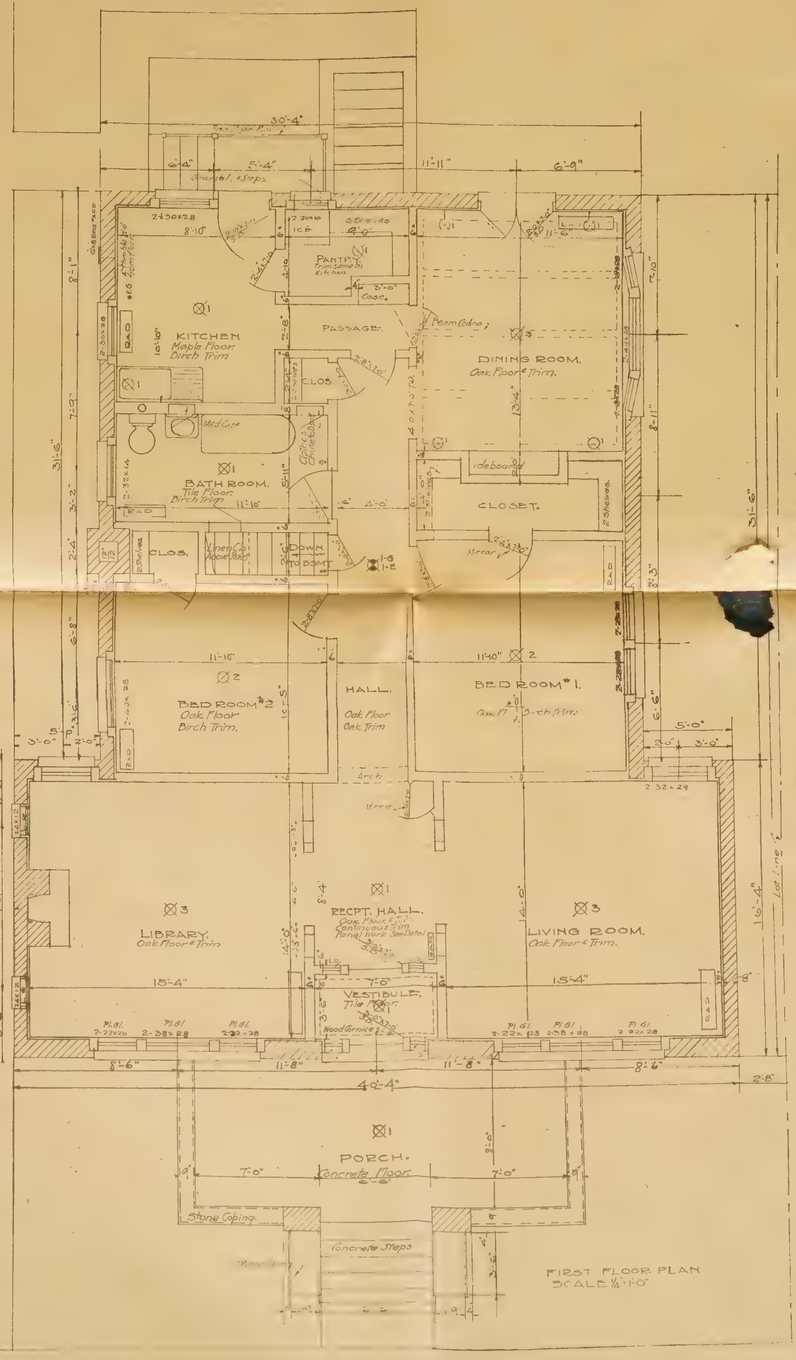






DETAIL OF SIDE BOARD.





SUPPLEMENT TO

THE NATIONAL BUILDER

SEPTEMBER, 1911

NATIONAL BUILDER DESIGN No. 345, THE WAGNER BRICK BUNGALOW

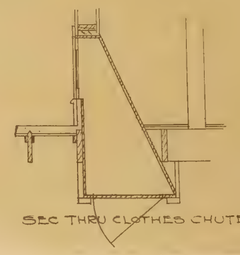
SCALE FOR FLOOR PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 8 FEET.

FOR ESTIMATE SEE PAGE 29

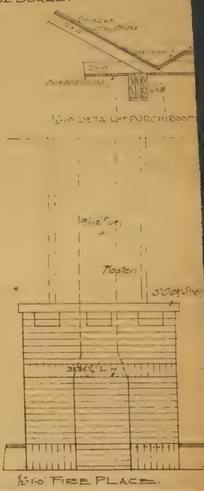


TYPICAL DOOR.

CASE IN PASSAGE.

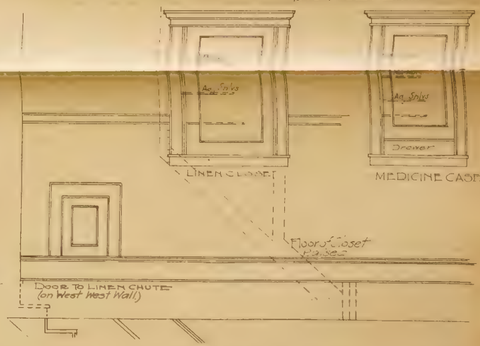


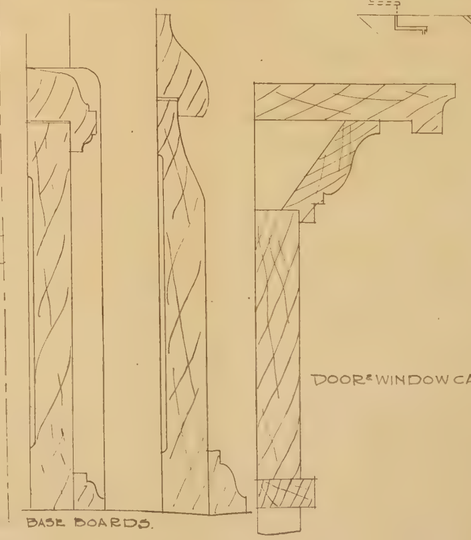
SEC THRU CLOTHES CHUTE.





Opening Between Hall and Living Room.





BASE BOARDS.

DOOR & WINDOW CAP.



CASING

THE NATIONAL BUILDER

Vol. 52 CHICAGO, OCTOBER, 1911 No. 10



THE AURORA HOUSE, built at Aurora, Ill.

NATIONAL BUILDER DESIGN No. 346

Worst and Shepardson, Architects, Aurora, Ill.

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $3,183.24

THE AURORA HOUSE

ON THIS page we show a typical suburban house of moderate cost. The architects have, by using wide siding and designing a unique construction of the porch, given an interesting appearance to what otherwise was a rather plain, square building. The interior has proved to be as convenient as the exterior is attractive. It might be noted that the house was built, including architect's fees, for slightly under the estimated price given here.

ESTIMATE OF AURORA HOUSE

By I. P. HICKS

EXCAVATING AND MASONRY.

116 yards excavating, 35c	$40.60
58 yards concrete cellar floor, 80c	46.40
160 cubic feet concrete ftg., 25c	40.00
960 cubic feet stone wall, 20c	192.00
240 cubic feet concrete block wall, 25c	60.00
18 lineal feet chimney breast, $2.50	45.00
16 lineal feet chimney above breast, $2.00	32.00
Cistern	30.00
Tile drain	28.00
Total excavating and masonry	$514.00

LUMBER BILL.

	Ft.
1 6x8x18 ft. girder	72
1 6x8x10 ft. girder	40
1 6x6x16 ft. post	48
24 2x10x16 ft. box sills	648
44 2x10x22 ft. floor joists	1,628
22 2x8x22 ft. ceiling joists	638
4 2x6x20 ft. hip rafters	80

36 2x6x16 ft. rafters	576
8 2x4x12 ft. dormer	64
120 2x4x18 ft. outside studding	1,440
32 2x4x18 ft. first story partitions	384
40 2x4x16 ft. second story partitions	440
50 2x4x16 plates	550
5 2x8x16 ft. porches	105
9 2x8x18 ft. porches	216
16 2x4x18 ft. porches	168
10 2x4x16 ft. porches	110
20 2x2x18 ft. furring, No. 1 com	120
30 1x6x12 ft. braces, No. 1 com	180
20 1x4x12 ft. bridging, No. 1 com	80
Total feet framing lumber	7,587
7,587 ft. framing lumber at $27	$204.85
1,400 ft. No. 2 sheathing, rough floor, $27	37.80
2,160 ft. No. 2, 10-inch sheathing for outside walls, $27	68.32
1,300 ft. 1x6 No. 2 roof sheathing, $27	35.10
13 red cedar shingles, $4	52.00
5 rolls building paper	3.75
1,400 ft. 1x10x12 to 16 ft. siding, $40	56.00
1,100 ft. ½x4x12 to 16 ft. siding, cypress, $32	35.20
630 ft. ⅝x4x12 to 16 feet cypress ceiling, $32	20.10
280 lineal ft. 1x6 cypress finish, $45 per M	6.30
100 lineal ft. 1x8 cypress finish, $45	2.97
110 lineal ft. 1x12 cypress finish, $45	4.95
56 lineal ft. 1⅛x12x14 ft. cypress finish; outside steps, $50	2.80
60 lineal ft. 1x4x12 ft. cypress finish, $45	.90
200 ft. 1x4x8 ft. fir flg., $45	9.00
50 ft. 1x4x12 ft. fir flg., $45	2.25
190 ft. ⅝x4x14 ft. cypress ceiling, $32	6.08
50 ft. ⅝x4x12 ft. cypress ceiling, $32	1.60
1,400 ft. ⅜x2¼ face oak flg., $85	119.00
250 ft. ⅜x2¼ face maple flg., $65	16.25
Total lumber bill	$685.22

MILL WORK.

3 cellar window frames, 14x14, 2 lt., $1.75	$.25
2 twin frames, 14x14, 2 lt., $3.50	7.00
7 cellar sash, 14x14, 2 lt., $1.20	8.40
1 front dr. frame, 3 ft. 0 in. x 7 ft. 0 in.	3.00
2 door frames, 2 ft. 8 in. x 7 ft. 0 in., $2.50	5.00
1 basement dr. frame, 3 ft. 0 in. x 6 ft. 8 in.	2.25
1 basement door, 3 ft. 0 in. x 6 ft. 8 in.	3.50
1 dormer frame, 44x12, 3 lt.	2.00
8 window frames, 32x24x20, dividend, $2.25	18.00
1 window frame, 34x36x22, dividend	2.25
2 window frames, 18x36x22, dividend, $2.25	4.50
1 triple window center, 44x36x22 } 2 side windows, 20x36x22, $2.25 }	6.75
1 twin sash frame, 24x32	3.50
1 twin sash frame, 20x28	3.50
3 window frames, 32x20, 2 lt., $2.25	6.75
1 sash, 44x12, 3 lt.	1.50
8 windows, 32x24x20, dividend, $2.50	20.00
1 window, 34x36x22, dividend	2.75
2 windows, 18x36x22, dividend, $2.00	4.00
1 window, 44x36x22, dividend	3.50
2 windows, 20x36x22, dividend, $2.25	4.50
2 sash, 24x32, $1.50	3.00
2 sash, 20x28, $1.50	3.00
3 windows, 32x20, 2 lt., $2.25	6.75
1 set dr. jambs, 2 ft. 8 in. x 7 ft. 0 in., cypress	.80
1 set dr. jambs, 2 ft. 4 in. x 7 ft. 0 in., cypress	.80
1 set dr. jambs, 2 ft. 6 in. x 7 ft. 0 in., cypress	.80
3 set dr. jambs, 2 ft. 8 in. x 6 ft. 8 in., cypress, 70c	2.10
1 set dr. jambs, 2 ft 6 in. x 6 ft. 8 in., cypress, 70c	.70
2 set dr. jambs, 2 ft. 4 in. x 6 ft. 8 in., cypress, 70c	1.40
1 set dr. jambs, 2 ft. 6 in. x 5 ft. 0 in., cypress	.60
2 set dr. jambs, 6 ft. 0 in. x 7 ft. 0 in., cypress, $1.00	2.00
450 ft. inside base, cypress, 4c	18.00
450 ft. base mold, 2c	9.00
450 ft. floor mold, ½c	2.25
300 ft. picture mold, 1½c	4.50
1 front dr., 3 ft. 0 in. x 7 ft. 0 in., 1¾	18.00
2 outside drs., 2 ft 8 in. x 7 ft. 0 in., 1¾, $5.50	11.00
1 door, 2 ft. 8 in. x 7 ft. 0 in., 1⅜	3.00
1 door, 2 ft. 4 in. x 7 ft. 0 in., 1⅜	2.75
1 door, 2 ft. 6 in. x 7 ft. 0 in., 1⅜	3.00
3 doors, 2 ft. 8 in. x 6 ft. 8 in., 1⅜, $2.60	7.80
3 doors, 2 ft. 6 in. x 6 ft. 8 in., 1⅜	2.60
2 doors, 2 ft. 4 in. x 6 ft. 8 in., 1⅜	2.50
1 door, 2 ft. 6 in. x 5 ft. 0 in., 1⅜	2.50
16 dr. casings, 7 ft. 2 in.	3.36
28 dr. casings, 7 ft.	5.88
28 window casings, 6 ft.	5.04
14 window casings, 5 ft.	2.10
24 head casings, 4 ft.	2.88
4 head casings, 7 ft.	.84
21 head casings, 4 ft.	2.52
84 ft. window stool, 3c	2.52
84 ft. apron, 2c	1.68
300 ft. window stop, 1c	3.00
180 ft. door stop, 1½c	2.70
Front stairs	60.00
Cupboard	18.00
Mantel	55.00
3 porch col., 12x12x10 ft., $5.00	15.00
2 porch col., 5x5x8 ft., $1.50	3.00
1 pc. porch rail, 8 ft., 12c	.96
2 pc. porch rail, 7 ft., 12c	1.68
1 pc. porch rail, 12 ft., 12c	1.44
60 1x4x5 ft. balusters, 8c	4.80
240 ft. 2 inch bed mold, 1½c	3.60
140 ft. cove mold, 1c	1.40
100 ft. quarter round	.60
Total mill work	$425.75

CARPENTER LABOR.

7,587 ft. framing lumber, at $10	$75.87
4,880 ft. sheathing, $8	38.84
13 M. shingles, $2.00	26.00
1,400 ft. wide siding, $12	16.80
1,100 ft. narrow siding, $18	19.80
820 ft. ceiling, $20	16.40
Dormer work	10.00
144 ft. cornice work, 10c	14.40
Porch work	20.00
Finishing cellar frames	10.00
Coal bin	4.00
Finishing front door	4.50
Finishing rear door	3.50
Finishing side door	4.00
Finishing double-acting door	4.00
Finishing 2 cased openings, $2.00	4.00
Finishing 10 inside doors, $3.00	30.00
Finishing 21 windows, $2.00	42.00
Finishing 450 ft. inside base, 6c	27.00
Finishing 300 ft. picture mold, 1½c	4.50
Putting up front stairs	25.00
Putting up cellar stairs	6.00
Outside steps	5.00
1,650 ft. finish floor, $20	33.00
Smoothing, $15	24.75
Closet and pantry work	20.00
Incidentals, 10%	48.93
Total carpenter labor	$538.29

RECAPITULATION.

Excavating and masonry	$514.00
Lumber bill	685.22
Mill work	425.75
Carpenter labor	538.29
Plastering, 580 yards, 28c	162.40
Electric wiring	50.00
Plumbing	260.00
Hardware and nails	46.00
Tinwork	35.00
Painting	180.00
Furnace	135.00
Incidentals, 5%	151.58
Total estimate	$3,183.24

The approximate cubic feet contained within this building is 18,480, from bottom of cellar, making the cost per cubic foot very nearly 10¾ cents.

EDITORIAL NOTES AND COMMENTS

Now is the time to overhaul storm doors and see that all are in readiness for putting in place for the coming winter.

* * *

If there is to be any repairs made on your plumbing plant, now is your time to have it attended to, as plumbing repairs after frost and snow arrive, are always very inconvenient, and often much more expensive than when the weather is warm.

* * *

Furnaces, heaters, radiators, grates and other similar appliances, should be examined and repaired if necessary now, and plumbers whose duty it is to attend to these matters, should not "put off" the work until cold or damp weather demands their use. It often transpires that when the services of these appliances are suddenly called upon, serious and imperative repairs are found necessary, which may require considerable time to adjust. This delay may, and does, in some cases, result in very disagreeable consequences to the inhabitants of the house, particularly when there are young children or delicate women living there, as colds, catarrh and even more serious trouble may follow.

* * *

Some days ago, a scaffold on which a painter and his apprentice boy were re-varnishing a store window framework, gave way, and the two men were precipitated to the sidewalk on an iron grating. As the distance from the scaffold plank from which they were working was not more than six feet from the plank, the men were not seriously hurt, and were able to walk to a hospital—which was not far away—for repairs, though the boy stands a good chance of being disfigured for life, he having a deep gash just under his right eye. An examination of the scaffold revealed the fact that one of the brackets on which the ends of the plank platform rested, was not fastened to the window but was supported by a loose piece of inch board cut in from the sill to the underside of the bracket, and which, by the movement of the workers, fell out, and the arm of the bracket was wrenched off, causing the men and plank to fall.

* * *

This incident—it can scarcely be called an accident—caused a number of people to gather about the scene, and quite a variety of remarks, criticisms and suggestions were made by the bystanders, and we give a few of them: "Workmen in this country take too many chances," said one man who seemed to know what he was talking about, "and something ought to be done to prevent every Tom, Dick and Harry, from building scaffolds, unless they have some knowledge of the art, and of the strength of materials. Most workmen," he continued, "do not seem to care whether they work on one nail or on six, and it is often impossible for a foreman or other person in authority, to know if a scaffold is sufficiently strong or not, and it's up to the workmen to look out for his own safety, which he often fails to do. Men take too many risks."

* * *

Another bystander remarked "That steps should be taken in every state and municipality to bring about such legislation to prevent the great loss of life that results through improper scaffolding, and men should be warned and told that all scaffolds are more or less dangerous. Every day I see men at work on weak boards and improperly constructed scaffolds, and I have often warned them as to the dangerous condition of their boards and planks, but in most cases, my good intentions have either been sneered at, or I have been jibed and looked upon as a meddler and told to mind my own business. Often men are rushed and efforts are made to make one man do two men's work, and no time is given to examine the scaffolds on which they are to risk their lives. In many cases the scaffolding is the biggest part of the job, and it often takes more time to build or suspend the scaffold than it does to do what is required to be done, and so things may be done in a slipshod manner. The experienced men are not likely to meet with accident, however, but the greenhorns need to be watched."

* * *

Contractors, when making an estimate, rarely provide a sum for building scaffolds. Sometimes they do set off a percentage for material, leaving out cost of construction, and because of this the structures are often flimsy and slovenly built. In consequence, thousands of lives have been taken because of the parsimony of some owner or contractor, who, innocently or otherwise, thought only of profits, even though loss of life was the result of such false and mistaken economy. The greatest care should be taken when erecting scaffolds, and good, strong materials should in all cases be employed, and any lumber or timber that show signs of rot, dose, brashiness, shakes, knots or other imperfections, should not be used on the works. Poles and putlogs that have been used as scaffolding on brick buildings should undergo a strict examination before being used. Many poles have been used dozens of times, and in taking down and moving from one place to another, they sometimes get broken or cracked, or otherwise injured to such an extent that their use would be dangerous. Putlogs, being short, are not so apt to be injured in moving, still an inspection of them is quite necessary, as generally in brickwork, they are required to carry big loads of brick, mortar and men. Other things to be considered, are the ropes employed for lashing the putlogs to the scaffolding poles. These become worn, untwisted, and rotted to such an extent as to be unable to bear the strain they may be required to carry. We have often seen a thousand or more of bricks piled on a pole scaffold, along with a ton or more of mortar, and from four to eight men. Imagine a scaffolding, two or three stories high, giving way with all this weight, and the men on it being precipitated to the ground. The result would be bruises, wounds, broken limbs, and, very likely, deaths. It seems scarcely credible, but we are told by certain statisticians that more deaths result from defective scaffolds and carelessness while making use of them, than from railway collisions and wrecks. A man falls from a scaffold and is killed; two or three lines in the news columns of a local paper simply announces the fact, and that ends it. And this is happening every day, but a railway collision or wreck, when ten to fifteen persons are killed, is heralded all over the country by the newspapers in large print and a column in length. This looks terrible, and is terrible, but it is hardly worse than having the same number killed in as many different places by the falling of defective scaffolding—which might have been avoided, if careful and diligent attention had been exercised.

Our attention has more than once been called to the question of swinging doors, which seem to be too common in many places, and when opening outward onto a street, and pushed vigorously from the inside, constitute a dangerous menance to pedestrians passing at the time. A case in point happened a few days ago, in a well known hotel, where an elderly lady was passing one of these doors. A messenger boy or waiter, engaged in carrying a meal on a tray, both his hands being engaged, gave the swinging doors a vigorous kick from his side, and as was to be expected, the door flew open at high speed. The lady, who was carrying a small parcel in one hand and leading a little girl with the other, was utterly unable to protect herself when thus unexpectedly assailed, and received quite a severe blow, the force of which was fortunately broken somewhat by the parcel she was carrying. Had she, however, been walking but a few inches nearer the wall, she would undoubtedly have suffered quite a serious shock, if not injury. This is one of the many cases that happen from time to time where doors are made to swing both ways, as young people never consider that some person may be just at the door and about to pass out, and trouble follows. As a rule, swinging doors are neither safe or convenient and should not be tolerated in any position. Doors should not be allowed to open outwardly on any thoroughfare, only in such places as may be used for public purposes, such as halls, rinks, churches and other public buildings of a similar kind, all of which is provided for by legislation. In hotels, shops, and similar buildings, the revolving door may be used, but even these have their limitation, and it is easy to imagine cases where the revolving door would prove inefficient, but, for general use where no exceptional cases would arise, there is no substitute in sight.

* * *

Exploration in the ancient city of Babylon is proceeding and the last report of the German Oriental Society gives interesting particulars of it. The palace of Nebuchadnezzar is being laid bare in all its vastness, and the line of fortification of the heights on which the palace stood is now almost completely traced.

The streets and private dwellings lying round the foot of the hill are being cleared. Among other finds is a small temple, the work of Nebuchadnezzar, beautifully built, in apparently perfect preservation and still showing the black and white color scheme characteristic of the Assyrians.

CALIFORNIA'S MODERN MISSION BUILDINGS

By HORACE F. STOLL (Continued from September.)

WITHOUT a doubt the most pretentious mission building in San Francisco is the new Alcazar Theater—a class A structure, dignified in appearance and beautifully proportioned. The red-tiled towers set off the front of the theater to advantage and the massive cream walls suggest solidity and stability. Nothing but steel and concrete were used in its construction, so theater-goers are assured safety in case of fire or earthquake during a performance.



ARCH AT LODI, CAL.

The mission style is not suited to tall buildings, and so you see none of this type in the new down-town business section. The modern office structure demands well-lighted rooms and plenty of them. In the mission days, on the other hand, there was little need of windows, since a dim light was more in keeping with the solemn atmosphere of the simple houses of worship. The moment you puncture the walls of a mission building with too many openings, you lose the effect of massiveness and strength, two qualities that give them their distinctive appearance. Heavy walls were a necessity before the Gringoes came, a precaution against earthquakes and the ravages of time, and a protection in case of Indian uprisings or raids from the pirates who cruised in the South Seas in quest of booty and on several occasions sacked the churches and carried off their valuables.

Another example of how attractively the ideas of the padres may be utilized in a modern building is the series of five mission flats that ramble up the side of a hill on Sacramento street. They are unique indeed and represent an outlay of $30,000. The lot is 56 by 104 feet. However, the building is so arranged about a terraced court that from across the street, the lot presents the appearance of being at least twenty feet wider than it really is. The exterior walls are finished in klinker brick and cement, with redwood beams and cornices left natural. The irregular roof is of bright red tile.



THE PUTNAM HOME, ALAMEDA, CAL.

The largest flat, occupied by the owner, who is also the architect, contains 14 rooms. The others have 9, 8, 6 and 5 rooms, respectively. Each flat has its separate mission entrance handled in an individual manner. Heavy oak doors, ornamented with immense iron hinges, locks and knockers, open into the reception halls and living rooms, with large inglenook fireplaces and high backs built in. The ceilings are heavily beamed and the woodwork is beautifully stained a rich, dark brown. Not a bit of moulding is used in the entire building and the millwork was all made on a circular saw, and left perfectly square and plain.

The most typical room in the flats—in fact, the only one in which any real attempt has been made to carry out the mission idea in the interior—is the architect's den or library. It is diagonally beamed and contains a big open cobblestone fireplace that would prove a delight to any man who enjoys a cosy lounging place where he can toast his feet in luxurious ease, or read to the rhythm of the crackling fire. Bookcases and seats are built in the wall and four mission bell chandeliers, especially designed, shed a soft radiance at night. Heavy mission furniture, which is usually better suited to halls or clubrooms, is distributed about the room. The long straight lines and the rich leather upholstery add not a little to the "atmosphere" of the den.

In planning the arrangement of his flats, the architect constantly kept in mind the necessity of plenty of light and sunshine in every room. The outlook from the windows overlooking the court is dazzling on a sunshiny day, for the cream plastered walls reflect the sunlight wonderfully.

The court is charming. It is laid out in terraces, the first being a flat lawn, dotted along the edge with klinker brick pots holding palms. The second is a sloping lawn running up to a cement wall that is draped in nasturtium vines, while the third is a circular center garden filled with flaming red geraniums. Formal looking bay trees, palms in terra cotta pots and an abundance of flower boxes overflowing with red geraniums and trailing



MISSION DOLORES, SAN FRANCISCO.

vines complete the floral decorations. The walks are paved in large square tiles of a rich dark brown.

An architectural mission gem on a smaller scale is the $15,000 cottage of Kingman B. Putman in Alameda, across the bay. It is in a setting of native oaks and rare plants and shrubs, the lot occupying a quarter of a block. The outside walls are of concrete plaster with a red tiled roof and an immense arcade mission porch of cement inlaid with red brick. The windows are small, with long narrow panels of plate glass. No attempt was made to follow out the mission idea in the interior. The large living room and dining room are finished in South American oak. The walls are paneled and covered, between the panels, with Japanese art tapestry. The ceilings are beamed with large heavy beams running the length of the rooms and smaller ones running across. The ceilings are also covered between with Japanese tapestry. The floors of these two rooms are highly polished maple stained to harmonize with the walls and are connected by immense oak doors. Each room has a large mission fireplace, made of tile and solid oak. The dining room is ornamented with a handsome sideboard built in the wall and the living room has wide seats and book shelves on each side of the fireplace. The sleeping rooms are finished in hard woods and the bathrooms with mosaic floors and high tiled walls.

There are mission bath houses, casinos, boat houses, even stables, that might be mentioned, but we cannot overlook the new

mission churches which have sprung up in many of the cities that were not favored by the padres. St. Mark's Protestant Episcopal Church in Berkeley is one that has all the charm of the old adobe missions. It is located at the intersection of two of the college city's most beautiful streets, both shaded with trees, and is accessible from all parts of the town.

The approach from the vestry room to the rear of the seats, which is used each Sunday by the processional choir, is an arched corridor of truest mission design protected by a sloping roof of red tiling. The towers, two in number, also carry out the designs



MISSION CAMPANILE, MILLS COLLEGE.

of old Spanish cathedrals and present a most imposing appearance. The church seats seven hundred and fifty persons and cost in the neighborhood of $30,000. The interior decorations carry out the general scheme of the builders, making St. Marks one of the most representative mission churches, planned by the modern school of architects.

As we came out of the pretty little church, with its old-world atmosphere, I could not help contrasting the rapidity and ease with which our new mission buildings are erected in comparison with the slow, tedious process of the olden days. The more important of the California missions were built of stone and a hard burnt brick that will even now turn the edge of the finest trowel. The labor of their construction was appalling. Brick had to be burnt, stone quarried and dressed with crude tools, and huge timbers for rafters brought on men's shoulders from the mountain forests, sometimes thirty miles distant, through rocky canyons and over trackless hills. The Indians performed most of this labor and did their work well, but the ravages of a century have been severe and save only a few, preserved by reverend hands, where modern worshippers still kneel and recite their orisons, the venerable ruins are forsaken by all except the tourist and antiquarian, and their bells are silent forever.



ROOFING WITH THE STEEL SQUARE—No. 5. HIP AND VALLEY ROOFS

By J. H. B.

THE two photographs herewith show two methods of forming a "valley" in a roof, the term "valley" being used to describe the gutter, which is inevitable when two roofs run into one another at right angles. Figure 36 shows the proper way of forming a valley, and this is shown in plan in Figure 37, while Figure 38 shows the plan of the plates which carry the rafters.

The valley rafters are those which spring from the angle of the two plates, as at A, and fit into the angles formed by the two ridges, as at B, thus appearing very like hips, with the exception that they form what may be called an internal angle in the roof instead of an external angle. As a rule, no foot is required on a valley rafter, the two nearest common rafters usually coming near enough to the angle to carry facia and soffit; but, like all other rules, this has exceptions, and feet are sometimes required on the valley rafters. The method of obtaining the correct length of the valleys is identical with that described in the previous article for the hips, but if feet are required these must be taken into con-

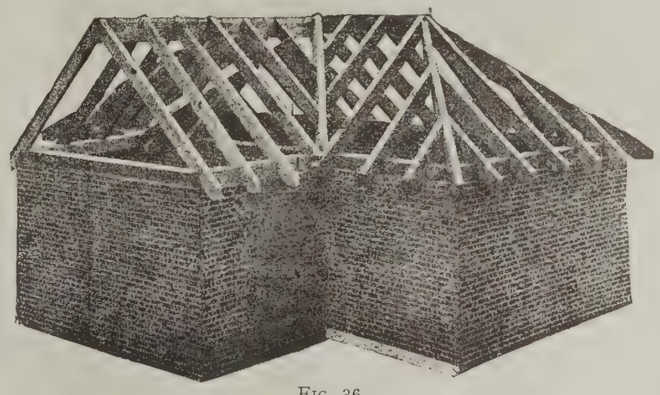


FIG. 36.

sideration, and even if not it must not be forgotten that the back of the valley must run over the edge of the plate. Thus, in Figure 39 the mark C is the backing, but the rafter must continue as shown.

Properly speaking, a center line down the back of the valleys should be in the same plane as the rest of the roof, but in practice the edges of the valley are brought level and the gutter boards get over the rest, as in Figure 40. This shows that, theoretically, the back of the valley should be as dotted lines, but as in the hips the back is rarely beveled, as in the valley the backs are left straight. In the same way, if a foot is used on a valley rafter, as Figure 41, it is not cut out straight with the roof each way, forming a notch, but straight across the angle. The top ends of the valleys are cut exactly as the hips, the same rules applying for obtaining the correct angles as well as for the lengths.

As regards the short rafters which come to the valley rafters each way, the lengths of these, as well as the bevels, are obtained

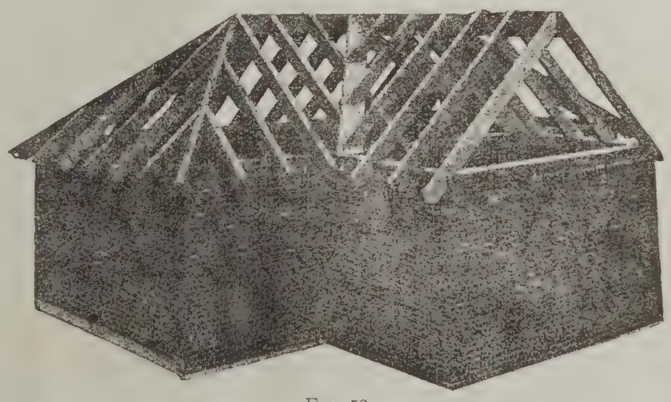


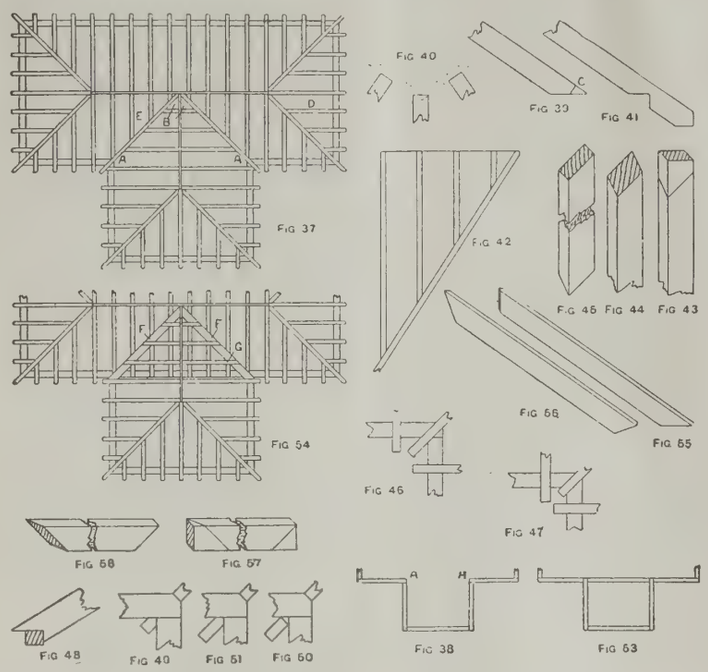
FIG. 52.

by developing one section, as Figure 42, when the angle shown is that for the top cut, the side cut being the same as the top of the rafters.

It is usual to follow on with the short rafters from the main roof, keeping them the same distance between and letting the last

come where it will at the top of the valley, as in Figs. 37 and 42. The length of each, as compared with the last, will then be shown by the square, each one decreasing in length in the same degree as the one befor it.

This method is the same as when dealing with hip rafters, except that in the one case the measurement worked from is the longest corner from the edge of the plate, and in the other it is the shortest corner from the top of the ridge. Thus Figures 43 and 44 show a short rafter, marked and cut for the right-hand side of a hip, as at D (Fig. 37), and Figure 45 shows a short rafter cut for the left-hand side of a valley, as at E in Figure 37.



In Figure 37 it will be noticed that the valley rafters have feet; also that the long rafters next but one to the hips are cut on to the valleys at the extreme bottom end of the latter. This, in actual practice, can usually be avoided, as there would be more scope than can be shown in small-scale drawings. It is best to bring the rafters in Figure 46, and have a foot on the valley rafters, or as in Figure 47, when no foot will be needed.

In many cases, especially if the roof is flat, the foot end of the valleys will have to be cut as in Figure 48. If so, the corner of the plates must be cut off as in Figure 49; while if the valley has to be cut as Figure 48, and also have a foot, it will fit on to the plate as Figure 50; or if exposed to view and the job is a good one, as Figure 51.

The method of forming a valley roof, shown in the photograph (Fig. 52), is somewhat easier to do, while it is quite as strong; but if the space inside is to be used, or if exposed to view, it is not admissible. The plates are framed as Figure 53, and the main roof is carried right through, as in Figure 54. The short ridge is fixed in position up to the ridge of the main roof as shown, and instead of the valley rafters, boards, called sleepers, are nailed to the rafters of the main roof in a line with the rafters on the shore roof, as at F (Fig. 54). The short rafters are then cut to fit on to these "sleepers," thus forming the complete valley.

The sleepers have to be exactly the same length from end to end as the valley rafters proper. The angles are also the same, but the angle of the bottom end of the sleeper is the same as the top end of the valley rafter. The top end of the sleeper is square in thickness to fit against the ridge, as the valley is at the bottom to fit on to the plate, and the bottom end of the sleeper must be beveled to fit the plate, as the top end of the valley is to fit to the rafters, but on one side only. As the sleeper is only half the thickness of the valley rafter it brings the bevel the same. Thus in Figure 55 is shown the valley rafter, and in Figure 56 the sleeper, both cut to fit their position and the correct way up as when fixed.

In cutting the short rafters, the lengths and angles will be as when fitting to the valley rafters, but just the opposite way, owing to the latter being fixed vertically and the sleeper horizontally. Therefore, instead of the short rafters being cut as in Figure 45, they will be as in Figures 57 and 58, the former showing the marking out and the latter the rafter cut, ready for fixing, the position it will fit being at C (Fig. 54).

The style of roof in which the latter method of forming valleys is especially useful is that where a low roof runs into a larger one, and, of course, where it is not seen inside after the roof is covered in. In such a case the "sleeper" method is much more economical than the valley rafters proper, and, of course, the steel square is equally useful in the framing of either.

CONCRETE HOT BEDS—By IDA D. BENNETT

CONCRETE hot-beds fulfill every requirement of a permanent, substantial bed at a cost reasonably within the reach of every owner of a permanent home. Of course, the dweller in the rented house or the home which promises to be more or less temporary, will prefer the hot-bed of wooden construction, but a hot-bed of some kind should be an adjunct of every flower or vegetable garden.

The construction of a hot-bed is a very simple affair, but like all mechanical work there are certain conditions which make for success and cannot be ignored. In the first place the location must be considered as a well drained soil and southern exposure are essential. Where the drainage is poor, as in case of a clay sub-soil, without any underlying strata of gravel it will be well to lay drain tile in the immediate vicinity of the bed and carry it to a point well below the intended site, but such a process is seldom necessary as one is much more apt to encounter sandy, gravelly soil or clay soil underlaid with gravel than the former and in the last condition the depth of the hot-bed which should be between three and four feet, would carry it well below the clay into well-drained sub-soil.

The southern position is necessary as a hot-bed started, as it is at a time of the year when the ground and atmosphere are still filled with the chill of winter, require all the sunshine and protection possible and if, in addition to a southern exposure, there is also protection on the north, as a building, wall or hedge and adjacent buildings or frees to break the force of the west wind the ideal location will be assured. If no such situation is available in the rear of the house or buildings I should not hesitate to put my bed along a front wall or porch providing the conditions were all that I wanted, for there is no reason why a hot-bed should not be made as attractive and ornamental—given artistic feeling and the means to execute, as a conservatory or bay window. A hot-bed full of well-grown, thrifty plants is always an attractive sight and after its usefulness as a purveyor of plants has passed it may be made still more beautiful by filling it with ornamental bedding plants such as coleus, cannas, caladiums and the like. A spent hot-bed offers a wonderfully congenial place for this class of plants as it is full of rich food, retains moisture and keeps the plants cool in a way impossible in the open ground.

One additional point I should mention in regard to location and that is that it should be as near the house as possible as it is likely to require frequent and sudden attention in the unsettled days of late winter or early spring.

The pit of the bed should be about four feet deep and as large as desired. If the regular florist sash are used, and these are made to slide, it will be necessary to place the bed far enough from the wall to allow of this, but for the home hot-bed I much prefer the shorter sash hinged to the frame and supported at any desired height by a notched stick. It one has their sash made to order then the bed may be any desired width but should not be wider than can be conveniently reached across and may be of a length to accommodate any number of sash—three by twelve feet makes a commodious home hot-bed, equal to any reasonable demands made upon it.

If the construction is to be of cement tiles it will only be necessary to excavate the pit of the right dimensions, allowing for the thickness of the tile, which may be laid on edge, but if economy of construction is to be practiced it will be best to make the walls, at least below the surface of the ground, of grout, for which purpose it will only be necessary to dig a trench of the depth of the walls and as narrow as one can handle and fill in with concrete, care being taken not to pour in too much at a time and to thoroughly tamp each pouring down before adding more concrete.

The wall above the ground, which should be about a foot in the front and two feet in the rear, the ends sloping to this degree, may, if preferred, be of tile, which will, probably, be as cheap as to furnish lumber and construct forms, but if one has the waste lumber, very good finish may be given by going over the walls with a higher grade cement after the forms are removed.

Before bringing the wall to a finish above ground the earth may be removed from the inside of the pit but if the concrete is to be continued, the earth may remain in until all the concrete has set, when it may be removed.

A strip of two by four hardwood should be mortised into the concrete at the top for the sash to rest upon and if partitions are to be used to divide the bed into sections provisions for these should be made by placing an inch strip of wood in the trench at the several points where the sash meet. This allows the sash to rest upon the partition and makes a closer joint than would be the case were it not there. The removal of the strip of wood leaves a slot in which a light partition of wood may be slipped after the soil is in place and the bed ready for planting, for these partitions need only to rest on the top of the soil. Such partitioning of the bed is most useful as it allows of the segregation of plants, requiring similar conditions of heat and moisture, to gather and each sash section can be operated independent of the remainder of the bed.

The best sash for hot-bed, I find, is that made to order of reinforced glass, such sash, while the initial expense is much higher than ordinary sash, is practically indestructible, for while, like anything made of glass, it can be broken by rough usage, it is proof against ordinary handling and if cracked cannot come apart and its usefulness is slightly, if at all impaired. Ordinary hot-bed sash is in constant need of repair, a sudden hail storm finding the beds unprotected will riddle them, a cat jumping from a roof above onto the glass spells disaster. Of course, if one wishes a practical, working hot-bed at little expense, they may use old window sash, which may be picked up at any lumber yard at a nominal cost, with excellent results, and usually one has sash of their own resulting from improvements in the home, which may be utilized. These old window sash are usually of a very convenient size and if in good repair and well glazed answer every purpose in a bed not too exposed to accidents. They are especially to be recommended for the hot-bed of frame construction.

In hinging sash to the rear of the bed it is best to use loose pin butts so that sash may be easily removed for repairs if necessary. It is also well to give sash a coat of protective paint, inside and out.

When the concrete is hard and ready to use the pit should be excavated down to the bottom of the wall; no cement bottom is needed in the bed, and the bed filled to within a foot of the top wall with fresh horse manure; this may be placed directly in the pit without preliminary piling in a heap and forking over as is done by florists who, using larger quantities, are seldom able to get sufficient at one time, so pile in a heap and allow to heat before using. Fresh manure, made over night and hauled in the morning will begin to heat at once when placed in a confined pit. Fill to within a foot of the top, tramping it down firmly and evenly in layers, taking pains to see that the corners are evenly filled. Place the sash in position and leave until fermentation is well under way. There should be a considerable quantity of straw or leaves mixed with the manure as this retains the heat much longer than manure alone would do. If the manure is very dry it will be well to give it a thorough soaking with hot water before leaving it.

Manure placed in the pit in the morning should be thoroughly heated by the following morning. The condition will be readily ascertained by the steam arising. If the manure is perfectly fresh it is usually safe to place the earth on it at once and let it heat up with the manure, but if there is any doubts about the life of the heating material it is better to defer placing the earth in position until heat is well advanced.

An inch or two of old, well-rotted manure placed over the fresh is an advantage as it furnishes food for the plants and prevents their penetrating into the hot manure and being injured thereby. Place about six inches of good, rich garden loam or a compost composed of loam, leaf mould and sharp, white sand on top of the manure making it as level and even as possible. Do not make the mistake of making the soil higher in the back than it is in front because the sash is; if this is done the water will all run towards the front of the bed when it is watered, also it will wash the seeds and plants from the ground. The surface soil should be free from stones, roots and twigs and it will pay to run the top inch or two through a mason's sieve if fine seeds are to be sown.

The soil should be in the same condition for sowing as would be desirable in a garden—neither too dry or too wet. In planting the various sorts of seeds it will be best to plant those which germinate at the same time under the same sash placing the taller-growing sorts in the rear where there is more space between the glass and ground and where they will not overshadow the lower growing sorts. Separate each little plot of seed by thin strips of wood pressed edgewise into the ground.

Label each plat with name and date of sowing and when known, with the number of days they will require to germinate. Most of the more common seeds, like asters, tomatoes and the like will germinate in from three to five days while certain others require from twelve to fifteen days and still others much longer and it is well to inform oneself on this point so that the seed plot may not be neglected or disturbed until the seeds have had ample time to germinate.

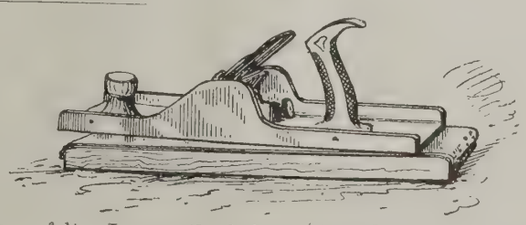
Very fine seed do not need to be covered with soil; merely pressed into it with a smooth faced board, other, somewhat coarser seed may be sown broadcast and a little fine earth or white sand, preferably the latter, sifted over them and the whole pressed down, still coarser seeds may do best sown in shallow drills from one-fourth to an inch in depth according to the size of the seeds, and the sides of the furrows drawn over them and pressed down.

When all the seeds are planted sprinkle lightly with a rubber sprinkler or very fine-rosed sprinkler, taking care not to disturb the seeds, cover with newspapers and close the sash and leave until germination takes place. Examine the bed from day to day and as soon as plants appear in a given plat remove the paper from over them, replacing it over the glass to give partial shade if the sun is very bright, but aim to give the plants all the light and air possible from the start, but protect from drafts of cold air directly across the bed by throwing a blanket across the opening of the sash on the windward side. Do not neglect to close the sash as soon as the sun gets off the sash in the early days of the plants or if the sun goes under a cloud or a cold wind springs up; the neglect to do this may mean a lot of chilled or frosted plants. If the bed has been started in late February or early March it will be necessary to protect warmly at night, but as planting approaches and the weather grows warm the sash should be left off more and more until finally the plants bear complete and continued exposure.

In planting out stuff from the hot-bed do not put out everything at once, rather set what one thinks necessary for their needs and leave a considerable stock to replace those destroyed by cutworms, for it is this reserve stock that most repays the gardener for the construction of a hot-bed, for in these days of excessive ravishings of the garden by worms the furnishing of plants for replanting is no small matter.

LUBRICATING IRON PLANES

When using an iron or iron-face plane the workman is apt to notice a disagreeable suction or repelling action which makes it necessary for him to use more force in handling the tool than when using the wooden plane. Slight lubrication will make the plane work very easily, and the following may prove a useful suggestion in this connection: Take a piece of wood about a foot long and 3 or 4 inches wide by ¾ inch thick. Tack on two thicknesses of baize or a piece of thin felt. Draw the baize taut aud secure it with tacks driven in the ends of the piece of wood so that they will be out of the way of the plane iron. Put a small quantity of oil on

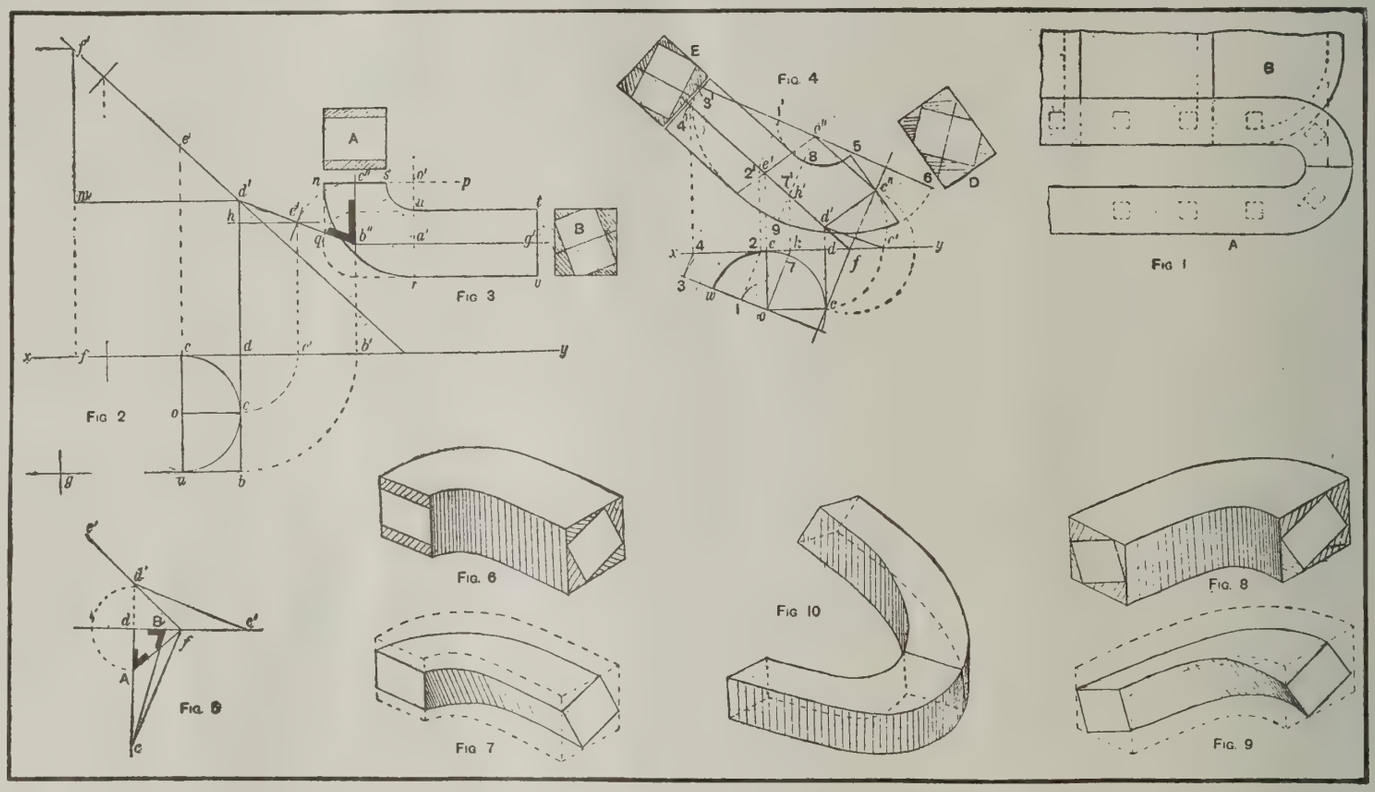


the baize or felt. In use, the baize will need a little oil from time to time. Now the workman simply lays his plane on the felt pad instead of on the bench; this will lubricate it sufficiently for the next planing.—Scientific American.

HANDRAIL WREATH STARTING FROM LANDING

By C. W. D. BOXALL

IN the accompanying illustrations, Fig. 1 shows the plan; the handrail over the portion *A* is to the level landing, and the flight at *B* commences with a quarter-round step as shown, the straight line of the face of the riser being in the same plane as the crown tangent. The going is 8½ in. and the rise 8 in.; in plan the distance between the center line of the rail is 6 in., and the rail is 3¼ in. wide and 2¼ in. thick, and the arrangement of the balusters is also shown at Fig. 1. Set out the center line of the rail in plan as shown at Fig. 2 by *f e c a g*, then draw the crown tangent *d b*, produce *f d* each way to *x y*. Set up the riser *d d'* and the going *d' m*, and also the riser *f f'*; then *d' f'* is the pitch *f e'* the vertical trace of the face mould plane. With *d'* and *c'* as center, obtain the point *c''* and join to *d'* and to *f*; also through *c''* draw the joint line at right angles to *c'' d'*. Draw *o k* parallel to *f c*, project up and obtain point *k'*, then draw *k' o''* parallel to *f c''* and equal in length to *o k* in plan; then *o'' k'* is the direction of the minor axis, and then at right angles to this draw through *o''* the major axis. Next in plan draw *o* 3 and right angles to *o k*, then from where the arc meets this line in w measure off half the breadth of the rail on each side as indicated at 1 and 3, then dray 1', 2 and 3, 4 parallel to *c f*; project upwards, obtaining points 2' 4'. Then from these points project to the major axis



line of the straight rail. With *d* as center draw arcs from *c* and *b*, meeting *x y* as shown in *c' b'*, and erect perpendiculars as indicated. Now set up the desired distances from *x y* for the under side of the level rail as shown by *b'' g'*. This distance, of course, varies, depending on whether it is desired to have the rail from 2 ft. 10 in. to 3 ft. or more from the landing to its under side. Join *b'' to d'*; we now have the development of the tangents. Through *c'* draw the joint line at right angles to *b'' d'*.

The plank for the lower half of the wreath will only have one pitch, and the setting out of the face moulds is as follows: At right angles to the line *b'' g'* draw the line *b'' c''*, making it equal to *b'' c'*. Through *c''* draw *n p* parallel to *b'' g'*, which gives the joint line and the minor axis. Make *c'' o'* equal to *c o* in plan; through *o'* draw *o' r* at right angles to *n p*. This is the major axis. On each side of *c''* mark off half the breadth of the rail as shown by *n* and *s*. From *n* project down parallel to *c'' b''*, giving point *q*. With distance *b'' q* mark off from *a'* on the major axis, giving points *r* and *u*. Then draw *u t* and *r v* parallel to *a' b'*, and joining *t v* gives the shank required; the quarter ellipses *s u* and *n r* may be constructed by any of the usual methods. As before observed, there is only one pitch to this plane, and therefore only one bevel, which is shown, and at A and B are shown the ends of the wreath set out.

The method of setting out the upper portion of the wreath will now be proceeded with. Set out the square *o e d c* (Fig. 4) similar to that shown in Fig. 2; through *e d* draw *x y*. Set up *d d'* making it equal to *h d'*, (Fig. 2.). (This distance is obtained by drawing a horizontal through *c'*.) At Fig. 4 through *d'* draw the two pitch lines *d' c'* and *d' e'* corresponding to those at Fig. 2. Producing *e' d'* we obtain point *f*, and from this draw through *c*; then *f c* is the horizontal trace and 1' 3', also from *o''* set off similar distances, obtaining points 5 and 6. Then from *o''* on the minor axis obtain point 7', which is equal to the radius *o* 7 in plan; next from 7' mark off half the breadth of the rail, which gives points 8 and 9 on the major axis for the internal and external curves respectively, and these curves can now be constructed, and the face mould with its shank completed as shown.

The method of obtaining the bevels is shown at Fig. 5 to a larger scale for sake of clearness; it being a portion of the setting out of Fig. 4, as will be understood by reference to the similar lettering, *d' e'* being the pitch of the straight rail, *d' c'* that of half the crown tangent, *d c* one side of the square and *f c* the horizontal trace. With *d* as center draw an arc tangent to *d' c'*, bringing it round to A, and join to *f*. Then the bevel thus obtained is for the well joint, and its application for this purpose is shown at D (Fig. 4). Again, with *d* as center draw an arc tangent to *d' f*, giving point B; join to *c*, then the bevel shown is for the shank joint, and its application for the setting out of this is shown at E in Fig. 4. At Fig. 6 is shown conventionally the lower half of the wreath cut square through from the face of the plank, the face mould having been applied and also the bevel and the ends set out. Fig. 7 shows this wreath piece squared up ready for jointing. At Fig. 8 is shown conventionally the upper portion of the wreath cut out square from the plane, and the ends set out ready for squaring up. Fig. 9 shows this piece squared up. At Fig. 10 the wreath is shown squared up and jointed ready for moulding. It will be noted that in these conventional views the wreath pieces are shown with all their arrises on, which would necessitate cutting them out a little fuller from the plank.

LEAVES FROM A STUDENT'S NOTEBOOK—No. 5

By GEO. METSON

RETAINING WALLS OR DAMS FOR WATER.

HYDROSTATICS teach us that the pressure of water is perpendicular to the surface pressed against, and that the pressure at any point is in proportion to the vertical distance of the point below the surface of the water, therefore a perpendicular drawn to the bottom of the inner surface of a retaining wall for water, equal to the vertical depth of the water above that point, will represent the magnitude of the pressure at this point. In Figs. 1 and 2, WP represents the magnitude of the water pressure at the point W, and the pressure will decrease until at the top of the water, O, it will be nil. This is shown in Figs. 1 and 2 by ordinates. From this it will be seen that the wedge-shaped volume of water WOP will represent the magnitude of the pressure on the retaining wall from the water.

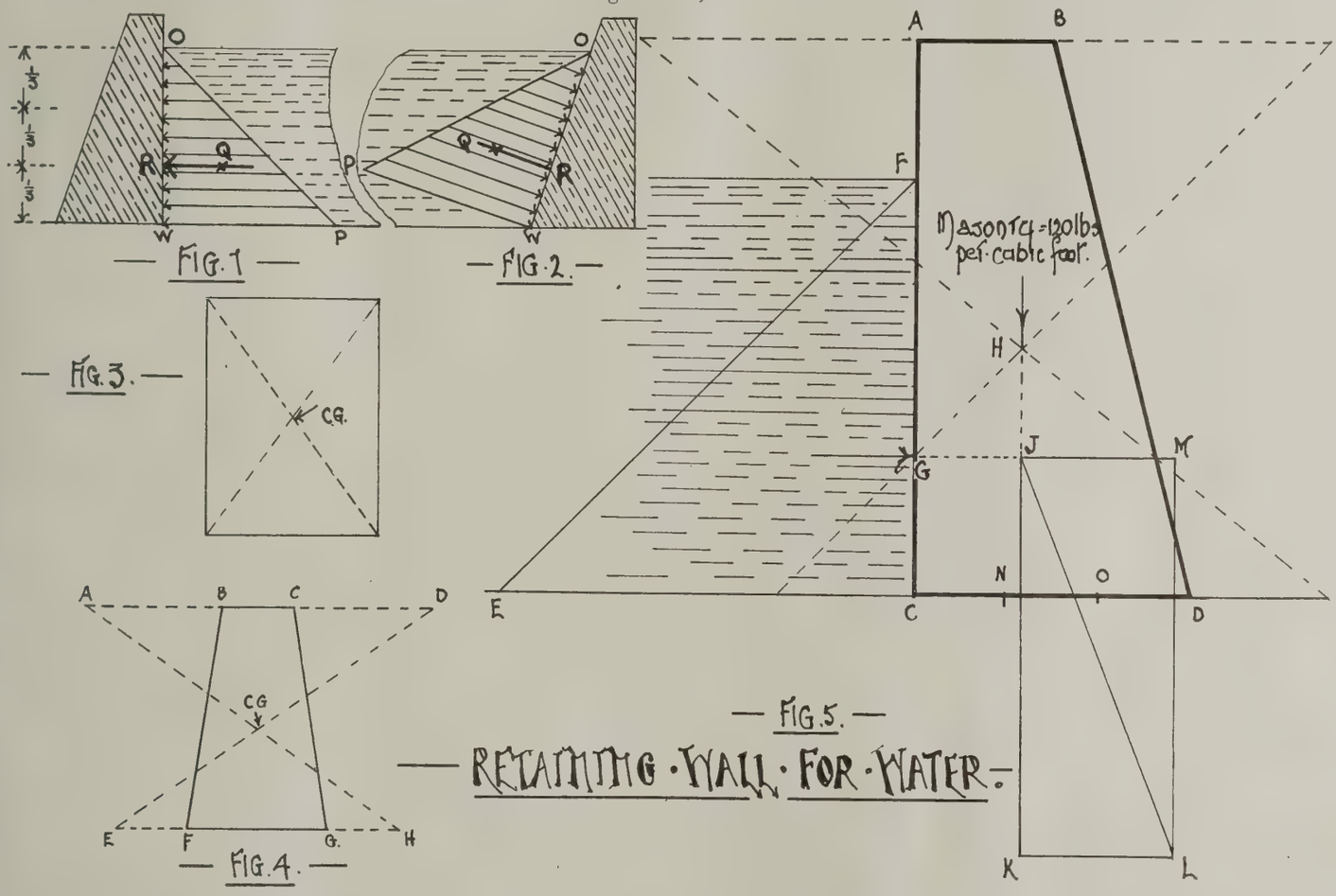
In order to compare this pressure as exerted on the dam, a section of the wall and water must be taken in calculating the pressure of the water as against the force exerted by the weight of the wall. Take this section as one foot in width. The magnitude of the force exerted by the water can now be determined. It will be $\frac{OW \times WP}{2} \times 62\frac{1}{2}$ lbs. (note 1 cubic foot of water weighs $62\frac{1}{2}$ lbs.), and as the weight of a body can be considered as concentrated at its center of gravity, this center of pressure must now be found. It will be a point joining the center of each side of the triangle to its opposite angle. The direction of the force will be perpendicular to the surface pressed against. Thus in Figs. 1 and 2, Q = the center of gravity and Q. R. denotes the direction of the force exerted by the pressure of the water. It will be noticed that the point of application is always one-third up from the base.

Similarly the force exerted by the weight of the wall must be taken as being concentrated at its center of gravity, and as it must act through the same, a vertical line from the center of gravity of the wall will represent the direction of this force.

The center of gravity (C. G.) of a rectangular wall is found by lines joining the opposite angles; i. e., the intersection of the diagonals as in Fig. 3. To find the C. G. of a wall trapzium in shape as BCFG in Fig. 4, add to each side of the top BC, in prolongation of BC, a length equal to the base FG as AB and CD. Similarly prolong FG each side, making EF and GH equal to BC. Join AH and DE. Their intersection makes the center of gravity of the mass BCFG.

Let it now be required to determine the stability of the wall ABCD in Fig. 5.

From C set out EC at right angles to AC and make it equal to FC. The triangle EFC will then represent the magnitude of the force exerted by the water. This will act at its center of gravity I, the point of application being G and IGJ its direction. Its magnitude will be $\frac{FC \times EC}{2} \times 62\frac{1}{2}$ lbs. $= \frac{6 \times 6}{2} \times 62\frac{1}{2} =$ 1,125 lbs.



Find as above for a trapezium the center of gravity of the wall ABCD. This will be H. The force of the weight of wall will act through H in the direction H J. The magnitude of this force will be $\frac{AB + CD}{2} \times AC \times$ weight of a cubic foot of the wall.

This can be taken as 120 lbs. for masonry, it will then be for the one-foot section taken $= \frac{2 + 4}{2} \times 8 \times 120 = 2{,}280$ lbs.

To any convenient scale set out from the point J (the meeting point of both forces) in the direction of those forces, lines equal to the magnitude of the same, viz., JM = 1,125 lbs. and JK = 2,280 lbs.

Complete the parallelogram JKLM and join the diagonal JL, which represents the resultant, the magnitude and direction of the two forces.

For the wall to be stable, it is generally considered necessary for this resultant to cut the base of the wall within its middle-third (NO = the middle-third of the base in this example). The wall is therefore considered safe against overturning.

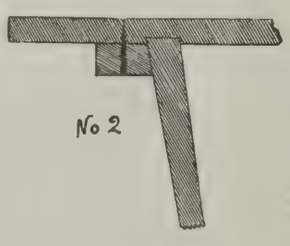
FANCY TABLES AND HOW TO MAKE THEM

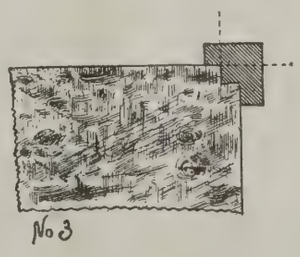
FANCY—or as they are often called, occasional—tables, although fairly simple to put together, it is wise to start on some simple form of table before the more difficult ones are attempted. Leave curves till the square has been mastered. There are many hundred designs of occasional tables obtainable by visiting people's houses, or from ordinary catalogues, if only a few tables are seen. A piece of one put in place on another table may make a great difference for the better. An improvement in the pattern of the brackets may improve what hitherto was considered an ordinary design. Many dozens of like hints might also be quoted. Take care, however, to keep all the parts in harmony with each other—to quote a flagrant case, don't put ordinary square legs on an elaborately carved top—this is for example. This description is intended to give the amateur a few hints rather than an explanation of the concrete designs sketched out. More instruction could be given in half an hour's practical demonstration than pages of writing, but as this is impracticable I must fall back on the pen.

The main thing in good cabinet making is originality in designs, get out of the common rut which is much in evidence in furniture makers' windows. Invent new designs for yourselves, and the trouble spent will be amply rewarded.

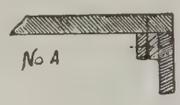


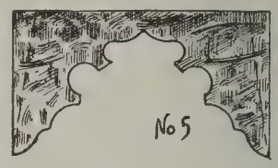
As an elementary design, and one which will present no difficulty, even to the merest beginner, is sketch No. 1. This one consists of a square top to which is fixed four simple pattern legs, an under shelf, and a few brackets and ornamental pieces. The legs could be butted against the under side of the top; but it is by far the best to let them in as depicted in sketch No. 2. Put





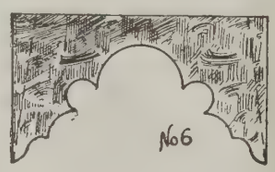
a small block underneath for strengthening purposes, but before fixing give the leg and table top a screw driven in slanting. Taper all the four legs together so as to get them alike. If they are square all the way down, then the table looks clumsy and ugly. For a small size table top, 18 in. square, 1½ in. square legs will be large enough, tapering to 1 in. The tops of the legs form a square about 3 in. inside the table top, and the bottoms form a square the exact size of the top. It would be useless to give any crude method of getting the correct inclination of the legs. Make a correct (no matter how rough) drawing full size, then it can easily be obtained.

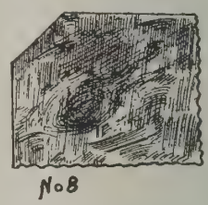




The under shelf could be cut to the inner angles of the legs, or, which is mostly done, let in the legs as shown in sketch No. 3. Small blocks could be put underneath on the legs if the former plan is adopted. From the full size drawing the size of the shelf can be obtained. Settle upon how much the shelf is to be above the ground, 10 in. will be enough, and then rule the position on the drawing.

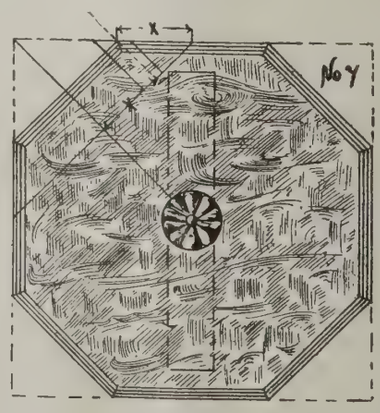
The ornamental brackets for an 18 in. square top and 1 in. thick need only be ⅝ in. thick. If all the four are to be alike, cut them all together; then you may depend on them looking alike —if each pair is alike, then cut in twos. Small fillets underneath





will hold them both, the brackets and bottom ornamental strip (see sketch No. 4.) These fillets can have a square lip or projecting tongue worked on them to rest in grooves in the brackets, etc. Again, if the brackets are let back slightly from the face of the legs, grooves could be worked on the inner sides of the legs, and the brackets let in. Settle this beforehand, however, for the mortises or grooves have to be made. Cut them exact, or material will be spoilt, or else bad jointing.

The ornamental brackets are shown separately in sketches Nos. 5 and 6. Mark them out square first, then cut together along dotted line. Measure carefully from the drawing the exact position of this dotted line, so as to get correct taper. The brackets in sketch No. 1 are different at the sides to those of the front and back. This may or may not be desired. Room is given here for fretwork designs. Instead of these long brackets, eight smaller brackets might be used without detriment to the result.

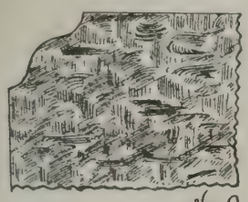


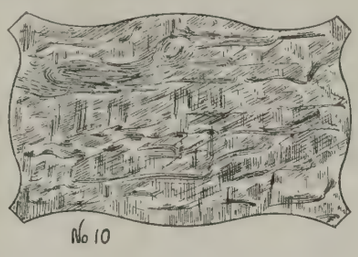
Tables of this description made in walnut or mahogany, or even ebonized, are saleable from 17 to 20 in. square top, with a total height of 2 ft. 6 in.

Many modifications can easily be made in a table of this description. Cut off the corners as in the octagonal table, sketch No. 7, which is common for larger size tables, say 2 ft. 6 in. square, to 3 ft., with vertical turned legs.

To get the correct length of side, draw a diagonal of the square, as shown, then draw a line at right angles from the center

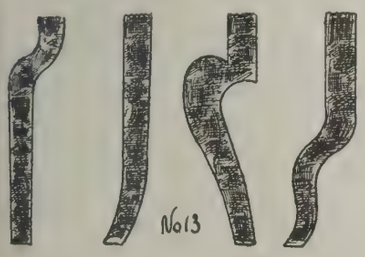
of one side, as shown, and by trial get the lengths X equal. This can easily be done after one or two attempts. There is, of course, the true geometrical way, which some readers may know of.

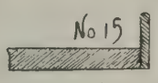




A center ornament is suggested, and as the top is not small enough to be made in one piece, it must be grooved or ploughed and tongued, or else dowelled together; a batten for strengthening is indicated by dotted lines.

Sketch No. 8 shows simple cut-off, the angles often adopted, or, again, a more ornamental corner, as No. 9. An oblong table looks nice, especially if fanciful, as sketch No. 10, and, of course, the tops and bottoms of the legs must form a rectangle instead of a square, as before said.






No. 11


No. 12

A kidney-shaped table—top and shelf alike—is very popular, and if made in rosewood and neatly inlaid, suggests of Sheraton. The side of the top of both these last two would fit a rectangle of 3 ft. by 1 ft. 6 in., and about 2 ft. 6 in. high, these being average sizes.

All the foregoing tables are, of course, to be left uncovered. The designs are few in number, suitable for this class of table. Sketches Nos. 11 and 12 give the common shape, others being the circular, square or crescent shaped. The tops and shelves may be the same size, in which case the legs seem to pass right through—that is, the dowels meet in the center of the holes in the shelf. The position of the legs is marked by circles, in the first case No. 11.

The legs and their shape must claim great attention. Unturned leges, square and rectangular in section, are far more chic for many table designs. A few patterns are given in No. 13, which may be combined at will. The first represents the top of a leg, and if gradually tapered down and curved out at the bottom, after the style of the second pattern, a graceful leg is the result. The third shows the top of a leg much used; the curve or hump may be flattened, as it often is. The last is the bottom of a leg now and again seen, and if neat curves are given, it looks neat and artistic. The third pattern, modified more or less, is the writer's fancy, and is recommended.



Turned legs are sometimes fancied, especially for octagon tables. Sketch No. 14 gives a few patterns, and although the bottoms are shown straight, these can be curved outward with pleasing effect. Do not have the legs too stout; they are ugly, and suggest a kitchen table. The fourth and sixth patterns please the eye. Use casters; they look nice and are useful for shifting the table. For preventing things rolling off, a gallery is often used fixed on the edge, as in sketch No. 15. Take time in making, and the result is gratifying.—F. H.

THE OLDEST CHAIR IN EXISTENCE

THE illustration shown herein is taken from a photograph of an old Egyptian chair now in the Museum of Boular. This is a chair of the XVIIIth dynasty, B. C. 1600-1368, and was found in the tomb of King Jouiya and his queen, Fouiyau, at Thebes. Those of our readers who fondly imagine that the cabriole leg was an innovation in the time of Queen Anne will see that it was even at that remote period a few thousand years out of date. The chair is beautifully proportioned and exceedingly well carved, the flatness of the symbolic work on the back being well adapted to the position which it occupies. The top rail is ornamented with the winged scarab, the symbol of everlasting life. In a climate such as ours, where the atmosphere contains so much moisture, a chair of this description could not have survived, but in the dry heat of Egypt it has been kept in an excellent state of preservation. Many specimens of Egyptian furniture are left to us in various museums; this absence of humidity, coupled with the faith of the people in the persistence of the personality after death and the return of the spirit to the body, led to the burying of models or actual pieces of furniture, and in this way we have records of the oldest civilization, which Renan has described as "The Queen of Nations and the Boast of Time; Mother of Sciences and the House of Gods." Queen Hatshepsu's throne in the British Museum is probably the most ancient piece of furniture in the world. The Egyptian folding chairs, stools and couches had seats of leather, plaited rushes or linen cords. On most of the furniture the craftsman of Egypt stamped his stern personality, but the chair which we illustrate suggests considerable comfort. Egyptian woodwork was usually painted, but inlay was also extensively employed. A remarkable evidence of the dry climate of Egypt is afforded by the fact that a wig, some 6,000 years old, was discovered at Thebes during the past century in a good state of preservation.—Cabinetmaker.



CONCRETE CISTERNS ON TOP OF GROUND PROVIDE COUNTRY HOUSES WITH CITY CONVENIENCES

An abundance of soft water is a great aid in solving the labor problem of housekeeping. With the general use of concrete there has developed a new style of cistern which further lightens the work of the housewife. This new concrete cistern is built on top of the ground and, by direct pressure, forces the water through pipes into the house and does away with the work and exposure of pumping and carrying water. The piping of the water allows the cistern to be located to the best advantage. Since the roof water from out buildings is free from soot and other impurities, many persons prefer to build the cistern at the barn, granary or corn crib. The cistern shown in the illustration is placed on a three-foot terrace in the rear of the house. The carrying of water is thus reduced to the mere matter of turning a faucet in the kitchen.



A FARM CISTERN BUILT ON A THREE-FOOT TERRACE.

THE FORMS AND FOUNDATION.

To illustrate the general method of construction, consider a cistern 8 by 8 feet square in the clear and 8 feet high with 6-inch side walls and floor and 4-inch roof. Such a cistern holds 121 barrels of water.

The first step in building a cistern is to have all materials on hand before beginning the work. Make the forms or molds of 1-inch siding on 2 by 4-inch studding spaced 2 feet. Remember that the siding always goes next to the concrete. Since the floor is 6 inches and the roof 4 inches thick, have the studs for the outside form not less than 8 feet 10 inches in length. The uprights for the inside form must be exactly 8 feet long. As the pressure of the concrete will tend to hold the siding in place, tack it lightly to the studding. Board up the outside form only to height of 3 feet, so as to make easier the handling of the concrete and the placing of the reinforcing rods. Build each side separately in order that the entire form may be quickly erected. See that the forms are joined in such a way as to make their removal an easy matter when surrounded by the solid concrete.

From the site of the cistern strip off the sod and other foreign matter. Do not disturb the solid ground. Three to four feet below ground level (depending upon the depth of freezing), lay a 2-inch house-supply pipe and have the cistern end fitted with a pipe connection, set at the concrete floor level and 1 foot from the cistern wall. Carefully imbed the pipe in concrete to the first joint beyond the cistern wall. Thoroughly tamp back the earth removed, so that there can be no settlement underneath the cistern floor. Lay out the cistern 9 by 9 feet, out to out. Within these lines dig the foundation trenches 1 foot wide and 3 feet deep.

MIXING AND PLACING THE CONCRETE.

With the forms ready and the foundation trenches dug, begin mixing the concrete. Proportion the concrete 1 part Portland cement to 2 parts sand to 4 parts crushed rock. Four parts of clean bank-run gravel may be used instead of the sand and stone. In measuring the materials do not guess or count shovelfuls. Measure exactly by means of a bottomless box, and count one bag of cement equal to 1 cubic foot. Mix the concrete mushy wet and fill the trenches to a level with the under side of the cistern floor.

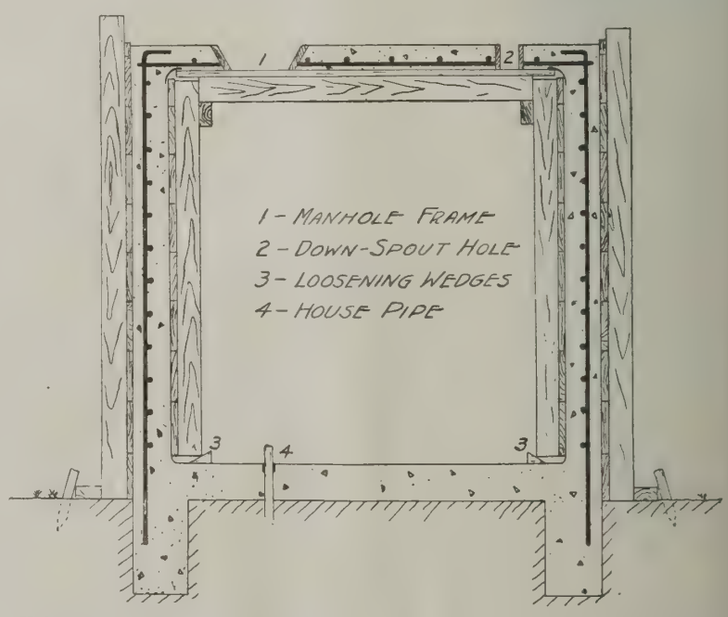
To take care of the water pressure, reinforcing rods must be run in both directions through the concrete wall. For this purpose, use ⅜-inch rods 10 feet long. While the concrete in the foundation walls is yet soft, set the vertical rods in it (spaced 8 inches) to the depth of 1 foot. Carefully place these rods so as to bring them within 1 inch of the outside of the cistern walls.

Next in order is the concrete floor. Make it 6 inches thick and tamp the concrete well. See that it overlaps the inside of the foundation wall and that the top of the pipe connection is at the floor level. Finish the surface with a steel trowel.

After the floor has hardened for three or four hours, erect the inside form. To aid in taking down these forms, place removable wedges between the ends of the studs and the floor. Before setting up the outside form, fasten the first four horizontal rods to the vertical reinforcing by means of small wire. These rods are spaced 8 inches apart. The ends must be bent and spliced around the corners of the cistern. Set the ouside form and begin building the concrete side walls. Use the concrete mushy wet and work it down next to the wall form with a wooden paddle. Place it in 8-inch layers carried around the entire cistern. See that exactly 1 inch of concrete is between the steel reinforcing and the outside form. As the work progresses, add the necessary boards of the outside form and the lengthwise reinforcing rods. Do not stop placing concrete until the walls are finished.

THE CONCRETE ROOF.

While the 4-inch concrete roof is hardening, a temporary wooden platform is needed to support it. Build this platform of 1-inch boards nailed lightly to 2 by 4-inch joists. Let these joists rest on 2 by 4-inch stringers nailed to the studding of the inside form at a distance of 4 inches below their tops, so that when the stringers are loosened the platform will come down. To keep the mushy concrete from wasting, place heavy paper or thin cloth at the edges of the platform. For providing a manhole opening, take 1-inch boards 5 inches wide and build a bottomless frame, 4 inches deep, 2 feet square at the top and 18 inches



CROSS-SECTION OF CISTERN BUILT ON TOP OF GROUND SHOWING FORMS AND REINFORCING.

square at the bottom—outside measurements; or have the tinsmith make a round bottomless dish-pan of the same dimensions at the top and bottom. Grease the manhole frame and set it on the platform where the opening is desired. For the downspout from the roof, make an opening by similar use of a round wooden plug or a short section of drain tile or sewer pipe, which may be left in the roof.

Over the entire platform spread 1 inch of concrete. Quickly place the reinforcing of ⅜-inch steel rods running in both directions (criss-cross) and spaced 1 foot apart. Bend the ends to a hook shape and fasten them to the rods in the side walls. Immediately tamp in the remaining 3 inches of concrete. Increase the thickness to 3½ inches at the center so as to shed the roof water. Finish the surface with a steel trowel. If the tin manhole frame is to be used, grease it, set it in place and build the cover along with the rest of the roof. Reinforce the cover with short length of rods laid criss-cross and within 1 inch of the bottom. As lifting rings, use two halves of an old bridle bit or two hitching post rings, the ends provided with knobs of twisted wire or with nuts and large washers for holding the bolts firmly in the concrete. If the wooden manhole form is used, carefully remove it after 5 hours. After 3 days build the manhole cover the same as for the tin form, with this exception—place greased paper around the edges to prevent the new concrete from sticking to that of the platform. When the cistern roof is 3 weeks old, lift off the manhole cover and saw an opening in the wooden platform. Descend, loosen the wedges under the studs and the stringers supporting the platform, remove the forms and pass them out through the opening. To keep the settlings out of the house pipe, screw a 4-inch length of pipe into the joint coupling. Furthermore, the downspout should be provided with a cut-off, so that the first flow from the roof of the building may be kept out of the cistern. The cistern may be used for water storage after it is 1 month old.

Below is given the bill of materials and a liberal estimate of their cost. By consulting local dealers, it may be found that the cost of the cistern can be reduced.

MATERIALS REQUIRED.

Crushed rock, 12 cubic yards	at $1.10.....	$13.20
Sand, 6 cubic yards	at $1.00.....	6.00
Portland cement, 21 barrels	at $2.50.....	52.50
Reinforcement (112 rods—⅜ in. by 10 ft.) 420 lbs.	at $0.02¼.....	9.45
		$81.15

If ornamental features are desired, moldings or tile decorations may be used. The point to bear in mind is, that an inexpensive cistern located on top of the ground provides the country house with the conveniences of a costly city waterworks.

APPLIANCE FOR MARKING MOULDINGS FOR MITERING AND SCRIBING

A GENERAL method of marking mouldings for scribing is to cut a miter as if for an internal angle, and afterwards to reduce this to the scribe. This entails waste and labor, and is not available for marking mouldings for the purpose of returning the ends in the solid. Figs. 1 to 3 show an appliance designed to do away with these difficulties, and properly manipulated, it will give any kind of scribe or miter that may be required.

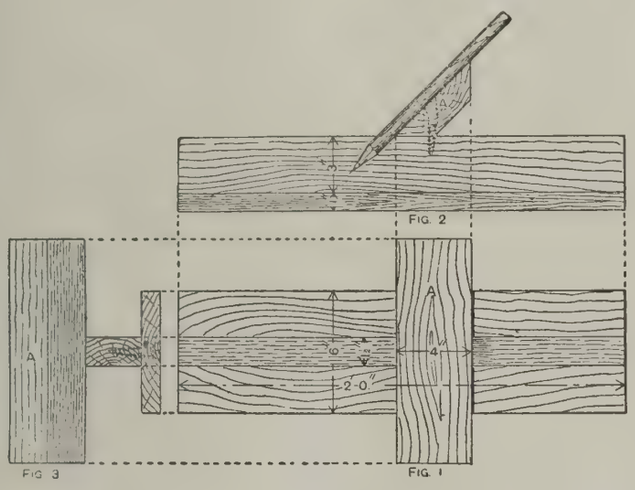
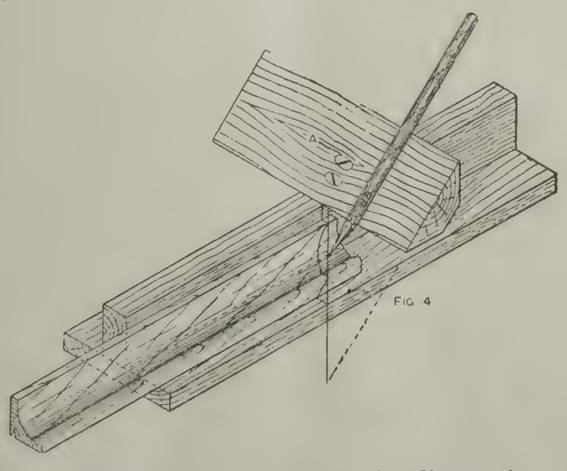


FIG. 2



The appliance can be constructed of ordinary pine or deal, A being the plane of intersection. The dimensions can be altered to meet requirements. The pencil has a flat side planed throughout its length, so as to bed fairly on the plane, and is used as indicated in Fig. 4, which shows the application of the apparatus. The moulding is held in position by the left hand, and any marks that have been made on it are adjusted to the point of the pencil, which is then worked all around the surface of the moulding, care being taken that it always lies flat on the plane. The curved lines show the path traced around the surface of the moulding by the point of the pencil. Fig. 5 shows an example of a similar device for use in brickwork or stonework. The side of the plane marked

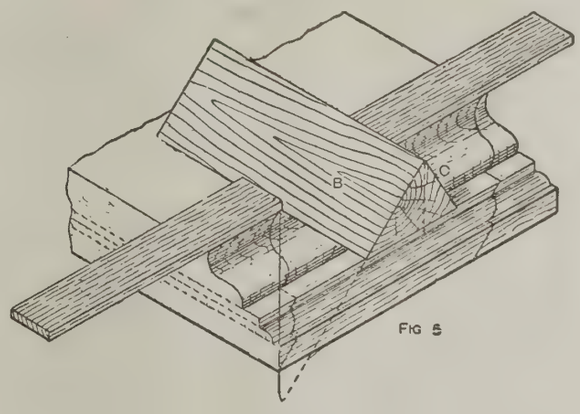


FIG 5

B is for square miters, that marked C being for octagonal miter. The curved lines on the moulding show the trace of the point of the scriber.

This method can be applied to miters or scribes of every angle by simply fixing on a fence or straightedge a plane having a pitch or inclination equal to half of the whole angle. Fig. 6

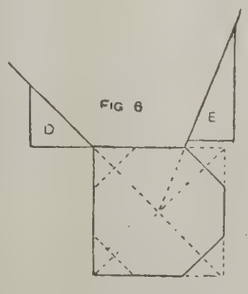


FIG 6

illustrates this adaptability, D being the plane of intersection of a right angle, E that of an octagonal angle.

The appliance, which is simple and inexpensive, might be considerably improved by hinging the plane so as to render it adjustable to any angle.

HOLLOW BRICKWORK

By H. T. F.

WALLS are often constructed in such a way that they represent a hollow space or vacuity in the interior, this not only effecting a considerable saving in bricks, but tending very much to keep the exterior face of the wall dry or dampproof, and this to a very considerable degree of completeness. This latter point will be obvious on slight consideration, inasmuch as,

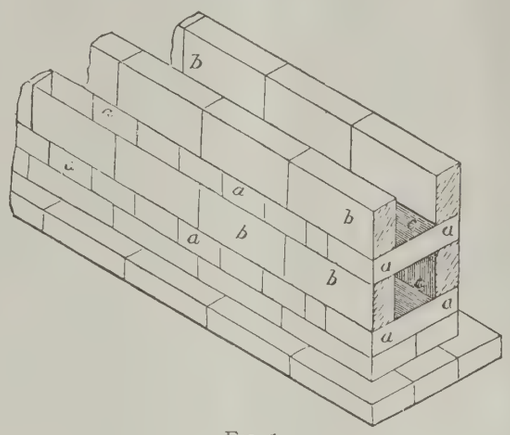


FIG. 1.

should the outer or weather surface of the wall be defectively built, either with poor bricks or through careless and improper "pointing," in heavy rains, especially if these be accompanied by high winds blowing in the direction of the walls, the wet or damp which may pass through the outer skin, so to call it, of the wall, will

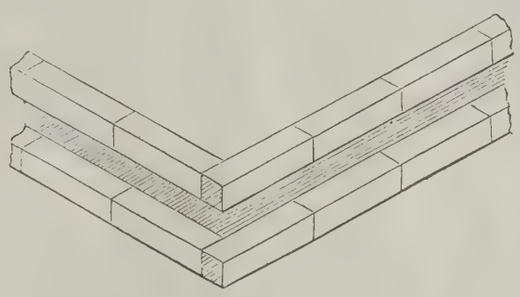


FIG. 3.

pass down the sides of the cavity or hollow, and not through the inner skin of the wall next to the room. In building "hollow walls" or "cavity walls," as they are in some districts named, the

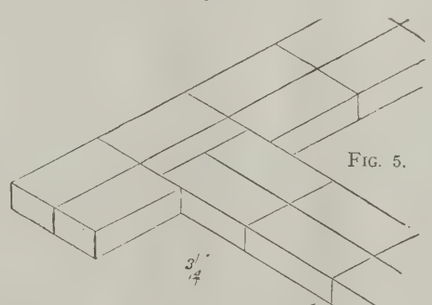


FIG. 5.

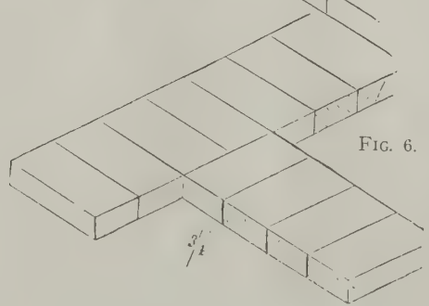


FIG. 6.

bond requires to be altered so as to meet the peculiarities of the kind or variety of wall determined upon.

In Fig. 1 we give a drawing of a hollow wall, built according to a novel bond. In this rows of headers, *a a, a a,* alternate with rows of stretchers *b b,* but the stretchers *b b* are placed on the edge; thus giving throughout the whole length of the wall a hollow space or vacuity *c c.* The appearance of this wall in elevation is also shown in the diagram; but the usual method of disposing the bricks in elevation is shown in Fig. 2, where the stretchers are

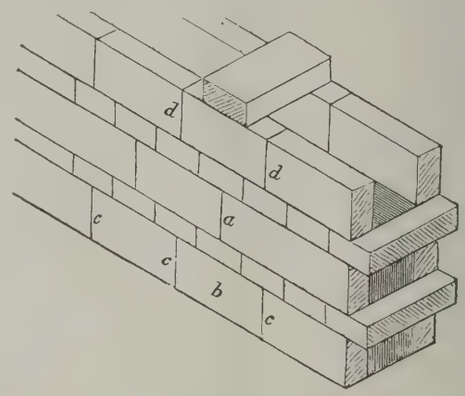


FIG. 2.

so disposed that the joints, as *c c,* of one (b) do the binding of the angle at the meeting of two walls, Fig. 3, and do not coincide with the row of stretchers next in succession, as *a,* but with the next but one, as *d d;* the joint *a* of two contiguous stretchers being

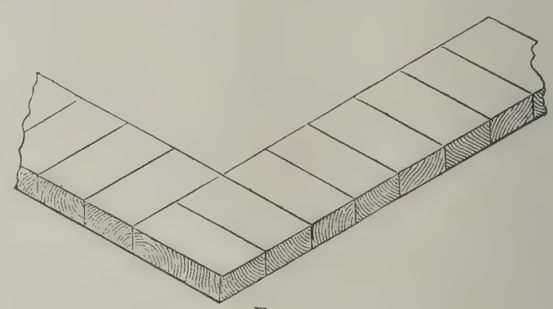


FIG. 4.

above the solid part of the stretcher *b* in the course of stretchers below. Fig. 3 shows the method being the "first course," Fig. 4 the "second course." This method of building effects a saving of

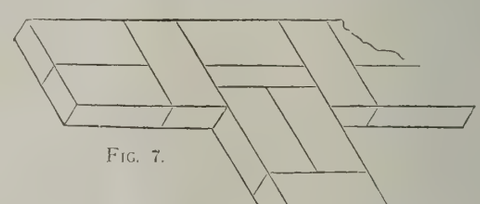


FIG. 7.

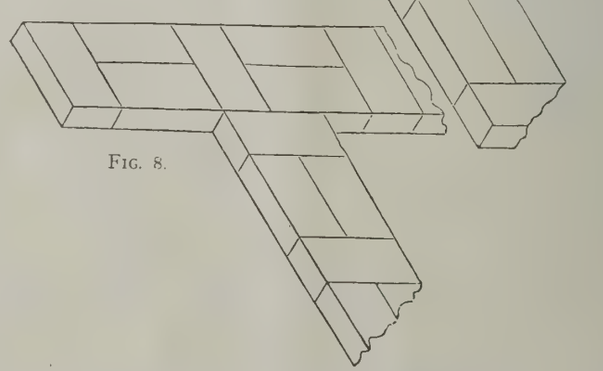


FIG. 8.

about one-third of the bricks and one-half of the mortar. Fourteen inch walls are built by having header bricks fourteen inches long.

In Fig. 5 we give an illustration of a wall equal in thickness to one brick, in English bond, this being the first course, Fig. 6 being the second. Fig. 7, the first course of a wall of same thickness, but in Flemish bond, is illustrated.

The openings in brick walls made to receive doors and windows, are in some districts technically called "voids" or the vertical sides of the opening to right and left of the "void" are called "reveals," or "jambs," according to their position. The vertical

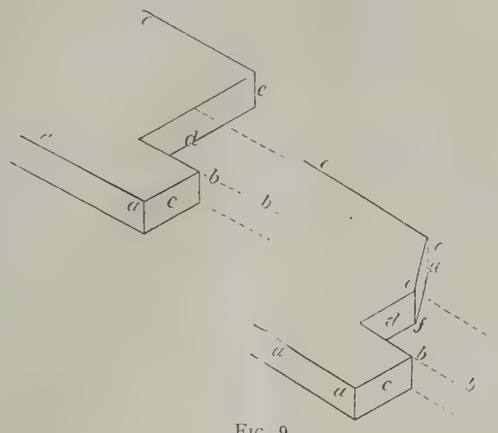


Fig. 9.

sides of the wall are called "reveals," as the part *c*, Fig. 9, formed by the "return" from the external face of wall *a a*, and the external face *b b* of the door or window frame represented by the dotted lines *b b*. The depth of the part *c* from *a* to *b* is usually half a brick, although much finer architectural effects can be obtained by having a deeper reveal. The mode sometimes still adopted, which was so prevalent in the last century, of bringing the front of the sash frame of a window formed so as to be flush, or nearly so, with the face of the wall, should be discarded. The inside return or recess formed behind the face *e e* of the inner wall, and the back of the door or window frame, is called a "jamb," as *d e*, Fig. 9. "Jambs" are of two kinds—"square" as at *a b d e*, and "splayed" as at *a b d e e*, Fig. 9. The corresponding letters indicate corresponding parts. Figs. 10 and 11 illustrate a "square reveal," or "jamb," in a two-brick wall, Fig. 10 being "first," and Fig. 11 being "second course," and in English bond. A similar reveal, but in Flemish bond, is illustrated in Fig. 12, which is the

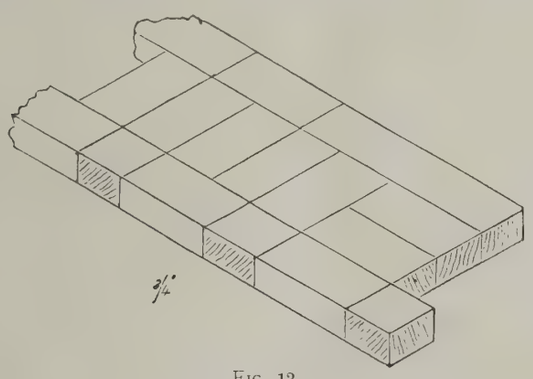


Fig. 12.

first, and in Fig. 13, which is the second course. The student will observe that in Fig. 13 the bond with the half closer, *a*, and the half brick *b*, is bad. It is usual, therefore, to throw in a brick so cut as to form both pieces (as a and b) in one. This is called a

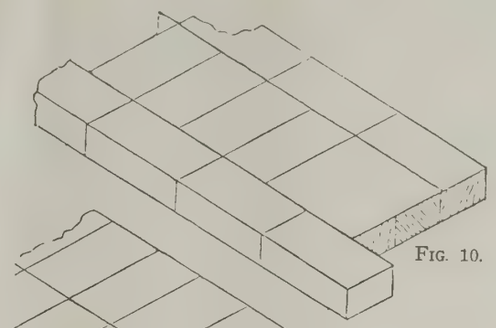


Fig. 10.

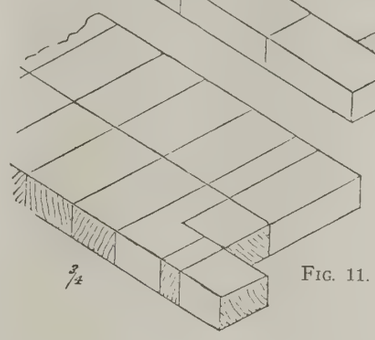


Fig. 11.

"king closer," and if it were practical, it ought to be formed, as shown by the line *c d e f g h*, with a shoulder *h g*, but as it cannot conveniently be cut in that manner, it is cut obliquely as at a Fig. 14.

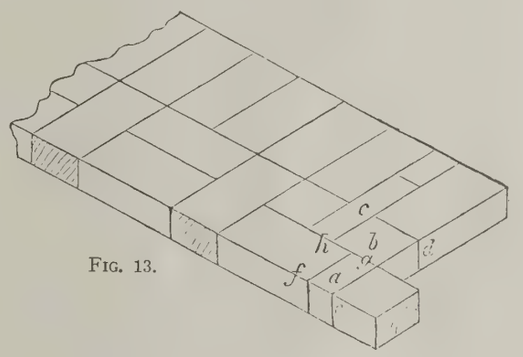


Fig. 13.

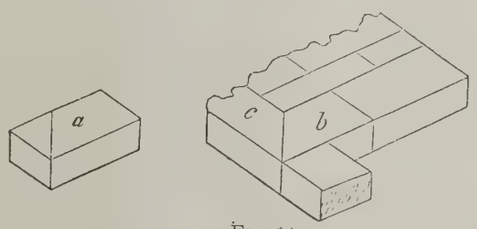


Fig. 14.

A CONTINUAL CHANGE

By WARFIELD WEBB

THE builders' occupation has undergone radical changes in the past few years. It was the vogue in times past for the builder to plan and execute every portion of the structure. The frames, sash, panels, even the doors in some instances, and the interior trim and much of the exterior detail. He had to be a skilled mechanic in all these lines. And further still, he had to know just how each portion of work was to be done and done rightly. The times have wrought wonderful changes in many of these things. Now we have houses made to order and set up at our command. We have exterior and interior docorations shipped in boxes and placed together with the aid of a few nails. Has all this changed the builders' occupation, and has he lost some of the finer art that was once his lot?

To answer this question in its strict and logical sense we must say, no. Conditions have changed; have undergone evolutions that have made over, in a way, the whole industry, and still there is today a greater demand than ever for men who can do a few things well. The day of the haphazard jobber and the careless carpenter is no more. The time when a man was expected to do any and everything has gone into oblivion. The ready-to-order structures of all kinds have robbed him of his occupation. For the man who can and who will specialize in his work and do it well, the vista widens and he is in demand. It is today a question of skill, rather than of occupations. What can he do and do exceptionally well? That is the question for him to consider at this time in a most earnest manner.

What talent has been most noted in his labor? What does he himself feel that he understands and prefers to specialize in? He has something that fits in more particularly than others. Let him cultivate this to its highest degree. Let him leave no effort idle that will make this possible. He need not complain that he has lost his occupation. No occupation is really lost to the man who is keen enough to keep abreast of the changes that are continually going on around him. If you will note it, there is generally an almost complete revolution in our methods of doing things once in twenty-five years. If we were to stand still at the sight of our industry undergoing this change, we would be left on dry land, and our bark would be unfit to continue her voyage on the seas of life.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

PLATE XX. BASEMENT PLAN.

A STONE wall 1 ft. thick, set upon a concrete footing, is heavy enough to carry our walls, though a dwelling any larger should have at least an 18 in. wall. Through the center is placed a 6 by 8 in. girder, set edgewise, upon which one end of the floor joists rest. This is supported through its run by three 6 by 6 in. posts set on a concrete footing. The ends of the girder are run into the walls about 8 inches.

The brick chimney is set upon a footing and runs to the basement floor where a cleanout is formed. It curves out at the top of the foundation for about six inches so as to run just inside of the outside wall line on the first and second floors.

A 6 by 6 in. post is placed at the turn in the stairs so as to support the joists where the well is formed for the stairs. The student should have little trouble in planning the cellar stairs from what has already been said concerning them.

The windows and door show their frames in the wall. The windows are single sash and are hinged at the top.

The heater should always be shown and some provision made for its fresh air intake.

The fruit and coal cellars are walled in with a 7/8 in. partition, the former having a door and the latter an open space for entrance.

The sewer outlet should be shown. All branches should turn at an angle of 45 degrees (never a right angle), in the direction of the fall of the system.

The cistern and the catch basin, if there is to be one, may be located, or may not, at the discretion of the draftsman.

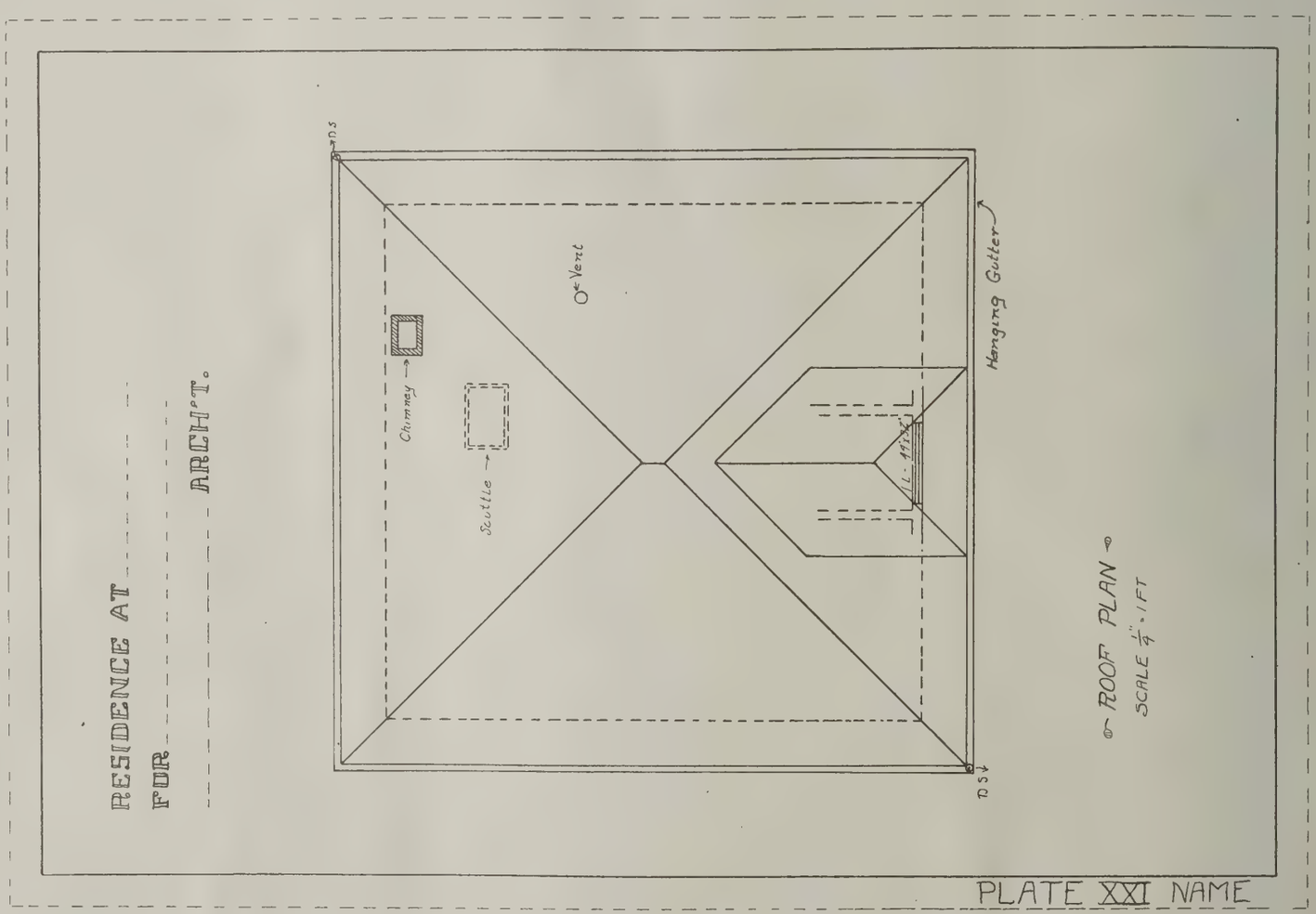
This plan must also show the piers for the porches. It must be fully dimensioned for from it the size of the building is determined and also the breaks in the wall which may be carried up the whole height of the building.

PLATE XXI. ROOF PLAN.

A roof plan for this building was hardly necessary, but for the sake of completeness it was included.

It shows an ordinary hip roof with a dormer on the front. The chimney, vent and scuttle are located as shown, also the hanging gutter with two down spouts. The dotted line all around shows the outside wall line of the building.

More information concerning the roof will be given when the elevations are explained.



METHODS OF REPRODUCING DRAWINGS.

The problem of reproducing drawings cheaply but satisfactorily, has been a hard one for the draftsman to solve until recent years, when a number of processes have appeared upon the market. The time was when a number of tracings were taken from the originals for use upon the field. It needs no explanation to understand the time taken to do this, hence the expense.

The best of the up-to-date processes by far is the blue print method, which we will now endeavor to explain to the inexperienced.

BLUE PRINTING. In the first place some sort of a printing frame will be needed by the student. It may be purchased or

made at home. It consists in a rather deep frame in front of which is placed a sheet of clear glass. Back of the glass is placed a pad of felt. Back of the felt is a hinged board upon which springs are fastened. The object of the springs is to force the felt evenly and tightly against the glass while the printing process is going on. It would be good practice for the young builder to test his ability as a draftsman by designing such a frame, getting out his drawings for it and constructing it himself.

To make a print we place the tracing in the frame, inked side against the glass. Back of the tracing we place a sheet of prepared blue print paper and fasten the felt and board in place by means of the springs. This is exposed to the light which acts upon the chemicals in the paper, changing their nature so that when the paper is taken from the frame and washed in clear water, we have a blue print, that is, white lines upon a blue background.

The action has been this: The paper was so prepared that when fresh and no light had struck it, the preparation could all be washed off leaving the paper white. Now when it had been exposed to the light it was so changed that when washed, instead of being washed off, it turned a deep blue color. Where the inked lines were on the tracing no light could penetrate, hence the solution washed off here leaving the white lines on a blue background.

The length of time which a print should be exposed depends upon the intensity of the light, the freshness of the paper and the chemicals used in its preparation. It should be determined by the student by successive trials. When the proper exposure is secured, the print should be washed in running water, or through a number of changes of water until no more of the solution will wash off, and then hung up to dry.

Very good paper may be purchased by the draftsman ready for use. It comes in a number of grades, weights, sizes, speeds and lengths. The best for all-round use where a large quantity is not utilized, is a ten-yard roll, 36 in. wide, medium weight and rapid printing. It will keep for some time in a closed tube and may be used summer or winter. If fresh and exposed to strong sunlight, an exposure of a minute and a half is generally about right.

If the student cares to experiment and make some paper of his own, he may do so in the following manner:

Dissolve thoroughly and filter

1.	Red prussiate of potash	1¼ ounces
	Water	½ pint
2.	Ammonia-citrate of iron	2 ounces
	Water	½ pint

Keep in separate bottles until ready for use when equal parts of 1 and 2 should be mixed and applied to the paper to be coated. This may be done at night by artificial light or during the day in a darkened room. The paper should be fastened at an angle and the solution applied from the top with a wide camel's hair brush. Allow it to dry in the dark and keep it under cover until it is used.

Another way of making blue prints which is rapidly coming into popular favor, is the positive print method, that is, prints of blue lines upon a white background. To do this a negative is needed. The negative is made from the original tracing upon paper which turns brown when washed, and it must be fixed in hyposulphite of soda. This is used in the frame with the blue print paper, the light shining through the white lines on the negative leaves these lines blue on the print after the latter is washed in water. There are ways of making positives directly on the blue print paper from the tracing, but it is not advisable for the student to use this method.

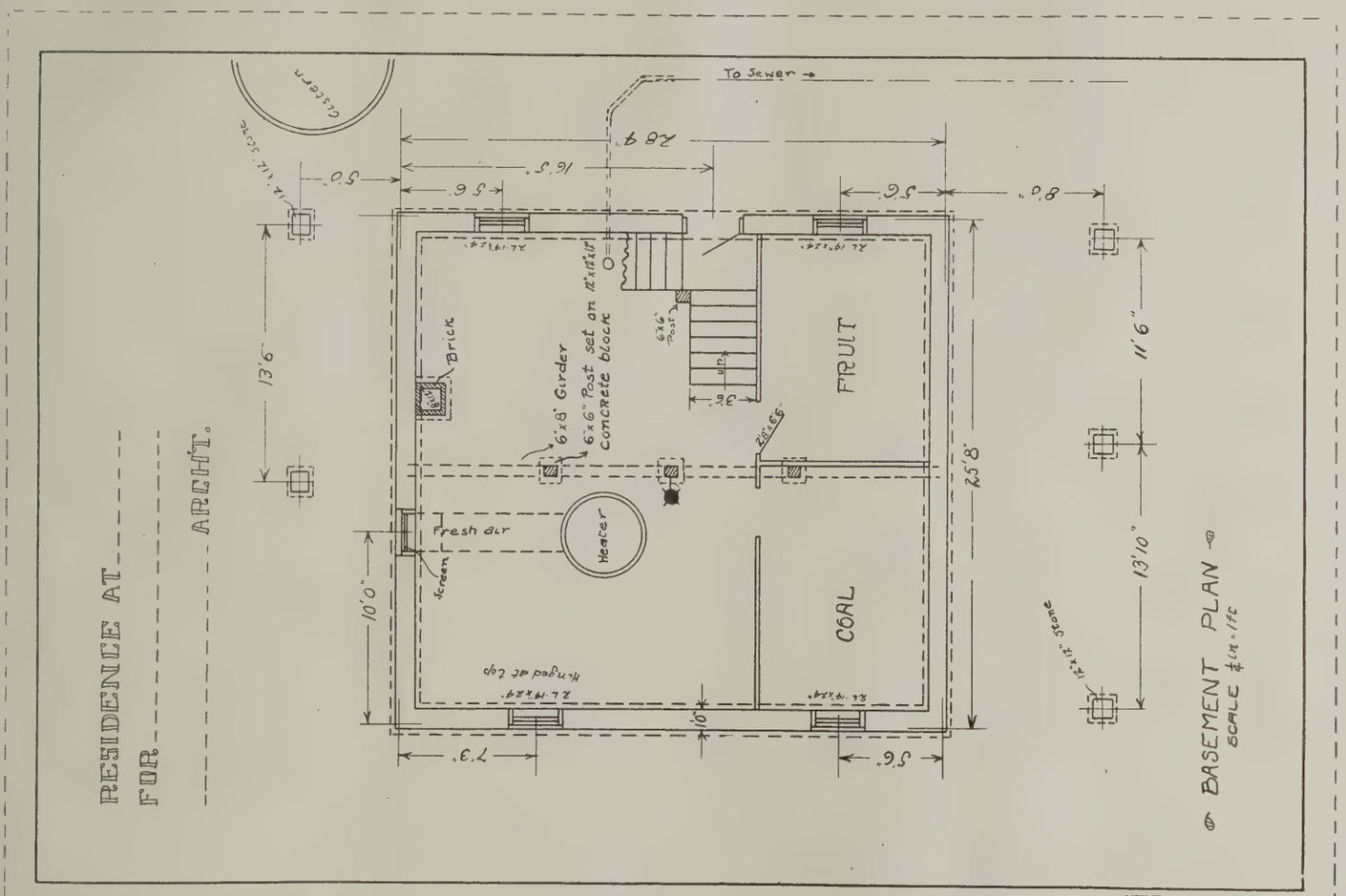


PLATE XX. NAME.

A number of other processes are on the market for reproducing drawings, but they are more expensive and do not give much better satisfaction than the blue print method.

The latest process to appear is known as Aligraphy. It is a patented process and reproduces drawings on paper or cloth with lines almost as black as the original. They closely resemble etchings. It is very expensive, but makes splendid reproductions, especially of fine work.

A process in use in some large offices and in the larger cities consists of inking the drawings with colored aniline inks. The drawing is then laid on a bed of moist clay which absorbs the greater part of the ink and a number of prints can be made by pressing blank paper against the clay. This process allows a drawing to be made in colors so that frame construction may be shown yellow, brick red, stone blue, iron green, etc. The inking can be done right over the pencil drawing, thereby saving the cost of tracing cloth. (To be continued.)



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

BURNISHING GILDING.

From A. Ashmun Kelly, Malvern, Pa.

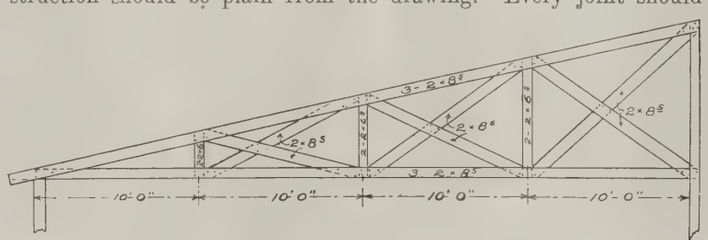
Replying to question by G. J. R., Syracuse, N. Y., the operation of burnishing varies with the kind of work done, but the essential feature in any case is the rubbing of the gold leaf, which causes it to adhere closer to the material and removes any inequalities, thus causing the leaf to look at its best; the leaf is naturally bright, and the "burnishing" does not polish the leaf, but simply smooths it out. In glass gilding the leaf is softly rubbed over with cotton wool, after it gets dry, say after 24 hours. This removes surplus leaf, and flattens the metal to the glass, showing on the reverse side, of course. The degree of burnish obtained will depend upon the strength and character of size used.

In picture frame or any wood gilding the burnishing is done with a tool called an agate, of peculiar horn-like form, its point being intended for getting into curves or sunken parts. The gilding is rubbed with this tool until bright or burnished. Same with book gilding, etc.

ROOF DESIGN.

From B. E. N., Chicago.

Replying to Z. R. N., Narvon, Pa., a design is submitted for a simple truss, which can be built up of 2x6's and 2x8's. The construction should be plain from the drawing. Every joint should



be well nailed. The truss can best be built on the ground and raised to its position, although if a proper staging be built the truss can be built in position.

For a length of 40 ft., three trusses will be required, making the spacing 10 ft. on centers, about. No trusses are needed on the ends unless they are to be open.

Purlins can be hung between the trusses to carry the metal roof, or they can be placed on top of the trusses if preferred.

STRENGTH OF WALLS.

From E. N. B., Chicago:

Reply to J. G. C., Flint, Mich. I think there must be some mistake in your text-book if it says the New York Building Code allows an 8-inch wall for a building of this character. We quote from the code as follows:

"Walls for Dwelling Houses. Sec. 31. The expression 'walls for dwelling houses,' shall be taken to mean and include in this class, walls for the following buildings: Dwellings, asylums, apartment houses, convents, clubhouses, dormitories, hospitals, hotels, lodging houses, tenements, parish building, schools, laboratories, studios. The walls above the basement of dwelling houses not over three stories and basement in height, and not over twenty feet in width, and not over fifty-five feet in depth, shall have side and party walls not less than eight inches thick, and front and rear walls not less than twelve inches thick. All walls of dwellings exceeding twenty feet in width and not exceeding forty feet in height, shall be not less than twelve inches thick.

"Walls for Warehouses. Sec. 32. The expression 'walls for warehouses,' shall be taken to mean and include in this class walls for the following buildings: Warehouses, stores, factories, mills, printing houses, pumping stations, refrigerating houses, cooperage shops, breweries, light and power houses, sugar refineries, office buildings, stables, markets, railroad buildings, jails, police stations, court houses, observatories, foundries, machine shops, public assembly buildings, armories, churches, theaters, libraries, museums. The walls of all warehouses, twenty-five feet or less in width between wall or bearings, shall be not less than twelve inches thick, to the height of forty feet above the foundation walls.

From this you will see that 12-inch walls are required as your building would be considered a store building, and in any event, being over 20 feet wide as a dwelling house, it would require 12-foot walls. It will be well to use 16-inch walls in basement.

PAINTING CONCRETE TENNIS COURT.

From "Concretor," New York City.

A. P. H. can make a dark green wash, that will stand by mixing Prussian blue with a little lamp black, and trying often until the proper shade is obtained. The vehicle should be made with clean water and neat cement, about as thick as ordinary whitewash, and may be poured on the cement from a bucket or other vessel, and then spread over by using broom, and well rubbed in. The prepared coloring must be put in the wash and well mixed with it, before poured out on the cement. The whole floor should be well cleaned off and moistened before the coloring mixture is applied.

From S. A. H., Toronto, Ont.: Floors of cement do not take kindly to paints or washes of any kind, for no matter how good the paint or wash may be, it soon wears or chips off and leaves the surface pockmarked and unsightly. It is always best to color the cement before laying. I have tried with some success a mixture of neat cement and water colored with some mineral paint: and applied with a whitewash brush. The work must be well soaked with water and properly cleaned before the wash is applied, the wash being about the same consistency as good thick lime wash.

BOOKS.

From "Contractor," St. Paul, Minn.

The best single book (of Hodgson's), suitable to the wants of a young and inexperienced contractor, in my opinion, is "Hodgson's Estimator," but, if T. L. W. wishes to know how to do the work as well as how to charge for it, he will require all of Hodgson's books, and more too.

CARE OF CIRCULAR SAWS.

From "Old Woodworker," Oshkosh, Wis.

If C. F. C., Budford, Colo., will get a copy of Grimshaw's large works on saws, or "Hodgson's Hand-Saws," he will find pretty nearly all he will ever want to know about saws.

CUTTING WINDOW OPENINGS.

From "Bricklayer," Detroit, Mich.

If G. J. R., Syracuse, N. Y., will be a little more precise in stating what he wants, he would stand a good chance of getting his query answered. Does he mean cutting window openings through an old brick wall, or does he mean preparing the openings in a new wall while building? If the latter, the process is simple, as the frames when set on the sills, are the guides around which the bricks are built. If the former, the openings are marked the proper size and shape on the brickwork outside, and the bricks are carefully removed to the lines made; when the frames may be inserted and the wall properly finished and pointed. Proper provision must be made for supporting the wall above the opening, when such is necessary.

I have noticed that many of your correspondents do not tell exactly what they require, or they ask their question in a loose and slip-shod manner; such kind of conduct makes it very difficult to give correct answers. If a question is worth asking, it is worth asking in a clear and proper way.

QUESTIONS

BACKING A HIP.

From "Young Un," Duluth, Minn.

Is there an easy method of backing a heavy hip rafter?

UNCOURSED RUBBLE, ASHLER QUOIN.

From "Stonemason," Utica, N. Y.

Please describe or illustrate what is meant by Uncoursed Rubble, Ashler Quoin, and benefit one perplexed?

REVOLVING TABLE.

From "Willie H," Granafield, Oklo.:

I want to make a revolving table for a dining room and would be thankful if some reader of the NATIONAL BUILDER would publish some pointers and give the usual size, some details, and send a little drawing of same.

TILING WALLS.

From "E. B.," Dugger, Ind.:

I have to plaster in the walls of a bath room and kitchen, marking same off to imitate tile, and would like some information as to how the work should be done, and what materials to use, and what tools to employ, and where to obtain them. I will be thankful for any information of the subject.

HOW MUCH PAINT?

From "Carpenter's Wife," Sedley, Sask.

How can I find out how much paint I would need to paint any given surface?

MEASUREMENTS OF BRICKWORK.

From "A. G. McF.," Smith Falls, Ont.:

I sublet the building of a brick store with the understanding that the contractor was to furnish all brick and mortar and do all the labor, and I to furnish all bond timbers and wood bricks. The contractor now claims full measurement of wall and will not allow me anything for space taken up by the timbers I supplied. Am I not entitled to the cost of bricks that would have been required to take the place of the bond timbers? Any information on this subject will be appreciated.

CONCRETE BARN.

From "A. O. P." Eastwood, Minn.:
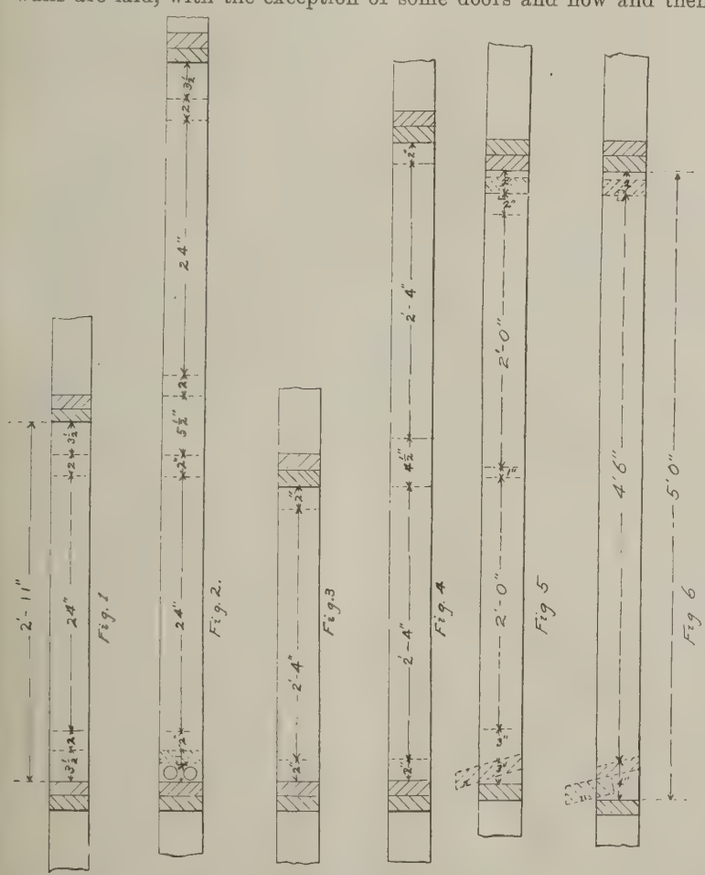
I am building a barn 36x60 feet, of concrete 8 inches thick for first story, with second story formed of studding 8 feet high, and I want a Gambrel roof over the whole. How can I design this roof so that there will be no posts, purlins, iron rods, or other obstructions in hay loft? I will feel grateful for information on this matter.

CUTTING WINDOW OPENINGS

By CHAS CLOUKEY

A SHORT time ago some one said he would like to see an article on cutting openings for window frames for frame and brick building, and it is the intention or purpose of this paper to furnish such practical information as will enable the carpenter to make the frame openings in the walls for standard size windows and sash.

As frames for brick walls are nearly always bricked in as the walls are laid, with the exception of some doors and now and then



a sash, I shall not take up the space of the paper or the time of the reader in treating an unimportant phase of the subject.

The first thing to be determined in cutting window openings is the location of the window, and if possible it should be located so that one of the regular studs will form one side of the opening, allowing for the extra piece which double trims all good work.

The next thing is to determine the height of the bottom of the window from the floor, and in the absence of specifications, about 22 inches is a very good height. If the carpenter is working from a set of plans he can have little trouble in locating his openings in the proper places, but the plans will not tell him just the size to leave the opening in which the frame is to be set.

In most cases the sizes of the windows are given in the dimensions of the lights. Thus, when we wish a 24x24 2-lt. window, we mean a window with a 24x24 glass in the bottom sash and a 24x24 glass in the top sash. As this is all the information we have as to the width and height of the window, it is necessary for us to know how much room is taken up by sash and how much by frame, in order to be able to trim the opening the right size for the window frame to be admitted readily and at the same time not to be so loose that it will be hard to fasten it in.

Some carpenters set the studs in the right place and trim the openings as they go along as is shown in Fig. 8, and some others stud every 16 inches, sheath up the whole house and then cut the openings out afterward; but in either case it is necessary to know about the sizes of windows and frames in order to work intelligently. Also he must know if the windows are to be weighted and the consequent room must be provided on each side for the weights. He should know if the frame is made with a plain sill or with a sub-sill, as it makes an inch difference in the length of the necessary frame opening.

Beginning with Fig. 1, we have a 24-inch glass, 2 inches on each side for sash, and 3½ inches more on each side for the jambs and weight space. This makes the total width between studs 2 feet 11 inches for a 24-inch window, with weight pockets.

Fig. 2 shows a twin window of the same dimension and the spaces on the extreme sides are the same as in Fig. 1, but in the middle or mullion there is a space of 5½ inches besides the sash for each light. Some frames are made with full 6-inch mullions, but this is an unnecessary bother, for the 5½ is wide enough to accommodate the two sets of weights, and it will take 8-inch material to make the full 6-inch casing, both outside and inside.

Fig. 3 shows the opening for a 24-inch frame without weights. The width of the sash is 2 inches on each side and the space for the jamb and play is 2 inches. If the jambs are thin and the windows short, the opening may be an inch narrower, but it is well to avoid making the holes too narrow, for it is a great bother to cut the studs out and set them back after the wall is ready for the frames.

Fig. 4 shows the space for a twin window, 24-inch glass, without weights, and it will be noticed that the mullion is 4½ instead of 5½, as in the weighted method. The reason for this is that the mullion in this style of frame should take the same width of casing as the sides. This is on account of the better looks and the less bother of making all the casings the same width. If the side casings are 4 inches wide then the mullion should be the same. But if there are weights to the windows, the mullion

should never be less than 5½ inches wide, no matter what the side casings are.

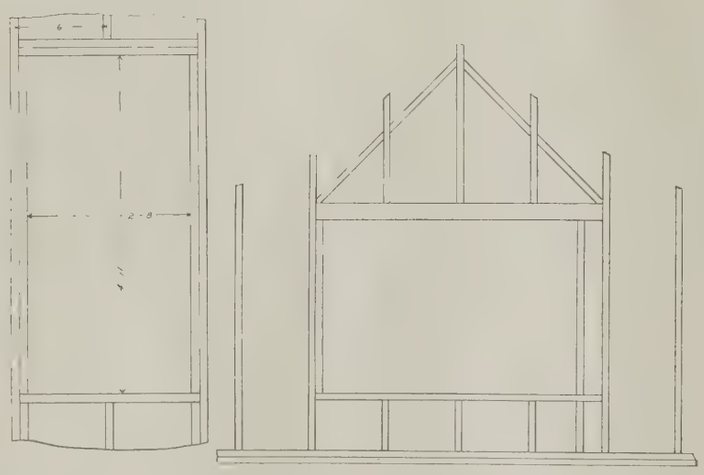
So the simple way to determine the width of the window opening to be cut is to add to the width of the glass in a two-light window, 4 inches for sash, and 7 inches for frame and pockets if weighted, and 3 or 4 inches for frame if not weighted. If the window is two lights wide then we must add to the width of the two glass 5 inches for sash. If the windows are 3 lights wide we must add 4½ inches for sash, and so on, according to the size of the glass and the number of lights. If the carpenter can get hold of a sash catalogue he will find the opening sizes given for the windows listed. The opening sizes given are for the outside measure of the windows and to this must be added the space for the frame and the pocket room, if any.

The consideration of the height of the opening includes the length of the two or more lights of glass, the sash and the space for the frame.

Fig. 5 shows the height of opening for 24-inch glass, 6 inches of sash and 5-inch space for frame, making a total of 4 feet 11 inches.

Fig. 6 shows the same window and frame with a subsill which increases the height of the frame 1 inch and makes the trimmed opening for the frame just 5 feet high.

Fig. 7 shows the trimmed opening for a 24x24, two light window frame without weights and without sub-sill. Fig 8 shows



the trimming for a large window in which a heavy header is used and a truss cut in between the studding to support the wall above the large opening. In wide openings for triple or quadruple frames where weights are not used, or are used only in every other frame, a stud may be set in each mullion to help support the upper wall. If the mullions are all full boxes, then the opening should be trussed so that no great amount of weight will come on the pulley stiles, or they may be sprung so that the windows cannot be raised and lowered.

Cutting the openings for sash frames is as easy as for windows without weights, but the carpenter must know the size of the sash or very nearly. The sash is almost sure to have 2 inches on each side for sash unless it should be a large one for plate glass, and in height it may have 4 inches or 5 inches of wood altogether. So if the carpenter is in doubt as to whether the sash has a 3-inch bottom rail, he should trim his opening as if it did, then if the sash is one inch shorter, the frame will go in just the same and the inch of slack at the top will make no material difference.

Openings for circle top and Gothic frames are usually trimmed square at the top and a brace cut in at each upper corner as close as the jamb of the frame will permit. The sheathing is nailed on and then sawed out to fit the required frame. Bulls-eye frame openings are trimmed in the same way except that the corners are braced below as well as above and the full circle sawed out of the sheathing.

The trimming for door frames is like that for window frames without weights, except that the bottom header is omitted. The two inch allowance on each side of the door width is enough to let in the frame even if the jamb is 1¾ thick, if it is rabbeted for the doors. However, there are some special door frames which require wider openings, among which are those having the doors swinging out from a hinge strip on the outside edge of the frame. Of course, this would come under detailed work and each case would have to be considered separately.

A BRICK COMPETITION

The manufacturers of brick, tile and other clay products will hold an International Exposition in the Coliseum, Chicago next March. To encourage beautiful effects among the exhibits, "Brick and Clay Record," are offering $175.00 in prizes for the best designs of exhibition structures, suitable for a show of this character. The greatest latitude is permitted for the display or original ideas in this competition, the terms of which can be obtained from the "Brick and Clay Record," 421 Plymouth court, Chicago, Ill.

CONCRETE IN HOUSE BUILDING

By JOHN UPTON

IN BUILDING a cellar wall of concrete, one man will proceed quite differently from another owing to different conditions and yet both may obtain good results. Under ordinary conditions there will be an abundance of stone. This may differ greatly in different locations. Of course, we must have gravel or sand, and cement. If we use crushed stone, coarse gravel or small cobble, it will be best to mix them in with the other materials—in fact, this would be the only way even if it were necessary to plaster the entire work over to secure a good job. Of course, where such stone were mixed with the finer materials, a facing of fine stuff could be secured by spading the coarser aggregates back from the face of the wall or by using a strip of iron to hold them back and filling in the face with fine material.

Let us suppose on the other hand that we have some quite large stone, as large as one man can handle, and that we are to build a wall eighteen inches thick. After putting up the forms for the inside of the wall, the bank of the excavation being sufficiently straight for the lower half of the outside, we will proceed to mix the concrete and will begin the wall by a row or course of large stones in the bottom, first digging out the extreme bottom of the trench so that it is a few inches wider than the top. These large bottom stones are to extend a few inches (2 to 4 beyond the outside of the wall and can extend somewhat beyond the inside face as the floor will cover them. After these are in place, the concrete or mortar is shoveled or poured around or over them, covering them about three inches.

Next, more large stones are placed in the trench, they being put at the outside of the wall, directly against the bank, and more mortar being poured between them and over them, also between the stone and the forms. The forms can be filled in this manner, using stone and mortar alternately until the top of the ground or grade level is reached. As the stones which we have been using below ground are not suitable for the face of the wall, we must do something else.

We will consider three different methods of procedure: First, use a better quality of stone, have them dressed and continue as before; second, use concrete blocks for the face of the wall; third, make a concrete facing to the wall and lay the stones in the center, out of sight. If we can readily secure a good grade of coursing stone which will work easily, we can lay them for the face of the wall just as such stone are commonly laid, making a course of narrow ones every second or third course so that the concrete will bind the wall, filling in behind them with concrete. If we use blocks, these can be laid up first to the desired level and the concrete filled in back of them.

In case we decide to make a wall with a concrete face, it will only be necessary to break the stone up small enough so that they can be placed an inch or two from each side of the forms. This will allow sufficient mortar to cover them and will give a good wall. For this class of work the mortar can well be made a little richer than for work where the aggregates are smaller. A mixture of one to four should be amply strong for any case and if the sand is of good quality, a leaner mortar will give excellent results.

A bit of advice recently seen in an enterprising farm paper was to not use hot water on a grindstone, because hot water takes the grit out, makes the stone slick and destroys free cutting. The recommendation is to use warm water, but not hot. Whether this logic is good or not, it should be interesting to woodworkers who use water on their grinding wheels, as marking the distinction between the comfort of warm water and the extreme of using hot water.—Exchange.

TWO CONCRETE BUNGALOWS

GIVEN the same conditions, it is hard to conceive a much greater variation in design than is shown in the two plans on this page. Each contestant was to provide a building of five rooms, of fireproof construction, not to exceed $4,000 in cost, exclusive of plumbing, heating, lighting and lighting fixtures.

The design by Mr. Pfeiffer is rather more formal than that of Mr. Lane, but both show a familiarity with the requirements of a building of this character, and a building from either plan would be homelike and comfortable.

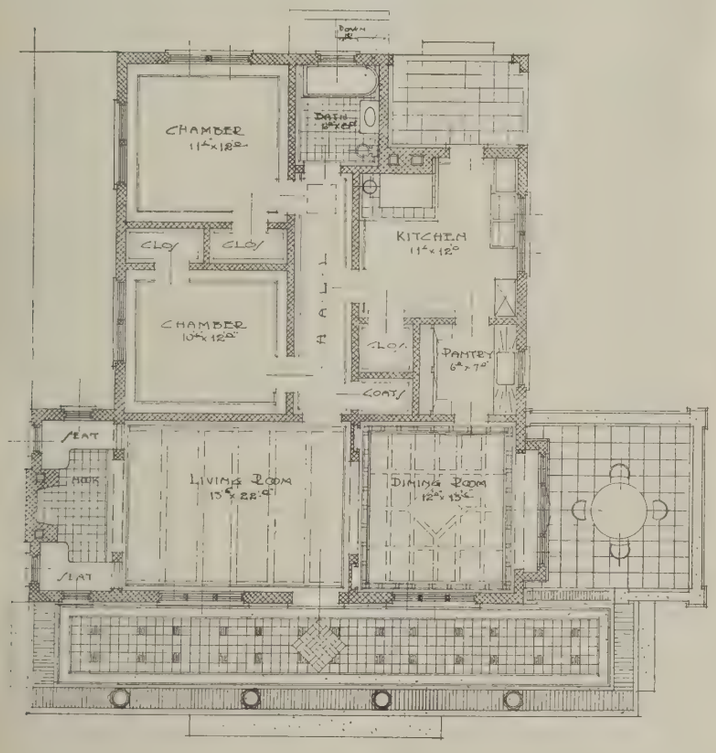
Both of these designs were submitted in the recent competition held by the Cement Products Exhibit Co., 72 W. Adams street, Chicago, Ill.

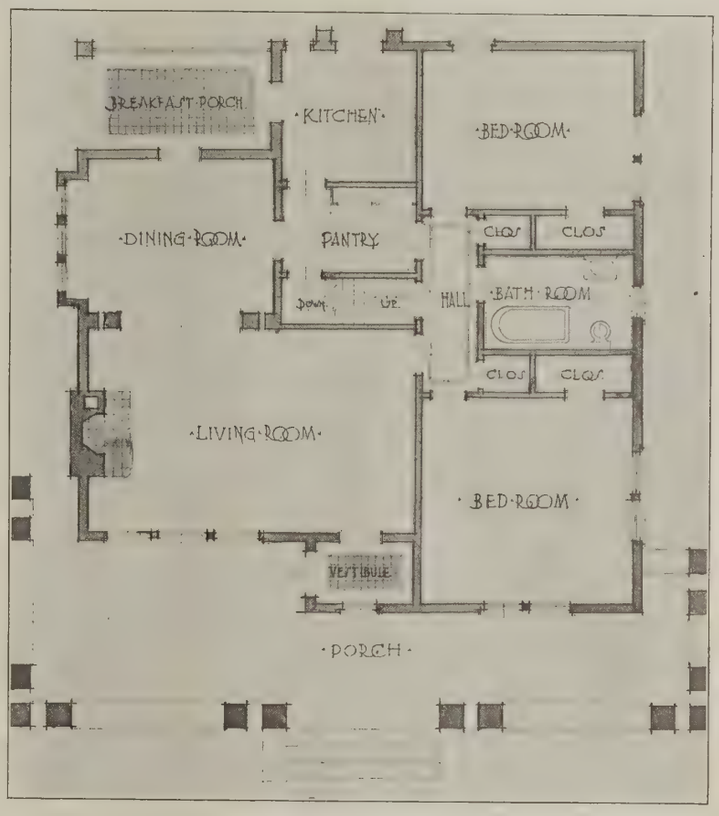


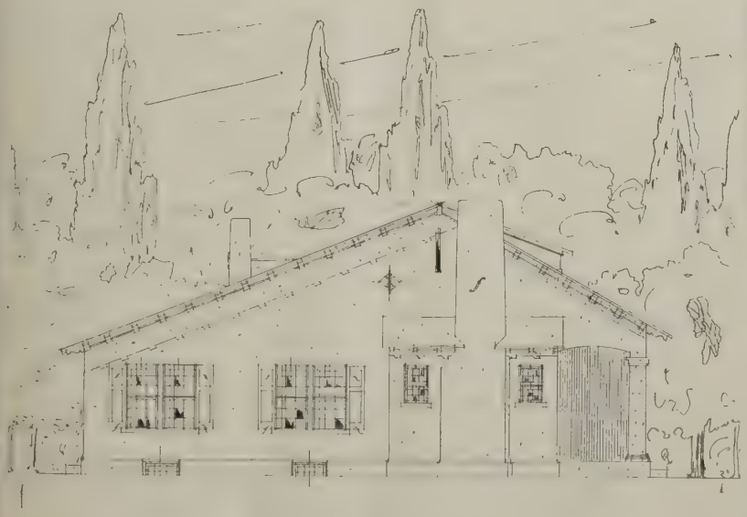
J. Bernard Pfeiffer, Architect, New York.



Harry L. Lane, Architect, Chicago.







SIDE ELEVATION



BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

THE CHILDREN'S LIBRARY OF WORK AND PLAY: Ten handsome volumes of 425 pages each, sold in sets or by single volume. Published by Doubleday, Page & Co., Garden City, New York.

This set of books consists of Carpentry and Woodwork; Mechanics, Indoor and Out; Working in Metals; Housekeeping; Needle Craft; Home Decoration; Gardening and Farming; Outdoor Sports and Games; Electricity and Its Everyday Uses; Outdoor Work. The set covers almost every department of industrial and domestic art, so far as very young learners can be interested. The books are so written and arranged that any young intelligent mind can grasp the spirit of the contents without difficulty, and the instructions given for the performance of the work presented are so plain and simple that boys and girls of from ten to sixteen years of age find it easy after one or two careful readings to follow every detail given, and make up in goodly manner any one or more of the articles they undertake to construct. Indeed, where there are children, boys or girls, or both, these books should be there also, for, we take it, every normal boy and girl is born with a strong desire to "make things," and "mend things" already made. The boy must have his hammer and his saw, he must cut off boards and drive in nails, he must make kites, boats and wagons and a thousand other things; and the girl must have her doll and must make and sew her doll's clothes, and keep house for it, and it is here where these books come in. Does a boy want to make a garden, build a boat, mend a sewing machine, or repair his sister's typewriter, he refers to his books, finds out what he has to do, and goes and does it. The girl wishes to cut out a dress for her doll, make a cushion, or decorate her bedroom; she looks in her books, finds what she wants and how to go about it, and "Presto," the thing is done. The instructions given are not for making toys alone, but for making and building things, needed in everyday use. Perhaps one of the best volumes in this capital series is "Mechanics," which has in its contents: Making a Cement Sidewalk; Building a Boat-house; Constructing a Foot-bridge; Building and Equipping a Gasoline Launch; Talks About Engines; Propellers, Mechanical Powers; Aeroplanes; Kites; Sundials; Patents; Copyrights; Gravitation, Tides; Phases of the Moon; Plumbing; Painting; Varnishing; Motors; Typewriters; Sewing Machines; Mechanical Movements, and many other things. And all this is written within the range of children whose age is not less than ten years. The ten volumes form a marvelous encyclopedia of good practical matter for youthful minds.

Write Doubleday, Page & Company, or this office, for catalogue or circulars, and if you mention this paper, we think you will meet with prompt attention.

OUR NEW HOUSE. HOW WE PLAN TO BUILD IT.—A Book for Sketch Ideas and Suggestions. With Drawings, By Louis E. Perrett. Half cloth. Illumned cover. Published by The Reilly and Britton Company, Chicago. This is rather a unique book, or rather a sort of repository, or may be a scrap-book, or all. Perhaps the best idea of it can be gleaned from the explanatory note by the author, which we give here in full. "The almost universal ambition of every person to 'some day' build his own home has prompted the publication of this book."

"As indicated in the sub-title, there will be found listed in the table of contents departments for writing or pasting in, Plans, Ideas, Suggestions, Sketches, Photographs or pictures, Clippings from Newspapers, Magazines, or collected from friends and other endless sources, about the arrangement, decoration and finishings of each individual room and nook inside the house, and about the outdoor sleeping-room, the veranda, the garage, the gardens and the other outside accessories."

While this "Note" may convey some little idea of what the book is for and its general usefulness, it falls far short of showing up all the "good in it." It contains some 158 pages, 7x10 inches, most of which may be written on, or may have clippings or sketches of furniture, drapery, fittings, color schemes, utensils, odds and ends, and written notes, memoranda, and anything that may be needed sometime about a happily conducted home. There are departments laid off for every room—pantry, closets, cellar, and every other out-of-the-way place, as well as for the higher class and more dignified rooms, and at the heading of each department, there is an artistically designed picture showing a portion of a drawing room, dining-room, reception room, kitchen, etc. This is just the book which every young couple who contemplate marriage—or married—should possess.

LAMPS AND SHADES IN METAL AND ART GLASS.—By John D. Adams, author of "Arts-crafts Lamps; How to Make Them." The latest Popular Mechanics Series of Industrial Handbooks. 18 complete designs. 128 pages. Cloth. Size, 5x7 in. Printed on good strong paper and well bound. Price 50 cents. Published by "The Popular Mechanics Publishing Company, 318 W. Washington street, Chicago, Ill.

Amateur craftsmen and others will find in this book, complete instructions for making a variety of beautiful electric lamps and shades in metal and art glass at a small outlay of time and money. The subject of lamps is important for four reasons; the necessity of a good and conveniently arranged light; the pleasing decorative effects possible; the variety and number of lamps that may be used to advantage in the home; and the small cost of equipment and necessary materials. Four different kinds of construction are treated: Build-up shades, Soldered shades, Etched shades and Sawn shades. The designs include Drop-lights, Reading Lamps, Dining-room Domes, Mission Chandeliers, Desk Lights and Library Lamps.

The author issued a work on similar lines some time ago, a notice of which was given in these pages at the time, but which dwelt with the subject of lamp making from a less difficult standpoint. The two vols., seem to cover the whole ground of amateur shade and lamp-making.

A TREATISE ON THE DESIGN AND CONSTRUCTION OF MILL BUILDINGS AND OTHER INDUSTRIAL PLANTS—By Henry Grattan Tyrrell, C. E., (Toronto University). Author of Mill Construction, Concrete Bridges and Culverts, History of Bridge Engineering, etc., Illustrated with over 650 sketches, diagrams and photograph reproductions; 490 pages, 6x9 inches, printed on good substantial white paper, and all well bound in greenish-gray, durable English buckram, in good style. Published by the Myron C. Clark Publishing Company, Chicago and New York.

Being interested in the subjects this work discusses, we have gone over the work pretty thoroughly, and feel somewhat surprised at the great amount of material on the subject of mills and similar constructions the author has been able to gather and so present it to his readers as to be easily intelligible and instructive. Among the contents are found chapters on "The Theory of Economic Design," "Static Roof Loads," "Roof Loading," "Steel Framing and Trusses," "Timber Framing," "Details of Construction," "Foundations," "Anchors and Piles," "Thickness of Walls," "Brickwork, Stonework and Concrete," "Floors and Footings of all Kinds," "Roofing of all Sorts and Grades," "Gutters and Downspouts," "Skylights and Ventilation," "Interior Finishings," "Wood and Iron," "Foot Bridges," "Painting Wood and Iron," "Engineering and Drafting Department of Structural Works," "The Drafting Office and Drafting Practice," "Making Drawings and Laying Out Work," "Weight of the Various Materials Used in Construction," "Estimating Cost of Labor, Materials, Supervision, and Contingencies," etc.

Each of these items, and over 400 others, are presented at length in the work, and had we space at our command we would quote some of the remarks made in reference to estimating quantities, drafting and some other matters so that our readers would have some idea of the terse style of the author's work and the useful quality of the subjects rendered. The book may be obtained from the publisher, or from this office.

We have just received a copy of the Proceedings of the Forty-fourth Annual Convention American Institute of Architects, 1910, also a copy of the Annuary of the American Institute of Architects for 1911.

Both of these pamphlets should be in the hands of every architect and prospective architect in the country. Both contain much useful information.

THE CEMENT GUN.

Placing cement mortar and concrete by gravity through tubes has been successfully done for some years. Just now great interest is being taken in the "Cement Gun" which the U. S. Government is using at Panama, Hawaii and elsewhere. From recent reports the machine has been effected so that the operation costs less than the older methods of construction, and good results are claimed. In operation the "Gun" works somewhat on the principle of the atomizer, except that a dry sand and cement mixture is blown through a hose and just before leaving the nozzle it meets a stream of water under high pressure. The mixture can be put on as thick as desired, but the practice thus far has been limited to coating walls and wire lath, in the form of stucco about one and a quarter inches thick.

Tests are now being made to determine the preservative qualities of mortar applied in this manner. Iron plates have been covered with various thicknesses and will be immersed in sea water and the action observed.

OAK, WALNUT AND CHERRY LUMBER.

[From Vice Consul George B. Stephenson, Liverpool, England.]

For white oak and black walnut a fair demand generally exists in Liverpool, but cherry lumber has not been imported to any extent for many years. White oak is received largely in the form of planks 3 by 12 inches, 3½ by 12 inches, 5 by 12 inches, 5½ by 12 inches, 6 by 12 inches, and 7 by 12 inches, in lengths of 12 feet and up—as many as possible 17 feet and up. These sizes are used for railway and general wagon-building purposes, and the value at present for first-class stock rules from 52 to 56 cents per cubic foot, ex quay Liverpool. White oak is also shipped largely in 1-inch boards, 4 inches and up wide to average 9 inches or up, in length of 10 feet and up. These sizes at present in plain oak are worth about 48 to 52 cents per cubic foot, ex quay. Quartered oak is, of course, of more value and is salable at 60 cents to $1.33 per cubic foot, according to specification, quality, figure, etc.

Black walnut reaches this market both in the form of logs and lumber, and to meet the demand the logs should run 10 feet and up and be of fair average length and 18 inches in diameter, with as large an average as possible. Values are from 73 cents to $1.46 per cubic foot, string measure, ex quay, according to quality, size, etc. Walnut lumber is shipped in various grades from 1-inch boards up to 3-inch planks, and here again there is a variety of qualities, running from about 54 cents to $1.58 per cubic foot, ex quay.

The bulk of this business, both in oak and black walnut, is done on consignment, when the goods are inspected on the quay in Liverpool and sold on their merits. It is stated that about 90 per cent of the white oak and black walnut imported is consigned to brokers for sale. The customary brokerage commission is 4 per cent.

Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Omaha, Neb. Corrected by I. P. Hicks.	Seattle, Wash F.O.B. Mill or Yard Corrected by Courtesy F. T. Bradley
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	yp $20.00	yp $27.00	F $11.00
2"x4" to 8" up to 16', No. 2	16.00	25.00	9 00
2"x4" to 8" 18 & 20', No. 1	31.00	28.00	11 00
2"x10" up to 16', No. 1	21.00	29.00	11 00
2"x12" up to 16', No. 1	22.00	31.00	11 00
2"x14" up to 16', No. 1	24.00	*	12.00
Each 2 ft. over 20 ft., add per M	1.00	1.00	up to 32 1.00
Select stock as above, add per M	5.00	*	2.25
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S
1"x3" to 1"x8", No. 1	yp $35.00	yp $46.00	F $30 00
1"x10", No. 1	35.00	44.00	32 00
1"x12", No. 1	40.00	48.00	32 00
1¼"x3" to 1¼"x12", No. 1	42.00	50.00	32 00
1½" and 2" same as above	42.00	50.00	32 00
1" drop siding, No. 1	25.00	32.00	22 00
½" lap siding, No. 1	18.00	30.00	rc 22.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM S 1 S
1"x4" to 1"x8", No. 1	yp $18.00	yp $25.00	F $11.00
1 x8" to 1"x10", No. 1	18.00	24.00	11 00
1"x10", No. 1	18.00	24.00	11 00
1"x10", No. 2	15.00	22.00	11 00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.
¼", T. & G. Flooring No. 1	yp $30.00	yp $40.00	$30 00
⅛", T. & G. Flooring No. 2	25.00	36.00	25 00
Add for ceiling per M	1.00	2.00	M ft 22.00
Add for partition per M	2.00	2.00	22.00
⅜"x4", Ceiling No. 1	25.00	30.00	22.00
	100 ft. run	100 ft run	100 ft run
4¼" Moulded Casing	yp $1.85	yp $2.00	$2.75
4¾" Moulded Casing	2.10	2.50	2.75
7¼" Moulded Base	3.25	3.50	3.50
⅞"x9¼" Moulded Base	3.75	4.00	4.50
1⅛"x4½" Moulded Window Stool	3.00	4.00	3.50
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	rc $3.50	$4.25	rc *A*o $2.00
Shingles, No. 2	3.00	3.75	*A*e 2.00
Shingles, fancy	5.00	4.50	2 75
Lath, 4 ft., No. 1	yp 3.60	F 5.50	F 1.75
Lath, 4 ft., No. 2	2.75	5.00	1 75
Pickets, 1"x3"x4' 6", dressed	40.00	30.00	22 00
Pickets, 1 x3"x4' 6", rough	*	*	18.00
	Piece.	Piece	Per 100.
6"x8' Post split	Cdr $0.13	Cdr $0.30	rc $12.50
8"x8' Post split	.20	.35	12.50
8"x8' Post whole	.44	.40	
6"x8' Post whole	.25	.35	
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3.50	$3.00	$2.95
Nails, cut, common	4.00	*	2.95
Nails, wire, fine finishing	1.60	3.50	2.95
Sash Weights, cast iron	1.50	1.50	1.75
Tarred Felt Paper, best 2-ply	Roll, *	Roll $1.00	Cwt $5.00
Tarred Felt Paper, 3-ply	*	1.25	Cwt. 5.00
Red Rosin, Atlas brand	.90	.90	*
Red Rosin, durable brand	.75	.75	*
Black Neponset	*	*	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	*
Brick, blue, at kilns, No. 1	*	*	*
Brick, blue, at kilns, No. 2	7.50	*	*
Brick, white, delivered, face	7.00	7.50	$45.00
Brick, red, delivered, backing	7.00	*	7 00
Brick, delivered, dry pressed	18.00	18.00	35 00 to 45.00
Brick, vitrified, dry pressed	*	24.00	20.00
Lime, best gray	bbl. $1.30	bbl. $1.25	bbl. $1.65
Lime, best white	1.40	1.25	1.85
Cement, Portland	*	1.85	Cwt. 2.25
Plaster, calcined	2.40	1.80	bbl. 2.50 to 2.65
Hair, 8 lb. per bush	.25	.25	*

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

RECENT COURT DECISIONS

Under Rev. St. 1889, § 4247 (Ann. St. 1906, p. 2330), requiring the court in an action to enforce a lien to render judgment for the amount of the debt, though the creditor may have unintentionally failed to enter the full amount of credits in his account filed, an inadvertent overcharge by a lien claimant, or the omission by mistake of credits does not defeat his right to enforce his lien.—Shepard v. Atchison, T. & S. F. Ry. Co., 129 S. W. (Mo.) 1003.

One employed as an architect in the construction of a building is not a general agent of the employer; but his powers as agent are limited by the contract, and, unless specifically authorized thereby, he may not modify the contract between his employer and the contractor, nor employ another to do the work which the contractor has undertaken, or substitute a subcontractor for the contractor.—McNulty v. Keyser Office Bldg. Co., 76 A. (Md.) 1113.

Where a written contract between the owners of the property to be improved and the principal contractor provides that certain claims shall be presented in writing to the architects by the contractor within a specified time, or they will not be allowed, that no alterations from the plans and specifications shall be made except upon the written order of the architects fixing the amount due thereon, that no extras shall be furnished except upon similar orders, these and like provisions, if ignored by the parties to the contract and the architects, will be ignored by the courts.—Campbell v. Kimball, 127 N. W. (Neb.) 142.

Under a building contract entitling the owner to retain from payments an amount sufficient to indemnify himself against lienable claims, and providing for payments on architects' certificates, when they were due, the sureties on the contractor's bonds were discharged from liability for mechanics' liens, amounting to less than the final payment, by the owner waiving the right to retain sufficient money to discharge the claims, and by his making final payment on orders of the architects without certificates that payment was due; the sureties being entitled to be subrogated to the owner's rights on paying the lienable claims.—Harris v. Taylor, 129 S. W. (Mo.) 995.

Where a contractor for the construction of improvements upon real estate distributes portions of his contract to subcontractors, no contractual relation arises thereby between the owner and the subcontractors, the liens upon the property in favor of the subcontractors being given by law, and the completion of the work undertaken by the subcontractors creates a debt due from the contractor to them. Upon the failure to pay said debts the contractor becomes liable to the subcontractors for the full amount which the subcontractors are entitled to receive. If the subcontractors find it necessary to file mechanics' liens, the contractor is also liable for the fees paid therefor. For these items the owner is not ordinarily liable.—Campbell v. Kimball, 127 N. W. (Neb.) 142.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,000,707. Hinge device for doors and the like. Fred G. Borg, Chicago.

1,000,691. Transom support and fastener. Wm. Roper, Philadelphia, Pa.

1,000,699. Floor-cleaning machine. M. Seyferth, Crimmitschau, Germany.

83,055. Cellar-door hinges. Jos. De Rose, Paterson, N. J.

1,001,372. Door-closing apparatus. Wm. Duggan, Jr., Dunedin, N. Z.

1,001,146. Device for supporting and securing plaster-boards used in partition construction. M. H. Jester, Denver, Colo.

1,001,315. Metallic door. Chas. M. Sinclair, Chicago.

1,002,027 Pneumatic door-operating mechanism. Thos. R. Brown, assor. by mesne assignments, National Pneumatic Co., New York, N. Y.

1,002,146. Fire-escape. M. F. Gore, Baltimore, Md.

1,001,865. Fire-escape. Wm. I. Lake, Detroit, Mich.

1,002,166. Fireproof window construction. Ed. H. Lunken, assor, The Lukenheimer Co., Cincinnati, O.

1,002,565. Reinforcing bar for concrete and similar structures. Wm. C. Coryell, Youngstown, O.

1,002,328. Door check. Jno. L. Spoon, Globe, Ariz.

1,003,274. Door-hanger. Geo. H. Knight, St. Johnsbury, Vt.

1,002,999. Fire-escape. Chas. V. Lindholm, Chicago.

1,003,070. Sheet-metal door. Nils P. Sjobring, Chicago.

1,002,940. Casement-window adjuster. I. D. Stine, Decatur, Ill.

1,002,940. Casement-window adjuster. I. D. Stine, Decatur, Ill.

1,003,591. Device for molding concrete walls. Wm. A. Fry, W. C. Darby and T. H. Kershaw, Pueblo, Colo.

1,003,754. Plaster support for wall covering. Fred L. Kane, Huntington, N. Y.

1,003,613. Window fastener. C. A. Kind, Dubuque, Ia.

1,003,652. Door check and closer. J. C. Regan, assor, Yale & Town Mfg. Co., Stamford, Conn.

1,003,552. Lock. H. G. Voight, assor. Russel & Erwin Mfg. Co., New Britain, Conn.

1,003,977. Fireproof window construction. J. G. Braun, Chicago.

1,004,299. Sliding-door construction. V. F. Outland, Indianapolis, Ind.

CATALOGUE AND MATERIAL INDEX

Pearson Mfg. Co.	52	Corrugated Bar Co.	56
Decatur Coffin Co.	52	R. F. Johnston Mfg. Co.	58
Union Fibre Co.	54	Union Metal Mfg. Co.	62
Buffalo Forge Co.	54	J. D. Weaver	60
Andrews Heating Co.	54	Standard Scale & Supply Co.	60
Luther Grinder Mfg. Co	54	Milwaukee Corrugating Co.	62
Ashland Steel Range & Mfg. Co	56	Sidney Tool Co.	64

PEARSON SHINGLE NAILING CONTEST.

Everyone knows that some men can get exceptionally fine results with a machine or tool while others will find the same thing almost useless. This occasionally happens, not on account of one workman being a better mechanic than another, but because one reads the directions the manufacturer gives with the machine or tool more carefully and then endeavors to fit these directions with actual working conditions.

Take the Pearson Nailer for instance. Here is a tool or machine which holds the shingle nails in a metal box in such a manner that the nails slide down with the heads always at the top and the sharp ends at the bottom and one nail at a time is placed directly beneath a plunger. The carpenter or operator strikes one blow on the plunger with his hammer. The nail below is driven half way into the shingle. Another blow with the hammer on the nail and it is clear down.

The Pearson Nailer is a small, well-made machine which can be easily handled on any job. The old way of climbing about on a roof with a face full of shingle nails taken from an open keg in the average store is not a very sanitary way of carrying nails. The Pearson Nailer does entirely away with this old, unhealthy method and besides gives the operator the comfort of wearing heavy mittens or gloves during the cold fall days and still being able to drive the nails at a very rapid rate.

The Pearson Manufacturing Company, the makers of the Pearson Nailer, frankly admit that a certain percentage of their nailers are returned because the buyer does not think he can use it satisfactorily. And the buyer's money is returned at once and without question. This liberal policy of selling, not only clearly shows that the Pearson Manufacturing Company deals squarely with everyone but it also shows that the nailer must be right in both material and workmanship.

The fact that thousands of these nailers are now in daily use by the best shingle experts, shows that it is well worth while to



get one and try it or at least look the nailer over at the nearest hardware store. This latter suggestion might be difficult to follow in some of the smaller towns, although many dealers are now carrying the Pearson Nailer in stock. The Warner Hardware Company, 13 Sixth street, South, Minneapolis, Minn., think so well of this nailer that they made up a window display for them recently. A portion of their big, fine store front was fixed up as shown in the acompanying illustration. One of the best carpenters in the city was secured to show how fast shingle nails could be driven into place with the nailer. Everything was clearly explained to the large crowds that collected about the window by means of a lot of neatly lettered cards.

This exhibit attracted a great deal of attention and added to the Warner Hardware Company's reputation of always having the most interesting and best window display in the Northwest. In fact, Mayor James C. Haynes tested a machine out with evidently the idea, as some one suggested, of buying one to nail campaign lies with.

The nailing contest arranged by the manufacturers was held at the Unique Theater while these window displays were going on. A prize was put up for the man who could drive the most nails in the shortest time. Seven men drove shingle nails before a large



EXHIBIT OF PEARSON MAILERS.

audience, which thought it great fun and very interesting. The best record with just an ordinary hammer was by C. K. Miner. Mr. Miner drove 52 nails in one minute. Fred Holmes, a Robbinsdale carpenter, using a Pearson Nailer, drove nails at the rate of 125 per minute. This nail driving contest and the window displays proved conclusively that people are interested in up-to-date tools and machines. The Pearson Manufacturing Company of Robbinsdale, Minn., are sending out circulars in regard to their nailers and newspaper clippings about the nailing contest. They are well worth looking over.

THE EUREKA SCREWDRIVER.

Mechanical perfection in the manufacture of tools is one of the features of the period. While many tools are more or less special in their use, the screw driver is of general use, and is only imitated by the hammer, which is sometimes called a "Philadelphia screw driver."

Improvements in the special action of the screw are few and far between, as practically the same principle has been in use for centuries. In the manner of driving the screws, however, there have been various improvements, not the least of which is the "spiral" principle,



as used by the Decatur Coffin Company, Decatur, Ill. In this screwdriver the turning action is obtained by merely pushing on the handle, when the shank revolves and turns the screw home. By a simple device the action can be reversed, and the screws drawn with equal ease.

One who has never used a screwdriver of this character might consider the old-fashioned form plenty good enough, but a short practice will allow a mechanic to do several times as much work with less labor than with a plain screwdriver.

The Eureka Special Screwdriver can be obtained from nearly all dealers or the manufacturers, the Decatur Coffin Company, East North street, Decatur, Ill., will be glad to tell you where they are kept in your vicinity.

The NORTHWESTERN TERRA COTTA COMPANY

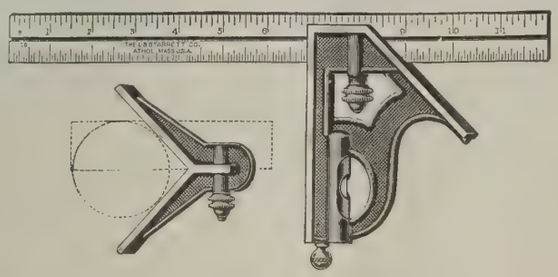
Manufacturers of High Grade

Architectural Terra Cotta

Enameled Work a Specialty

Main Office and Works, 2525 Clybourn Ave.
Branch Office, Room 1415 Railway Exchange

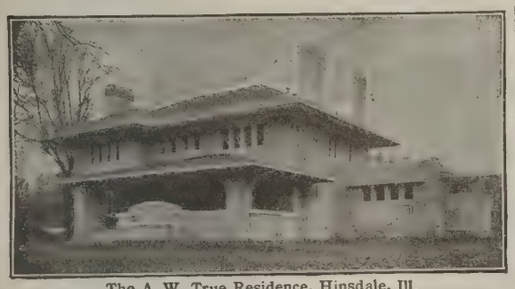
CHICAGO, ILLINOIS



STARRETT TOOLS for Carpenters are made with just the same superiority in respect to accuracy, workmanship, design and finish as Starrett Tools for Machinists. And that's saying a good deal.

Complete Catalogue No. 18-M sent free

THE L. S. STARRETT CO., Athol, Mass., U. S. A.



The A. W. True Residence, Hinsdale, Ill.

143 Cities USED **"Stonekote"** ROUGH CAST in 1910

Before you build or repair the old home have your architect write us for book telling of "Stonekote" Portland Exterior. What color would you like a sample to be: Gray, Silver Gray, White, Buff, Red, Brown.

THE GARDEN CITY SAND COMPANY
MANUFACTURERS
709-11 Chamber of Commerce, CHICAGO, ILL.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary STEEL Medicine Cabinet



The Recessed Steel Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles—four sizes. To recess in wall or to hang outside.

Send for illustrated circular



The Outside Steel Cabinet

HESS, 907 L Tacoma Bldg., CHICAGO
Makers of Steel Furnaces. *Free Booklet.*



When your work is a pleasure it is a success. Pleasure comes from Perfect Satisfaction. Why not be a success in your profession and be happy by using Simonds Hand Saws? They prove the Best by Test.

A stranger seeing a carpenter at work on a building noticed that he was using a No. 7½, 26-inch Simonds Hand Saw.

"I see you are using a Simonds Saw," said the stranger.

"Yes."

"How do you like it?"

"Well, I'll tell you. I have been carpentering twenty years and bought that saw four years ago and haven't set it since I had it. It is ground thin on the back and don't need setting, which saves half the labor in sharpening it; and it beats anything I ever saw to hold an edge."

What we want is not only Customers but Pleased Customers

Simonds Manufacturing Company

WARRANTED The Simonds Saw WORKS FITCHBURG, MASS. CHICAGO, ILL. U.S.A. BRANCH HOUSES NEW YORK, NEW ORLEANS, PORTLAND, ORE. SEATTLE, WASH. SAN FRANCISCO, CAL. LONDON, ENGLAND.

Fitchburg, Mass.
Chicago, Ill.
New York City
New Orleans
San Francisco
Portland, Ore.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

HEATING CHURCH BUILDINGS.

Few church-building committees consider carefully the amount of fuel required to properly warm the rooms. Operating expenses, fuel, etc., are a continual expense, while the exterior is paid for but once. The architect is too often inclined to be concerned with the external appearance and interior decorations, rather than the heating, ventilating and plumbing.

It is therefore up to the committee to see that proper provision is made for heating, and also to see that a large part of the heat is not wasted through improper insulation of walls, ceilings, floors, etc. That such insulation can be done is evidenced by the work on the cold storage warehouses, freight cars, refrigerators and the like. In such structures the cold is kept in, and the heat is kept out, but the principle is the same with churches and other buildings. It is a well known fact that buildings warm in summer are cold in winter, mainly from the lack of proper insulation.

Until recently little attention has been paid to the amount of heat that leaked through the walls, as it was generally considered that the amount was too small to take into account and that the expense of conserving this heat was too great for the results obtained. The heat lost through exposure to glass surfaces (four times as much as through



Clark & Bell, Architects.

a sixteen-inch wall) can be reduced materially by close-fitting sash, double windows, etc., but little attention is paid to the walls, which, on account of their great area, possibly six or eight times the expense of glass really leaks twice the amount that the glass does.

Regarding the manner of insulating the walls, probably the best method is to line the wall with some especially prepared insulation. There are a number of concerns manufacturing preparations, all more or less suited to various conditions. In general, the preparations may be divided into two classes, boards or stiff form and quilt or felt form. The use of either depends somewhat on the construction of the building. When there is a wood surface to nail to the quilt or felt, this makes an ideal insulator, as it is light, pliable and easily applied. For brick or stone walls, the board is more easily applied, and can also be used as the base for decorating if desired.

The saving of fuel by the use of insulation of this character is estimated at from 25 to 40 per cent; with double windows the saving is nearer 50 per cent. The extra cost of the insulation is actually saved in from two to four years, after which there is a clean profit in its use.

The saving in summer is more of a negative character. As no fuel is used, there is of course no money saving, but by keeping the temperature down by keeping the heat out, the comfort of the congregation is greatly increased. Much of the discomfort of summer church attendance will disappear before proper insulation.

Among the prominent concerns which have given the subject of insulation careful study is the Union Fibre Co., 30 Union avenue, Winona, Minn. This concern employs a staff of skilled engineers to make a study of the conditions surrounding each case before they advise the form of insulation required for the best results. Their product LINOFELT has been used in many places to such advantage that they encourage the use of it wherever the beneficial results are desired.

Church committees and others should be sure to ask concerning LINOFELT, as its use will save both fuel in winter and discomfort in summer.

A BIG HEATING CONTRACT.

We understand that the Buffalo Forge Company, Buffalo, New York, have been awarded the contract for the heating and ventilating system in the new carpenter shop of the Westinghouse Air Brake Company, Wilmerding, Pa. The building, which is of brick, is 210 feet long, and equipped with high grade wood-working machinery, which with the kiln dried material, requires an even temperature and freedom from moisture.

The problem of heating and ventilating industrial buildings of this character is quite different from that of public buildings or residences. In the latter sanitation is the principal requisite, and economy is secondary, while in the factory or shop, economy is of primary importance and sanitation more or less incidental. The efficiency and contentment of the workman depends largely on his comfort and well-being and for this reason the question of an adequate system of heating and ventilating the workroom must be carefully considered.

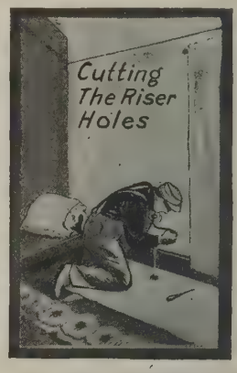
Knowing the care with which the Buffalo Forge Company build their apparatus, and the study they have given the question of industrial heating and ventilation, we feel sure that neither the owners of the plant in question or the workmen employed in this building will find fault with the system to be installed.

MODERN CONVENIENCES.

It is an undisputed fact that American homes are the most comfortable of any in the world. Nor do the wealthy alone possess all the comforts, but in even the most humble do we find conditions materially better than in other countries. Some of this is brought about by the wonderful resources of the country, together with the general good wages and the fact that it costs but little more to build well. Then, too, there is economy in good building. It takes less fuel to keep a well-built house warm, and it takes less fuel to warm a building with a good hot water or steam plant than with the old-fashioned stoves. In the modern, we might almost say the American, method of heating by hot water we have the greatest comfort for the least cost.

There are many manufacturers of heating equipment on the



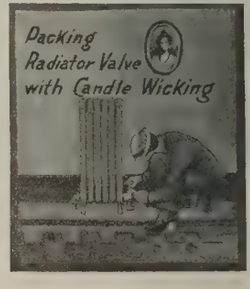


market and one in the trade can order from several manufacturers the material for a complete plant. For instance, the boiler-maker does not always make radiators, piping, etc. To the average contractor this way is costly and inconvenient, and to overcome this difficulty the Andrews Heating Company have devised a plan for furnishing everything complete from boiler to expansion tank.

As there is considerable variation in house plans, local conditions, etc., it is necessary to supply the Andrews Heating Co. with certain data before an intelligent estimate can be given. As soon as this is received, a plan is prepared showing the size and location of boiler, radiators, etc., with an estimate covering all the material necessary to install the plant complete. These plans and estimates are prepared by competent engineers, and the Andrews Heating Co. have so much confidence in their plan that they ship on 365 days' free trial. As this carries the plant through the entire cycle of seasons, there is little chance but that any trouble will be found and remedied long before the guarantee expires.

Mr. Andrews' wide experience as a mechanical engineer has perfected a system for getting out the material in such a way that all the pipe are sent cut to proper lengths, etc., so very little work is required to put one of their plants in place. It has been found that





carpenters can readily install these plants, as very complete plans, diagrams and instructions are sent with the plant.

The Andrews Systems are popular because of their group system of piping, the Andrews Regurgitating Safety Valve, the economy and efficiency of the boiler, and the fact that each system is designed by itself to give the best results.

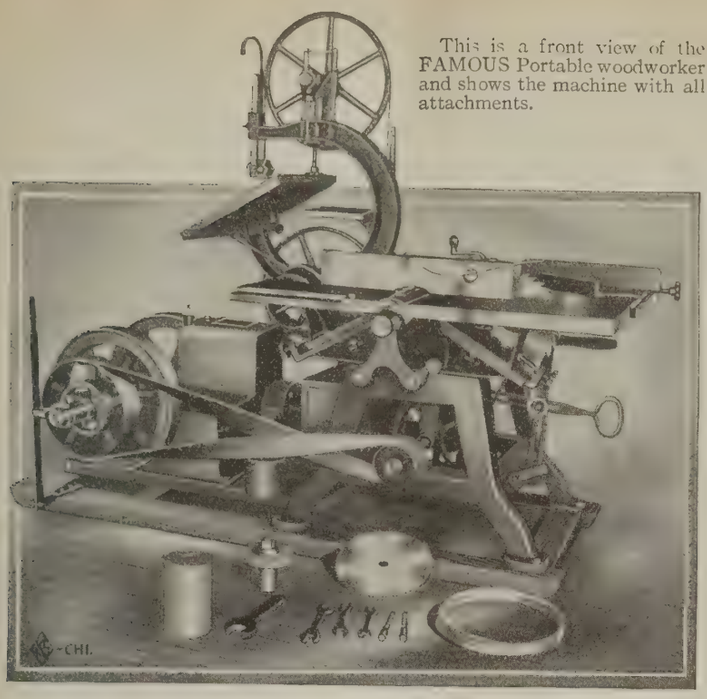
The Andrews Heating Co. are also manufacturers of Septic Sewage Disposal Systems, which is the ideal system for country houses. They also design lighting plants for residences, and so provide the most remote houses with all the comforts and conveniences of the city.

Carpenters and builders generally are invited to send to the Andrews Heating Co., 1199 Heating Building, for further information. We understand that our readers can, by writing at once, obtain their 72-page book, which describes these several lines of modern house equipment, any one or all of which can be installed in new or old homes.

THE TRADE IN GRINDERS.

Mr. C. J. Luther, president of the Luther Grinder Manufacturing Co., of Milwaukee, has just returned from a trip throughout the west. "The hardware business," he says, "is rather low on the coast. Both dealers and jobbers are carrying light stocks. Throughout the middle west, however, conditions are fine. The drought has affected crops in limited portions, but outside of these the hardware business is in as fine shape as could be asked for.

"The coast has always been a fine field for grinders. This year is better than ever, for our advertising has been doing wonders in educating the public to the great amount of time wasted on the grindstone. The demand for Luther machines was never better. The demand is constantly increasing and we are making preparations for a record business this coming season."



This is a front view of the FAMOUS Portable woodworker and shows the machine with all attachments.

A Remarkable New Portable Woodworker

—called the "FAMOUS"

Imagine *one piece of machinery* that does all kinds of ripping and cutting off, dadoing, surfacing and edging, circular band saw work, boring, grinding and sanding—

—*a complete machine shop*, in fact!

Then imagine such a machine *equipped with its own power plant*—a compact and sturdy three horse-power gasoline engine, complete with batteries and all belts necessary to operate the machine!

On top of this imagine this machine constructed so that it *can be moved from place to place*—wherever your work is—with practically no trouble and little cost!

Imagine all these and you will understand the advantages offered in the *embodiment* of the above features—**the FAMOUS Portable Universal Woodworker.**

800 Famous Universal Woodworkers in Use

We have been perfecting this machine for the past two years—studying contractors' needs and shaping our plans accordingly. Today we offer a portable woodworker that we *know* is the *only one worth while.*

This new machine is backed by the experience and reputation of The Sidney Tool Co. who have built and sold *over eight hundred* Universal Woodworkers. That's why there's *nothing experimental* about it.

A Number of Machines in One

The FAMOUS Portable Woodworker consists of:

- 8″ Jointer
- 20″ Band Saw
- Saw Table (carrying a 14″ Saw Blade) with raising and lowering arbor
- Mitering attachment
- Cut-off and Ripping Gauge
- Emery Grinder
- Disc Sander

With the outfit is included: 12″ Rip Saw, 12″ Cut-off Saw, ⅜″ and ¾″ Band Saw Blades, ⅜″, ½″ and ¾″ Boring Bits, set of Planer Knives, Sand Drum, Emery Stub (equipped with 6″ emery wheel.)

Every Contractor Can Afford One

It's *not* a question of expense but of *investment.* Don't think you cannot afford it—you cannot afford to do without it! Think of the convenience—think of the time, trouble and dollars you can save!

Illustration shows the woodworker mounted on skids which permit it to be pulled around easily. The machine can also be placed on a specially manufactured wheeled truck, which we furnish at a small additional cost.

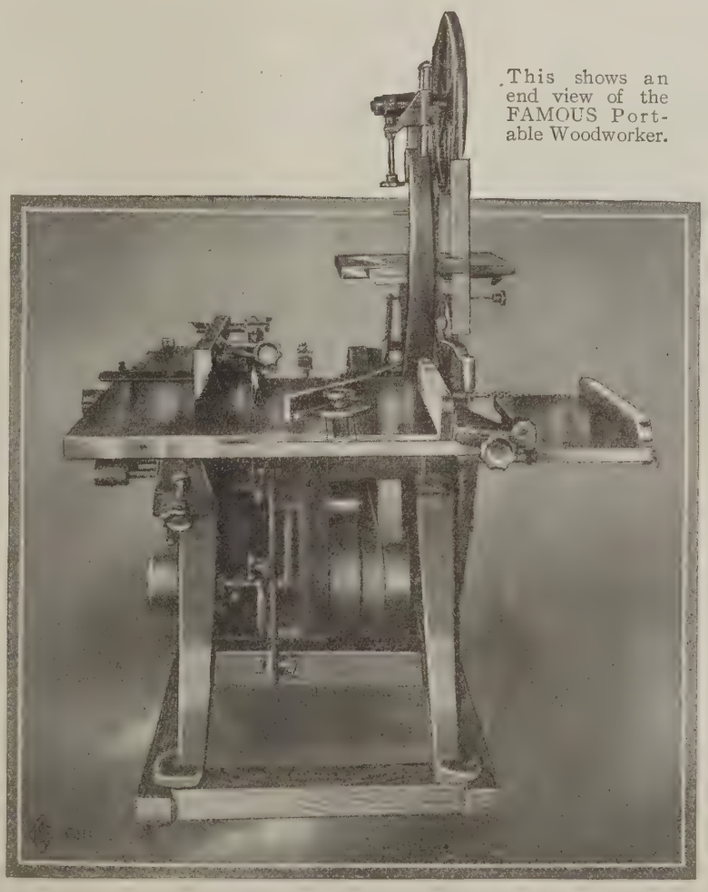
Don't Forget to Write for Particulars

The price is so low that it is a good investment for *every* contractor. Write today and get full particulars. Remember, we are making a conservative statement when we say the FAMOUS is so far superior to other types of portable woodworkers as to be *beyond comparison.*

Send us a letter or postcard *today* for full details—get educated to the real advantages we offer.

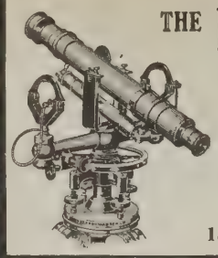
The Sidney Tool Co.

Sidney **Ohio**



This shows an end view of the FAMOUS Portable Woodworker.

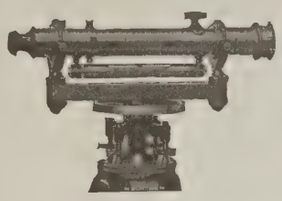
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



THE **New Gun Metal Finish**

Makes the "STERLING" Builders' Levels by far the most Durable Instrument in existence—1912 Models now on sale. Write today for Catalogue and special prices.

ISZARD-WARREN CO., Inc.
Makers
136 No. 12th St., Philadelphia, U. S. A.

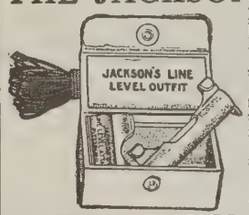


WHITE'S IMPROVED LEVEL

combines Simplicity with Accuracy and Durability. Three features to be found only in the White's Level. We will ship this regular $45 Improved Level for the next 30 days at $40 prepaid to any address. Examine it upon receipt and if found other than we represent it return it to us and your money will be refunded.

DAVID WHITE COMPANY, 421 E. Water St., Milwaukee, Wis.
Write for Catalogue and complete price list.

THE JACKSON ALUMINUM LINE LEVEL



Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

This is possible because the Aluminum Line Level weighs only one-fourth ounce and is easily and quickly attached to a line. Levels thus taken are guaranteed to be accurate on a stretched line from one to forty feet. Besides, from its construction, it can be used as a Pocket Level.

This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

PRICE $1.00, POSTAGE PREPAID

It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

JOS. WOODWELL CO., Sole Agents, 201 Wood St., PITTSBURG, PA.

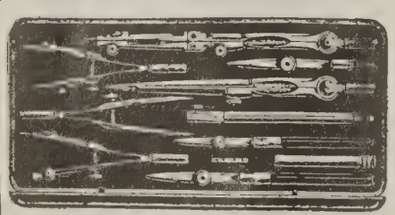
Drawing Materials **Surveying Instruments**

Drawing and Blue Print Papers, Architects' and Builders' Levels, Drawing Instruments, T Squares, Triangles, Scales, Inks, etc. Steel and Metallic Tapes, Builders' Levels. Repairing promptly executed.

Catalogue on Application

127 Fulton Street, New York — **KEUFFEL & ESSER CO.** — General Offices and Factories, Hoboken, N. J.

CHICAGO, 111 East Madison St. — ST. LOUIS, 813 Locust St. — SAN FRANCISCO, 48-50 Second St.



ALOE THE STANDARD FOR 60 YEARS

FREE! FREE! FREE!

Our new catalogue of Civil Engineers' and Surveyors' Instruments, Architects' and Draughtmen's Material, Draughting Room Furniture, Blue and Black Print Papers, is now ready for distribution, and will be mailed on receipt of request.

A. S. ALOE CO., : 511 OLIVE STREET, : ST. LOUIS, MO.

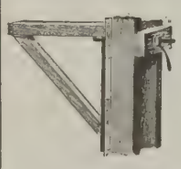
$15 SAVED ON EVERY FRAME HOUSE YOU BUILD

Wheeler Safety Scaffolds

Use no lumber or nails—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

Write today for our trial offer

AMERICAN STEEL SCAFFOLD CO., 62 McGraw Bldg., **Detroit, Mich.**



Rockford Bolt Co. — Strap & T Anchors, Truss-Rods

100 Ruby Street, Rockford, Ills.

BARS FOR CONCRETE WORK
Bolts, Lag Screws and Forgings to Order

Scaffold-Bolts, Plates, Stirrups, Turn-Buckles

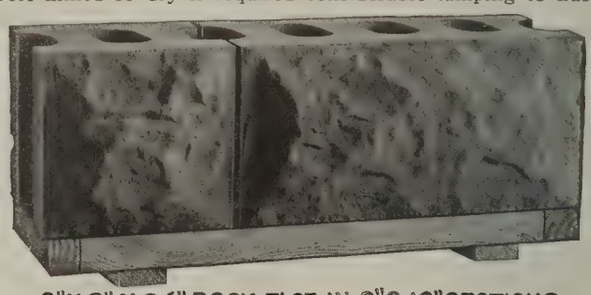


WASHERS Cast, Wrought, Malleable

CONCRETE MACHINERY.

Every new industry develops a wealth of original ideas, all calculated for the betterment of the industry. In many cases, however, progress has been so rapid that the machinery in use one year becomes practically obsolete the next and it requires far-sighted and cool-headed men to so arrange their affairs that none will pass them in the advance.

When the manufacture of Portland Cement became a certainty in this country, there was immediate response from the building industry. Systems of re-enforcement were designed, some of which are still in use, and many others which have been forgotten. Methods of building also passed through a transitory stage. We have had concrete mixed so dry it required considerable tamping to flush the



8"X 8" X 24" ROCK FACE IN 8"& 16"SECTIONS

surface, and so wet it would flow by itself. Through all this, however, there have survived methods good beyond question and machines whose work is superior to hand work.

One of the first uses for concrete was in the form of blocks, to take the place of brick and stone. It is unfortunate that for a long time these blocks, although equally as good and often better than the materials it imitated, could not at the outset have been given a character of their own. They are fast being recognized as the logical material to use in many places, not only where other materials are unavailable but on account of their own intrinsic values.

Provided the materials, cement, sand, stone, etc., are first class, there are two operations calling for considerable skill and accuracy. The first of these is in the mixing, and the second is in the forming of the block. The mixing must be thorough and quick. It may be said that Portland Cement deteriorates from the moment it is wet until it is in its final position. Therefore, the more rapid and complete the mixing and making the block, the better the product.

Many manufacturers of mixers are justly proud of the work of their machines, and it speaks well for them that they continue making the same models, with only slight changes from year to year. Among the manufacturers of this class of machines, the Ashland Steel Range & Manufacturing Company are well known. Their mixers, known as the U. S. Standard, are made in several styles and sizes to



meet the different classes of work. These machines are designed to measure accurately and automatically the quantities of cement, sand and aggregate, without loss of time in the mixing. This insures the right composition and speed.

Casting the blocks is such a simple operation that almost any old form can be used. For good results, however, only the best machines should be considered. By the use of first-class machines a variety of work can be done impossible on the plainer machines. Then, too, speed—the essense of good results—is more easily obtained with the high-grade machines. It is not permissible in this short space to go deeply into all the reasons why it pays to get the best, but we are sure a careful study of the U. S. Standard block machines, as made by the Ashland Steel Range & Manufacturing Company, will convince the intelligent mechanic of the soundness of their principles.

The increasing use of concrete and of block machines should lead every builder to ask the Ashland Steel Range & Manufacturing Company, Ashland, Ohio, for their Catalogue D, which contains much valuable information about cement and concrete, as well as descriptions of their line of machinery.

REMOVAL NOTICE.

The Corrugated Bar Company have announced the removal of their headquarters from St. Louis, Mo., to Buffalo, N. Y., to occur on the 14th of this month. They will occupy the third and fourth floors of the Mutual Life Building in Buffalo.

The change in headquarters has been decided upon as their stock warehouse and fabricating plants are located near Buffalo. The move will enable them to give their customers better and more prompt service in the handling of orders.

District offices will be maintained in the National Bank of Commerce Building at St. Louis, as well as in New York and Chicago.

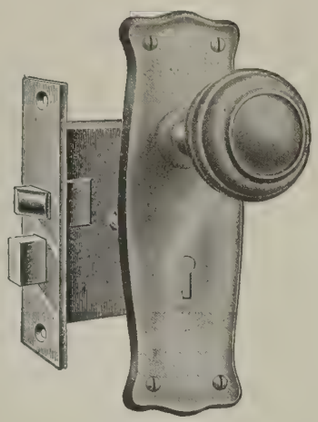
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

44c ONLY 44c

A Price That Talks
A Style That Attracts
with
Good Quality and Finish

MAKES THIS LOCK SET

B 333 A BARGAIN



All Complete 3½x3¼ in.

Knobs 2¼ inches

Escutcheons 7⅛x2 7/16 in.

Dull Brass or Antique Copper Finish

Have You Our No. 5 Builders' Hardware Catalog? Write for It—It's Free

It contains a complete line of the latest styles and finishes of lock sets and all hardware required to furnish a house.

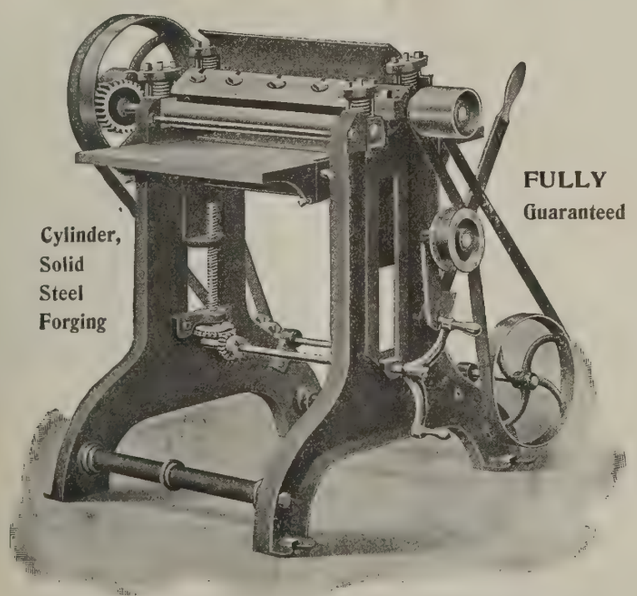
State whether contractor or material man.

We do not sell to contractors or builders in Cook County, Illinois.

REHM HARDWARE CO.
1503 Blue Island Avenue
CHICAGO - - - ILLINOIS

AT LAST!

A 16-inch Planer
$84.00



Cylinder, Solid Steel Forging

FULLY Guaranteed

Just the Machine for Contractors' and Builders' Use

Write for Descriptive Circulars

THE FRANK MACHINERY CO.
Manufacturers WOODWORKING Machinery
BUFFALO, NEW YORK



"That coupon gave me my start"

"It's only a little while ago that I was just where you are now. My work was unpleasant; my pay was small. I had my mother to take care of, and it was tough sledding trying to make ends meet. I hadn't had much schooling. I didn't **know enough** to fill any better job than the one I had.

"One day I saw an advertisement of the American School. It told how other men got better positions and bigger salaries by taking their courses. I didn't see how a correspondence course could benefit me, but as long as it didn't **cost** anything to mark the coupon I thought it was worth investigating at least. I marked the coupon and sent it in on the next mail.

"That was two years ago, **and now I am drawing more every week than I used to get in a month."**

If you want a **better position,** if you want to get into **congenial work,** if you want a salary that's **worth while**—

Sign the Coupon NOW

American School of Correspondence
CHICAGO, U.S.A.

Opportunity Coupon

AMERICAN SCHOOL OF CORRESPONDENCE
Chicago, U. S. A.

Please send me your Bulletin and advise me how I can qualify for the position marked "X."

Nat'l Bldr., 10-11

...Aviator	....Lawyer
....Draftsman	....Fire Insurance Engineer
....Architect	....Telephone Expert
...Building Contractor	....Moving Picture Operator
....Structural Engineer	....Bookkeeper
....Civil Engineer	....Stenographer
....Electrical Engineer	....Accountant
....Elec. Light & Power Supt.	....Cost Accountant
....Master Mechanic	....Certified Public Acc'nt
....Sanitary Engineer	....Auditor
....Steam Engineer	....Business Management
....Reclamation Engineer	....College Preparation

NAME .....

ADDRESS .....

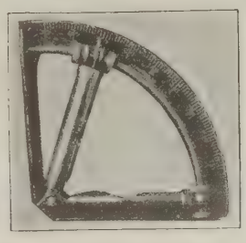
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN
Steel Measuring Tapes

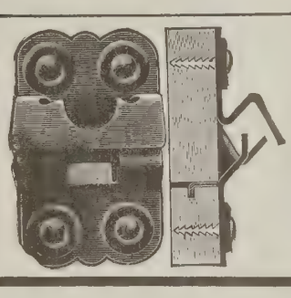


With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor

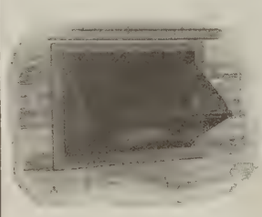


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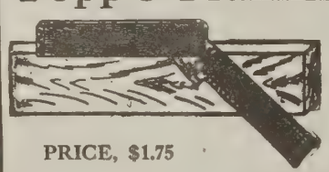
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EASIEST AND QUICKEST TO SET
Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.
E. L. WATROUS MFG. CO., Des Moines, Iowa

ELEVATORS
Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.
MECHANICALLY PERFECT
State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.
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The Window Chute
FOR BUILDERS OF MODERN HOMES
Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.
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Topp's Framing Tool
A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.
IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
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G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.

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By Geo. B. Clow
PRICE: 16MO., CLOTH, 250 PAGES—OVER 150 ILLUSTRATIONS—$1.50
A PRACTICAL up-to-date work on Sanitary Plumbing, comprising useful information, the wiping and soldering of lead pipe joints and the installation of hot and cold water and drainage systems into modern residences. Including the gravity tank supply and cylinder and tank system of water heating and the pressure cylinder system of water heating. Connections for bath tub. Connections for wash-bowl or lavatory. A modern bath room. Bath tubs. Lavatories. Closets. Urinals. Laundry tubs. Shower bath. Toilet room in office buildings. Sinks. Faucets. Bibb-cocks. Soil-pipe fittings. Drainage fittings. Plumber's tool kit, etc.
Sent postpaid on receipt of price by
HODGSON BOOK COMPANY, 542 S. DEARBORN ST., CHICAGO

DULL-KOTE PAINT.

Progress in the building line has been developed first for construction, the buildings being erected for protection and comfort, and to accommodate numbers rather than to provide luxurious surroundings for a few. The development of the artistic qualities came later, when society had advanced to a place where means and time were at the disposal of the builders. Surface treatment was only possible when construction had advanced until appropriate surfaces were available, where the expense was warranted by the improved appearance, and the desire to express the artistic feeling was prevalent.

At the present time we have construction in the highest development that the world has ever seen. The construction of a modern office building or metropolitan hotel presents problems vastly more intricate than the building of the pyramids. It is not along the cost, the amount of labor, the weight of the materials, but the proper



blending of all the arts and trades to a complete whole, embodying all the necessities and conveniences to which we have become accustomed in these modern times.

While the construction has advanced, can we say as much for the good taste and artistic feeling of the people? Are we, as a whole or individually, superior to the ancient Greeks, Egyptians or Romans in the appreciation of the beautiful and artistic, or are we degenerating more to the taste of the savage? Is it not a fact that our art galleries and museums are deserted for the moving picture shows, our best art stores empty while the ten-cent bric-a-brac stores are crowded with people buying "plunder?" Are the articles selected of good taste, color and finish, or do we find an uncouth "Billiken" supplanting the Venus de Milo?

From the earliest times, colors have been used in decorations. In the ancient building traces of colors still remain, although the entire color scheme is more or less conjecture. The decoration with color has always been present, but the changing conditions, political and constructive, have largely destroyed the best examples, and we are able to find only fragments by which we can gauge the whole.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Regarding the surfaces, in all our researches we find a uniformity of flat or matte finish. Ancient bronzes and statuary, although smooth, show not the slightest trace of the "polish" or "shine" with which many modern works are finished, and they would lose much of their charm and value as works of art if they did. Modern decorations and art are the same. Early photographs were made with a high polish on account of the nature of the materials, but one seldom sees photographs now except in the dull "carbon," "velvet" or "platinum" finish. Every element in nature tends to dull the best artificial polish we are able to put on an article, and thus restores to it the artistic feeling, depth and harmony of one which art demands.

Painting and decorating of modern buildings have, like all other arts and trades, had its period of transition, in which high artistic feeling was striving to overcome what might appear to be natural advantages of certain conditions. The use of linseed oil and varnish in paints produced an excellent surface from a sanitary point of view, but the shiny glazed surface destroyed the artistic effect of the colors, was an offense to the artistic eye and a real injury to the health as well. For this reason, calsomine and so-called water-paints were of value, but their other qualities, flaking, rubbing off, difficulty of patching, etc., made them undesirable for permanent work in the better class of buildings. It has remained for the R. F. Johnston Paint Co. to produce a pigment at once possessing the permanency of oil paints with the dull surface of water-paints or calsomine.

DULL-KOTE PAINT, as made by the R. F. Johnston Co., dries with a flat, velvety finish, which can be washed like the best oil or varnish. The colors in which it is made provide an almost endless variety of shades. The surface lends itself to all the decorative processes of fresco, stencil, borders, etc., the nature of the pigment being such that the surfaces naturally blend together harmoniously when various color schemes are used.

Modern construction has evolved a number of items of construction requiring special finishes. Wall-board is supplanting plaster in many places, and possesses many points of advantage for many places. For the proper finish of wall-board Dull-Kote paints are especially valuable, the naturally matte surface of the board making a pleasing finish.

Possibly the best test of the value of a pigment of this character is a statement of some of the places where it has been used. No buildings are more exacting in their requirements than the modern hotel. In the famous Hotel Patten at Chattanooga and the San Antonio at San Antonio, Texas, the interior walls are painted with Washable Dull-Kote paint. Among the modern buildings, schools, theaters, banks, public and private buildings, so many are well known that only a manufacturer's list can properly contain them all. There are few cities in which the manufacturers cannot find samples of their product to which the interested can be referred, and we feel sure that they will ge pleased to hear from any one contemplating the finish of an artistic interior. The R. F. Johnston Paint Co., Pearl and Main streets, Cincinnati, Ohio, are the manufacturers of this point and have a particularly unique method of satisfying the inquisitive by practical tests which cost the inquirer nothing. So sure are they of its approval that they stand back of it to the fullest extent. Their literature, telling all about Washable Dull-Kote Paint is, of course, sent free to readers of the NATIONAL BUILDER.

A HANDY NEW TOOL.

Aggressive contractors and mechanics are always on the lookout for labor-saving tools, realizing that a small amount spent in new tools and equipment may be the means of saving both time and money.

One of the chief requisites of first-class work is that it should be plumb, level or straight, as the case may be. Nothing so detracts from the appearance of otherwise good work as to have one or two lines or surfaces just a trifle out. The cause of the error is



Old Way New Way

immediately apparent to the skilled workman, while the average observer knows something is wrong, but cannot always just place the blame.

Various means are used to secure accurate work. The engineer may use an instrument costing several hundred dollars, which is necessary to secure accurate engineering results. The builder will use a cheap instrument to obtain the results necessary in his work. The mechanic, the carpenter, mason, plasterer, etc., all must put up their work accurately and these have, as a rule, depended on the



Asbestos "Century" Shingle Roof — Residence Frank C. Child Lexington, Mass.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

If you want to give your client the fullest possible use of the top floor of his house, you must roof it with Asbestos "Century" Shingles.

It's the only way to avoid the extremes of heat and cold that bother him with the ordinary roofs.

Asbestos "Century" Shingles are very efficient heat insulators. They are made of reinforced concrete which is celebrated as a non-conductor of heat and cold.

From every consideration, it's worth your while to look into Asbestos "Century" Shingles before recommending a roof, rebuilding or altering.

They are indestrucible by weather. They are the best preventive of fire you could give a building. They last forever without painting or repairs.

And they cost no more than you expect to pay for a first-class roof.

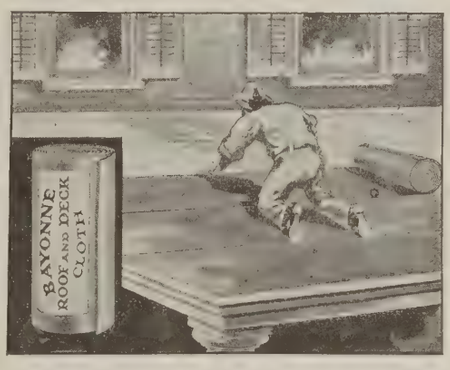
You can get Asbestos "Century" Shingles in shapes to suit any architectural style—in several sizes—and in three colors: Newport Gray (silver gray), Slate (blue black) and Indian Red.

Send for quotations and booklet, "K. & M, 1911." It will settle your roof problems to your great satisfaction.

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Easiest to lay—Lasts longest. Requires but **one coat of paint.**
The treatment permeates the fabric and preserves the fibre

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All Widths—All Weights—Any Quality

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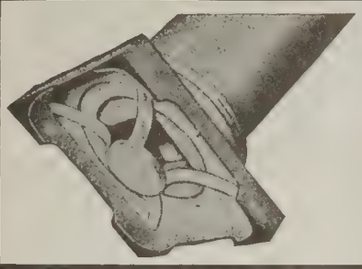
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NO SINKING INTO THE FLOOR WITH THE

ZIMMERMAN IRON BASE

It has a center bearing that the sun cannot heat. Have done with this rot nuisance and have your architect specify the ZIM-ZIMMERMAN BASE. It separates the column from the floor and also ventilates the column shaft, preventing columns from checking and opening.

Write for Circular J

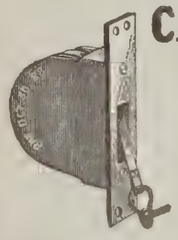
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SYRACUSE, NEW YORK

Framing For Any Roof Pitch of Hundredths

Marked IN FIVE MINUTES on Timbers with the New Parkhill Pitch Gauge

Anyone can use it and almost instantly mark length per foot run and both cuts of common rafters—hips—sides bevel on jack; both bevels on facia—plancher and sheathing, and hip joining to unequal pitches. Other cuts marked as easily and quickly. The Parkhill Pitch Gauge is unequalled as a stair and brace gauge. It is steel nickeld—small in size—fits any steel square—is simple to operate and accurate. **Sent prepaid in U. S. for $1.50,** If not satisfied money returned within 30 days of sale. Write for circulars showing illustrated directions.

JOHN PARKHILL, Reference: First Nat'l Bank **Rochester, Minn.**



CALDWELL SASH BALANCE

Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

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Have increased holding power on account of the corrugated ribbed exterior surface.

Securely clamped together without the use of springs or wires.

A better shield at the same price.

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Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS



and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa

old-fashioned level, which gives accurate results when properly used, but in many places is more or less awkward. Whenever it is necessary to use a straight-edge, the use of a separate level with it practically means another man to handle it, or possibly we see a man holding up the straight-edge with one foot while both hands are busy holding the level and straight-edge together at the top.

The Weaver Adjustable Plumb and Level is designed to overcome the objections to the separate level and straight-edge. It consists of a place to which one level is rigidly attached, and a level on an adjustable arm which may be set at any given angle. With this arrangement there is no chance for the level to fall and break and one man easily does the entire work. The adjustable arm is especially useful for grading, splays, battering walls, etc.

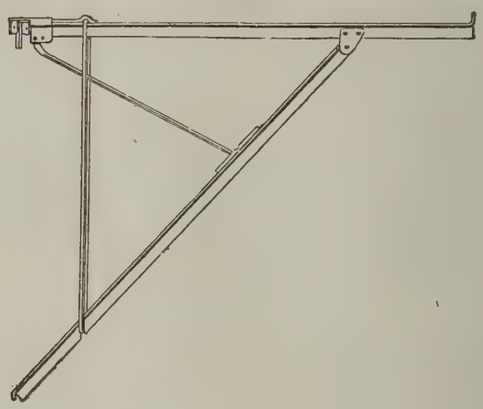
Every mechanic has use for an adjustable level at times. The farmer may have to lay out a concrete floor with a pitch to it or dig a ditch across his farm. This instrument aids him materially in setting out the proper grades.

This level is made by J D. Weaver, 718 Hurd street, Jacksonville, Ill., who is anxious to see one or more of his levels on every job. His circulars are interesting and should be in the hands of every NATIONAL BUILDER reader.

SAFETY STEEL SCAFFOLD BRACKETS.

In many parts of a building under construction we find labor and material of a temporary character, which serves to facilitate the erection of the building, but has no place in the completed structure. In these places we find lumber forms for concrete, runways, fences, protection of stone work, watchmen, lights, etc.

One of the most important, however, in the frame building is the scaffolding for the exterior work. This scaffolding is in use for only a comparatively short time, and the tendency of the builder it to make it as temporary as possible to save labor, material and time. The result has been a considerable loss of life through breaking



scaffolding, as well as frequent serious injury. No contractor intentionally builds a weak scaffold, or orders his men to go on one, but the tendency is toward insufficient supports, bracing, etc.

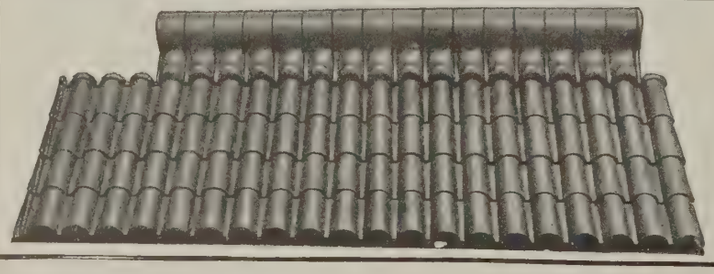
Among the devices calculated to assist the builder along these lines, we find the Wheeler Safety Scaffold Bracket. These brackets are so easily attached to the frame of the wall and so handy to move and work from, that a considerable saving is made, sometimes amounting to 20 or 25 dollars per job. The safety which a workman feels when working on a scaffold of this character adds greatly to the quantity and quality of his work.

These brackets are made by the American Steel Scaffold Company, 61 McGraw Building, Detroit, Michigan, who have a special offer to NATIONAL BUILDER readers. It will pay any builder to communicate with them when considering the subject of safe and economical scaffolding.

LARGE ORDERS FOR SCALES AND TRUCKS.

The Standard Scale & Supply Co., of Pittsburg, Pa., recently made shipment of ten carloads of scales and trucks for use at the new plant of Sulzberger & Sons Co., at Oklahoma City, Okla. This order, as well as the one for 35 scales, mostly 120 ton Railroad Track Scales, for the Bureau of Water, Gas and Electricity, of Brooklyn, New York, also recently shipped, are the largest orders for this class of goods that have been placed in recent years, and the selection of "The Standard" scales and trucks on these large orders demonstrates the merits of the goods manufactured by this company.

In the equipment for Sulzberger & Sons Co. were included a large number of special new pattern Portable Suspension Scales with steel plate platforms, which have recently been put on the market by the Standard Company. This scale eliminates the necessity of cutting the floor where the scale is placed and it is only necessary to use an incline of two inches at each end to run on the platform. This type of scale is particularly desirable for users where the



MULLINS METAL TILE ROOFING

has won widespread and lasting favor because of its many superior qualities. Beauty, Simplicity, Durability—these are its salient characteristics. Absolutely storm-proof and water-tight.

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We also make Cornices, Building Fronts, Garlands, Medallions, Enriched Moldings, Capitals, Finials, and other architectural ornaments. Many thousands of designs to select from.

Our prices are attractive, our services prompt. Quick estimates on special jobs.

Catalogue along any desired line will be sent you by return mail.

The W. H. Mullins Co.

210 Franklin St., Salem, Ohio

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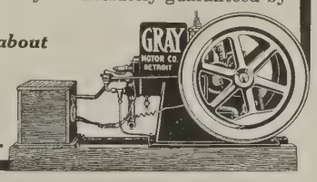
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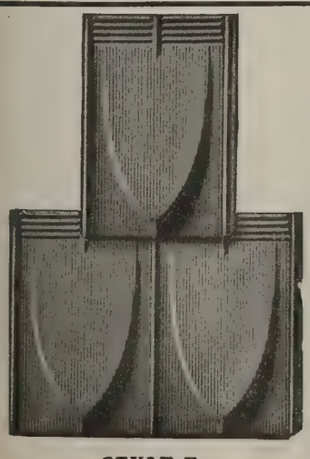
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Being tough and light it is extremely easy to put on. It does not stretch nor tear and is readily handled. It is made of pure sulphite and comes in regular size rolls, 36 inches wide.

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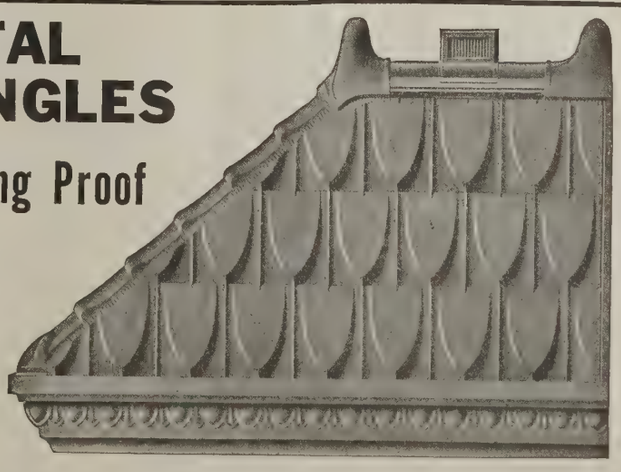
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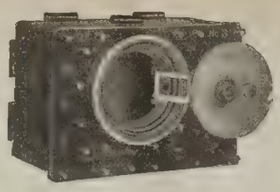
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It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

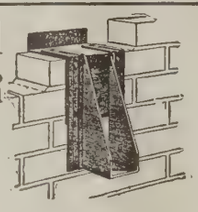
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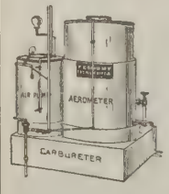
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floors are damp and wet, as there is no opening to allow the water to run through to the floor below. Because of this advantage this scale is being adopted by various packing houses and other users throughout the country.

A SHEET METAL EXHIBIT.

Milwaukee has considerable right to be called an Exhibition City and the recent Manufacturers' Industrial Exhibit was a good example of the harmony among the manufacturers of that busy city. This great Exposition was carefully planned and carried out under the direction of the Merchants and Manufacturers Association and proved to be extremely interesting and educational in portraying the great volume and variety of Milwaukee products.

Among the most interesting of the exhibits from a builder's standpoint was that of the Milwaukee Corrugating Company, a view of which we are able to show herewith. The booth was handsomely



decorated inside with Invisible Joint Metal Ceilings and Side Walls, the exterior being covered with rock face siding, the entrance being flanked with galvanizing steel pillars. The conical roof was covered with Titelock Shingles, made of Cold Rolled Copper, Galvanized Iron and painted tin. The peak was surmounted by a Nu-air ventilator, from which a number of ribbons were blown by an electric fan inside the ventilator.

It was surprising to see how many people had never before seen metal shingles and siding, and the exhibit was a complete success, judging from the educational results.

UNION STEEL COLUMNS.

However must we decorate the interior of our houses, a certain amount must be expended on the exterior to give it a pleasing appearance. As the entire development of architecture is an amplifica-



tion of the column, it is natural to use some form of the column for the exterior as well as the interior decoration.

In the ancient, as well as the modern, monumental building, stone has been almost universally used for the columns, whether

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Despite the growing scarcity of Oak, which has been seized upon by lumber dealers and manufacturers as a pretext for raising prices on Oak Doors, Interior Finish and Flooring, we are actually selling the very finest qualities and grades at **less than dealers charge for Pine.** Years ago the Gordon-Van Tine Company arranged for the output of large tracts of the best Oak timber in America. **Our customers profit by our foresight.** We are actually selling Oak to carpenters and contractors at less than the same material would have cost you **ten years** ago. The cut in prices not only affects **Oak Doors,** but extends through the whole line of **Oak Finish and Interior Trim.** A further reason for our low prices on Oak is the big scale on which our goods are manufactured, and our small selling expense.



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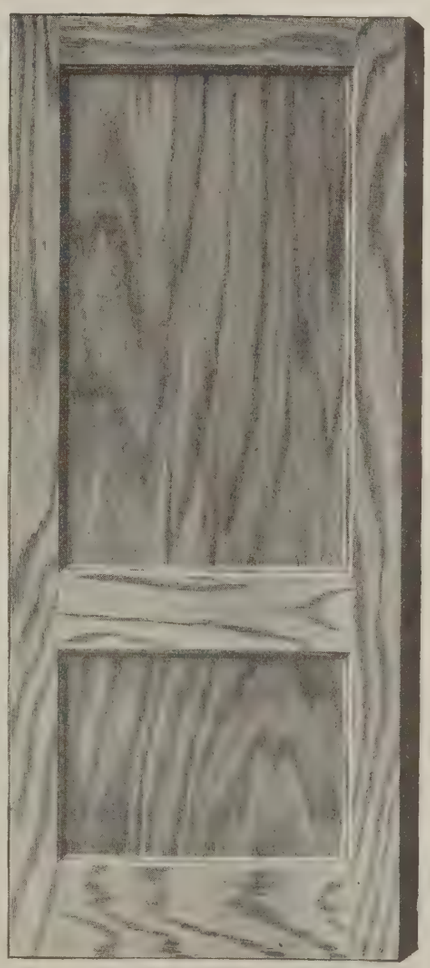
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(172)

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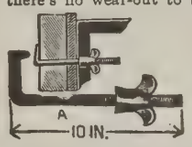
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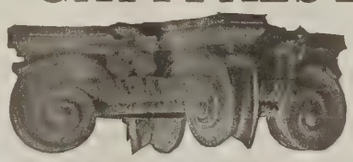
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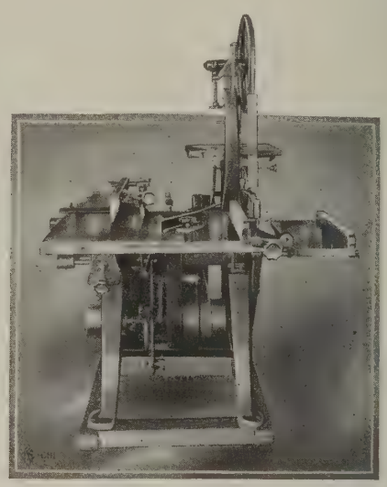
used as supports or for decoration. In the smaller private buildings, residences, etc., wood has been largely used for the columns as well as for the rest of the building, but there are certain disadvantages in its use especially for columns exposed to the weather, whether the snows of the North or the damp atmosphere of the South. Among these advantages are the tendency to check or crack unless carefully made from the best materials, and the liability to decay as soon as a crack appears unless carefully painted at frequent intervals. These disadvantages can, to a certain extent, be overcome by care in manufacture, and during and after erection.

The Union Metal Mfg. Co., of Canton, Ohio, are manufacturing a column which they claim overcomes many of the faults in columns of other construction. As made by them, the column consists of a cast iron base and cap, and a shaft of pressed galvanized steel. They thus have abundant strength as well as correct architectural detail.

As it is manifestly impossible for us to list all the places where these columns have been used, we can only show their use in one building, and ask that our readers write to the Union Metal Mfg. Co., Canton, Ohio, for further information regarding these columns and other goods of similar manufacture.

NEW TYPE OF PORTABLE WOODWORKER.

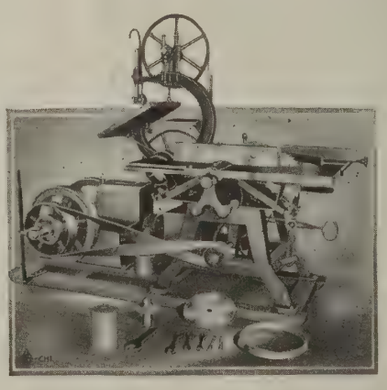
The latest addition to the family of woodworkers now on the market is a new type of portable woodworker, built by the Sidney Tool Co., who have over eight hundred of their stationary woodworkers in use throughout the country. Their latest achievement is sure to be a winner as it meets the demand long existent among the majority of contractors.



As the name implies, it can be moved from job to job as desired, with little trouble. It is usually mounted on skids which permit it to be drawn over the ground very easily; the manufacturers also can furnish a specially designed wheeled truck which, of course, allows it to be moved even easier than on skids.

The machine is furnished quite complete, the outfit including a three horse-power gasoline engine, batteries and all belting necessary to its operation. In fact, it comes ready to begin working with.

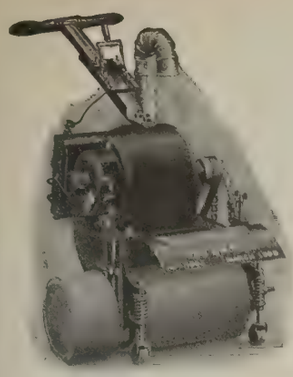
In operation the machine is similar to the stationary woodworkers, performing various kinds of work, such as ripping, dadoing, surfacing, edging, boring, grinding, sanding, etc., all of which can be performed by one man. The complete machine includes: 8-inch Jointer, 20-inch Band Saw, Saw Table with Raising and Lowering Arbor, carrying a 14-inch Saw Blade, Mitering Attachment, Cut-Off and Ripping Gauge, Emery Grinder and Disc Sander.



In multiplicity of work, durability and ease of operation the FAMOUS Portable Woodworker is considered far in advance of any similar machine on the market, and the builders have taken steps to supply a big demand. The advantages offered by a machine doing various kinds of work are well known; with the added feature of portability it should prove a boon to every contractor, as he can take his "machine-shop" with him on almost every job he undertakes.

Full particulars of the construction, together with prices and terms, will be sent upon request to the builders, The Sidney Tool Co., Sidney, Ohio.

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Made in three sizes:
8x18, 8x15, and 8x12 in. Roller
Edge Roller easily adjusted to either side

Perfect Results are Easily Obtained by Using Schlueter Rapid Floor Surfacer

This machine is built on the only correct principle. It is guaranteed to be **The Best** machine with which to produce an even, smooth service on any kind of large or small wood floor, old or new, hard or soft, and in all buildings: Residences, Stores, Factories, Bowling Alleys, Roller Skating Rinks, Reception and Dance Halls, Etc.

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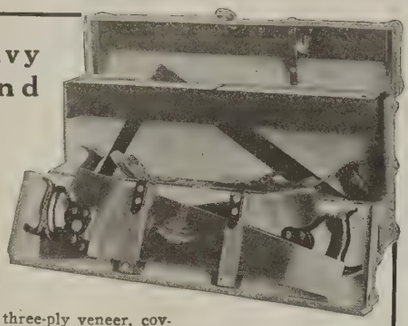
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Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO

CARPENTERS' TOOL CASE

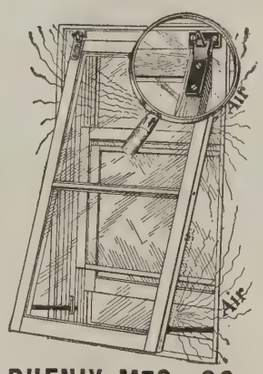


It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges can not be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

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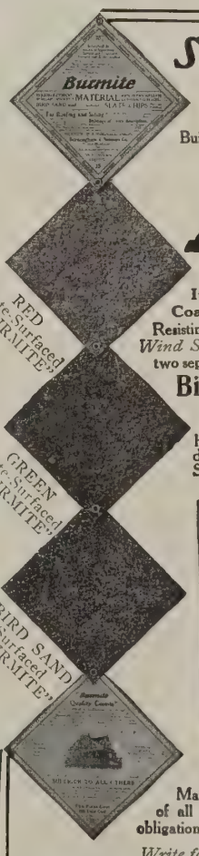
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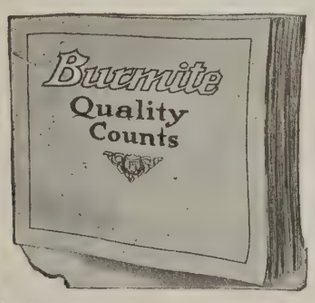
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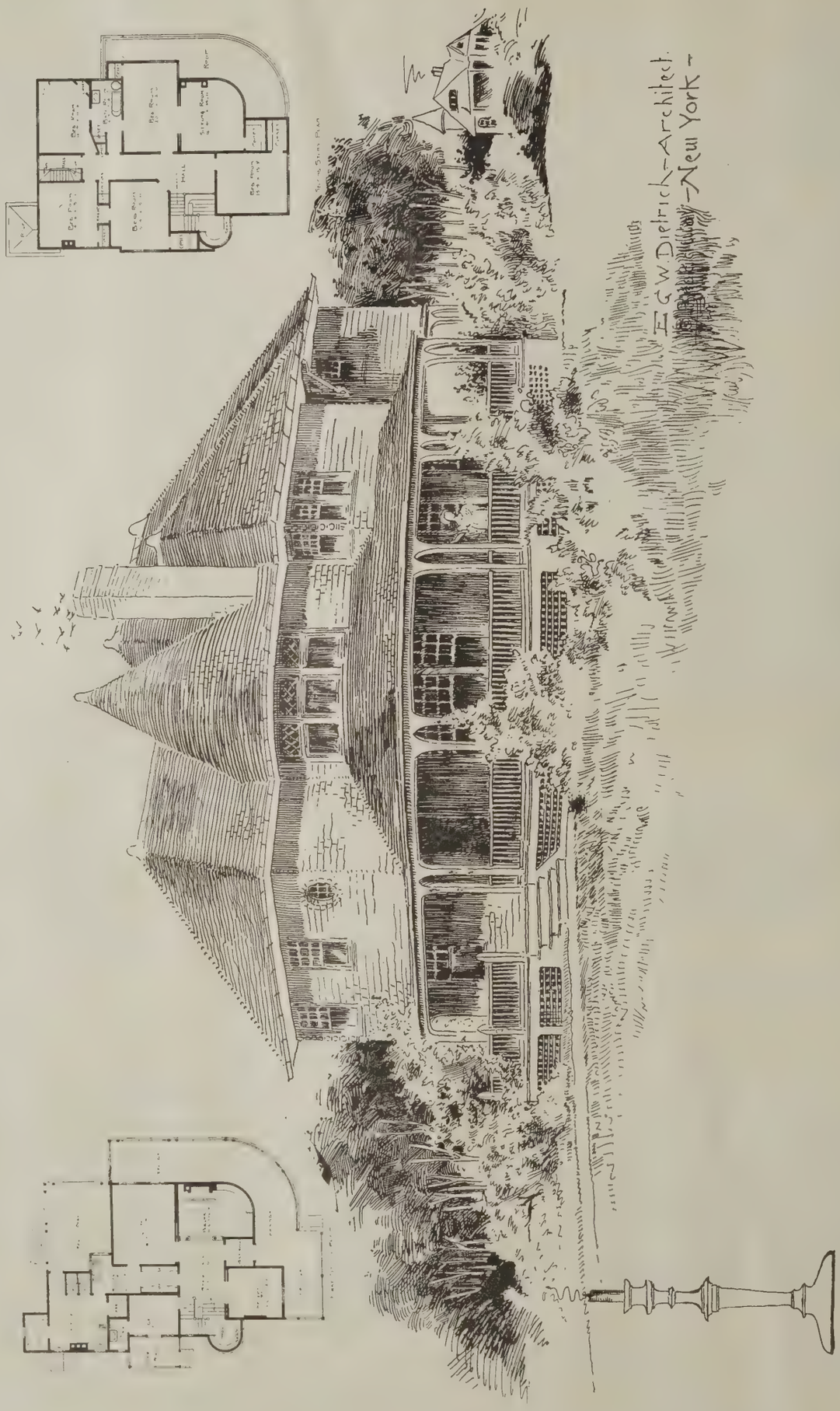
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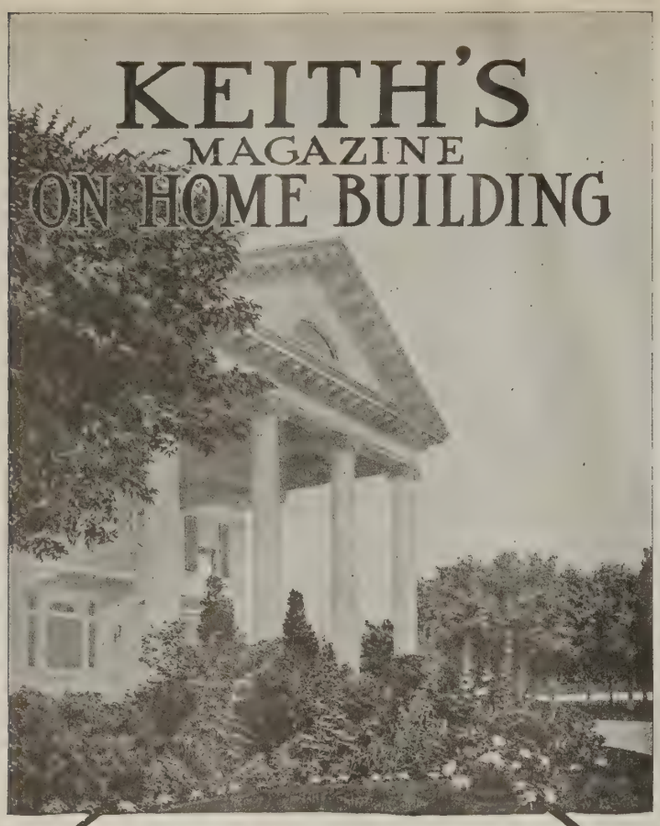
10% DISCOUNT

For 30 days, to introduce the Nailer to new users, we will give a 10% discount. Or instead of $5.00, the price will be $4.50 net. Besides, we will prepay express. Send in your order at once for either the Blue or Red Nailer. The Blue Nailer (painted blue) is for common 3d No. 14 wire nails and the Red Nailer is for the galvanized 3d No. 13 1¼-inch wire nails. Order from your dealer or direct from us, and be sure to state size wanted according to the nail used. Money returned if Nailer is not as represented.

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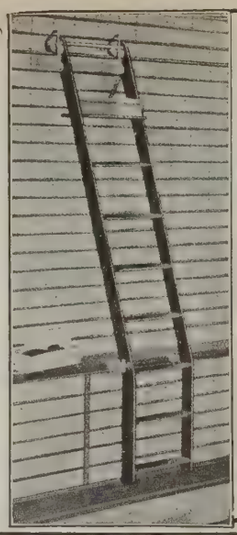
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Koll's Patent Lock Joint Columns

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As the leaders in Architectural Beauty and Quality.

When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.

We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, **that's why** we are selling more columns today than ever before.

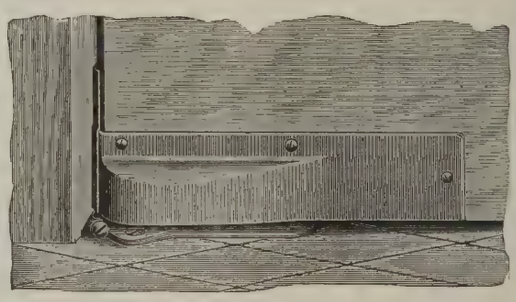
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Send for catalogue T 27 of pergolas, sun dials and garden furniture or T 40 of wood columns.

We manufacture a full line of porch material and Interior Hardwood Columns.

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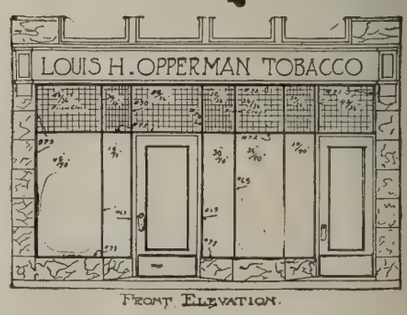
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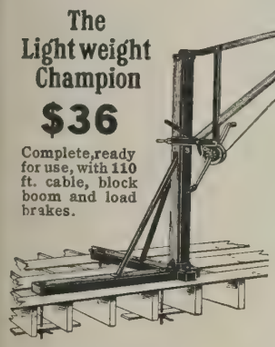
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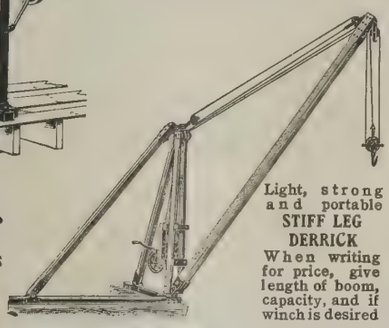


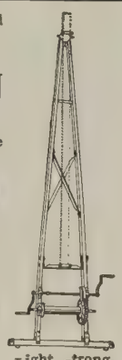
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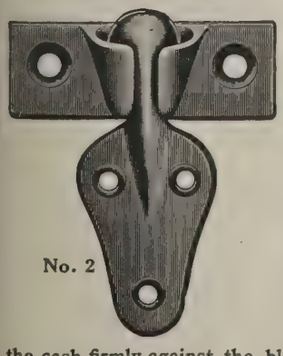
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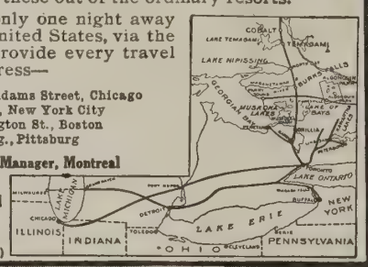


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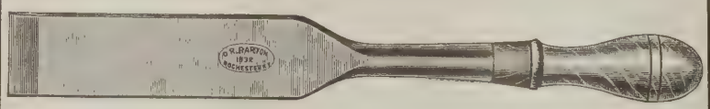
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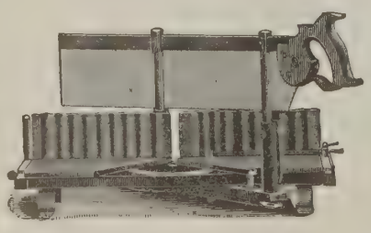
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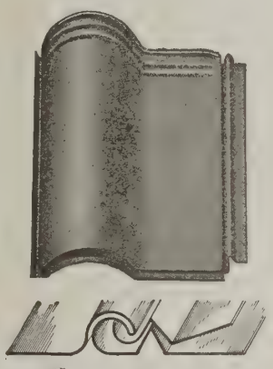


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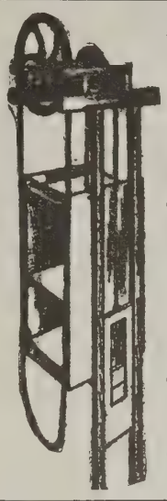
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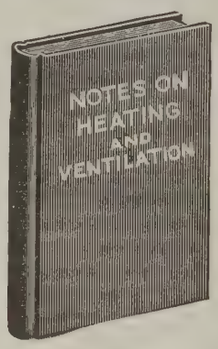
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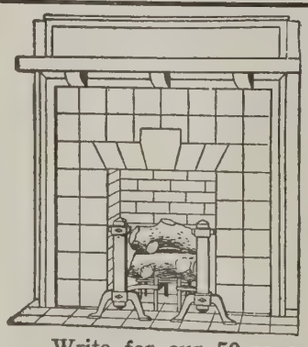
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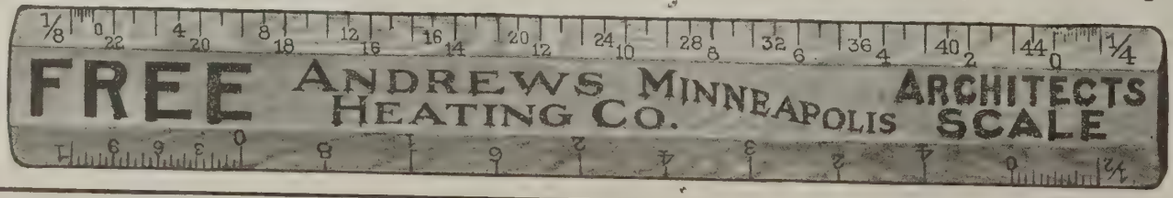
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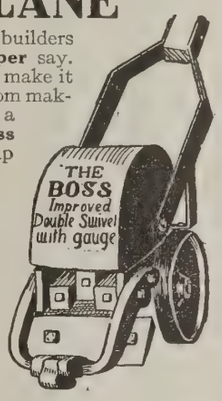
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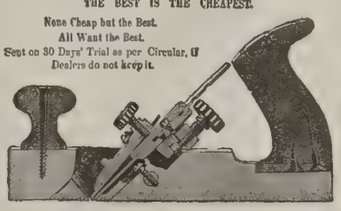
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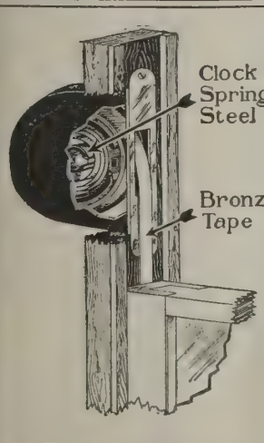
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Draftsmen Drawing $125-150 Monthly

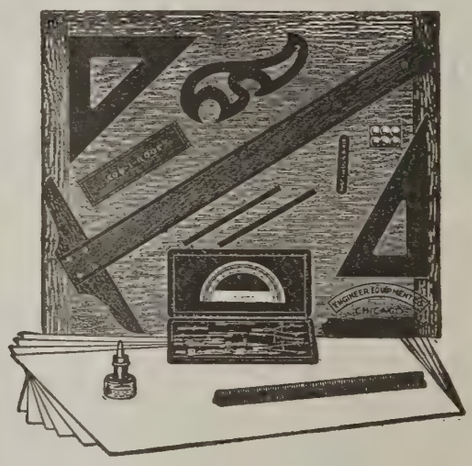
Are NOT MADE in Schoolrooms,
Are NOT MADE by reading books,
Are NOT MADE by making Copies,
Are NOT MADE at home drawing pictures, from printed book lessons.

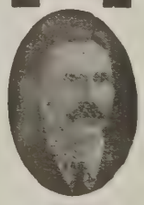
LET ME TELL YOU:

It requires actual, practical, up-to-date DRAFTING-ROOM WORK to train YOU to gain the PRACTICAL EXPERIENCE that your employer will demand of you.

FREE

This $13.85 DRAWING OUTFIT and Free Position





Chief Draftsman



Chief Draftsman

As Chief Draftsman of Engineering firm I know exactly the Quality and Quantity of PRACTICAL training, knowledge and actual up-to-date experience (not school knowledge) you must have, in order to obtain a good position and advance to highest salary.

I give **INSTRUCTION UNTIL COMPETENT and PLACED in POSITION at above Salary.**

DON'T waste TIME and MONEY trying to learn from books or printed "STUFF"—you can only learn on PRACTICAL WORK which I furnish you. **Write me at once—TODAY.**

F. B. DOBE
Chief Draftsman, Div. 6,
Eng's Equip't Co. (Inc.,) Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Carpenter's First Thoughts—

Sharp Tools and Carborundum Sharpening Stones



A good workman starts the job with every edge tool keen and smooth. He knows that a good tool properly sharpened means more work with less effort. The best, the quickest way to put them in perfect condition is with a ***Carborundum Stone.*** They are hard, sharp, uniform and non-glazing. They *cut* while the others merely rub.

The Carborundum Round Combination Bench Stone is a great favorite:		
It gives full sweep to the tool—it wears evenly.	*No. 107*	*$1.00*
Carborundum Combination Stone, rectangular,	*No. 108*	*$1.25*
Carborundum Pocket Stone, in case,	*No. 146*	*.35*

AT YOUR DEALER OR BY MAIL DIRECT.

THE CARBORUNDUM COMPANY

NIAGARA FALLS, N. Y.



No. 450. CUT FULL SIZE, 3½ INCH.

WE INITIATE
NEVER IMITATE

A Big Hit

Is the new tip with which "NATIONAL" Butts are now equipped, both Common and Ornamental.

The TIP is threaded and screws into the Butt in both the Jappanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter. These are exclusive "NATIONAL" features.

Style No. 450



here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 inches inclusive. These butts are highly polished, double plated and have beveled edges.

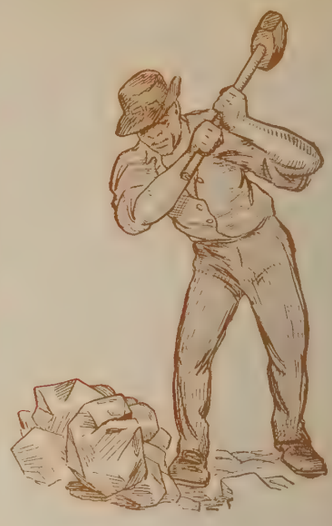
They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

NATIONAL MFG. CO., Sterling, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



BRAIN OR BRAWN



YOU EARN your bread with brain and skill rather than with muscle. Otherwise you would be a laborer with pick and shovel, instead of a mechanic with a kit of fine tools.

One day two husky laborers were told to remove a few yards of paving bricks between street-car tracks. They began hammering them to pieces with sledges. Hard work—slow work. Not until they were shown, did they think of loosening the bricks with bars and pulling them out. ALL BRAWN—NO BRAIN.

You use your brain to save your brawn, to save time, to save mistakes, to save you money. And you never make a more profitable use of your brain than in the selection of the saw, for it is the tool that you use most—the tool requiring most energy and most skill in handling. The intelligent mechanic uses

ATKINS SILVER STEEL SAWS

These saws are fully abreast of the times. They embrace the latest and most scientific ideas in saw making. They are so constructed that they run easier than any other saw, and the SILVER STEEL used in the blades will receive that keen, sharp, cutting edge that you high-class mechanics want—and hold it.

How to Get Them

Go to your dealer and tell him that you are a progressive mechanic and you want tools that will save you time and strength. Select a saw with the words SILVER STEEL on the blade. Then you'll be sure of getting a saw representing the highest achievements in saw making. If your dealer does not sell them he will order for you from his wholesale house. If he won't do this, then let us know. We'll help you get the finest saw if you want it.

You Run no Risk

We stand back of every SILVER STEEL SAW with a guarantee so strong that you risk nothing—not one cent. If the next saw you buy is an Atkins saw and if the words SILVER STEEL are on the blade, remember that it is guaranteed to run easier, cut faster and hold its edge longer than any other saw. If it is not absolutely satisfactory, you are authorized to take it back to your dealer and get your money back or a new saw. If he won't refund your money, let us know.

Offer to Carpenters. We are compiling a list of high class mechanics and if you will send us your name, we'll mail you our book on saws free of charge. If you'll send us ten cents to pay postage, we'll forward you free a strong, durable nail apron, our Saw Sense book, monthly time book, and a whole lot of useful information about high grade saws.

E. C. Atkins & Co.

INCORPORATED

Indianapolis, - - - Indiana.

MORE COPIES
PRINTED AND CIRCULATED THAN ANY OTHER BUILDING PAPER IN AMERICA.

THE NATIONAL BUILDER



PUBLISHED
On The 15th Day Of Each Month
Twenty Cents Per Copy Two Dollars Per Year

NOVEMBER, 1911

Disston Saws, Files and Tools



For fifty-six years we have been making Disston Crucible Steel. It is made under the exclusive Disston process. The long life and cutting properties of Disston Saws are due to Disston Crucible Steel and the treatment it undergoes in our shops.

The Disston establishment is the ONLY ONE making steel for its full line of saws and tools—one reason why Disston Saws are uniformly durable and efficient.

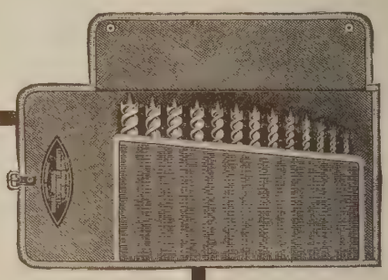
Disston Saws are hardened and tempered by the exclusive Disston process.

It pays to buy Disston Saws and Tools. For any and every kind of work Disston Saws, Files and Tools are the most reliable.

We have been making saws for over seventy-one years.

Henry Disston & Sons, (Incorporated)
Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, PENNSYLVANIA

ANNOUNCEMENT



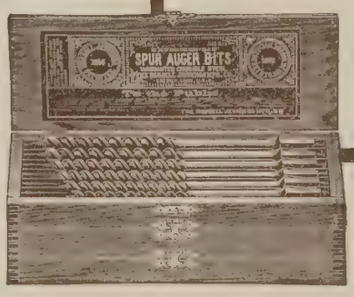
4 ADDITIONAL SETS
"RUSSELL JENNINGS"
AUGER BITS
NEW SETS

22½ quarters— 11 bits
Standard thread ¼ to ¾ inch, quick boring thread 8 and 10 sixteenths.

18 quarters— 9 bits
4, 5, 6, 7, 8, 9, 10, 11 and 12 sixteenths.

20½ quarters— 9 bits
4, 5, 6, 7, 8, 10, 12, 14 and 16 sixteenths.

17½ quarters— 7 bits
4, 6, 8, 10, 12, 14 and 16 sixteenths.



RUSSELL JENNINGS MFG. CO.
CHESTER, CONN., U. S. A.

All sets are put up in either Hardwood Tool Box or Canvas Roll.

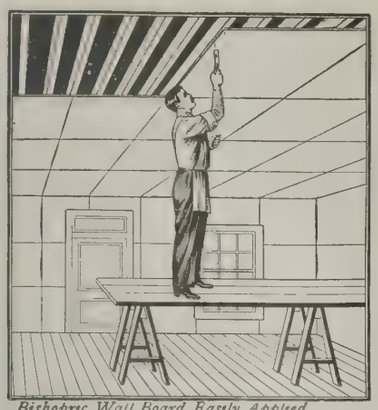
2141

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BISHOPRIC WALL BOARD AND SHEATHING

BISHOPRIC Wall Board is cheaper and better than lath and plaster. It is the ONLY Wall Board COMBINED WITH LATHS and Asphalt Mastic. Laths are necessary in a Wall Board, just as they are in plaster walls, to prevent warping and to insure solid, rigid, stiff substantial

WALLS AND CEILINGS



Bishopric Wall Board Easily Applied

Bishopric Wall Board also is the only Wall Board with a waterproof body. The Asphalt Mastic in which the laths are imbedded affords absolute protection against dampness. Does away with delays in building. Applied winter or summer. Is nailed to studding dry, ready for immediate application of paper, paint, burlap, or any other kind of decoration.

Bishopric Wall Board is made of kiln-dried, dressed laths imbedded in hot Asphalt Mastic, surfaced with sized cardboard and cut in the factory into 4x4 ft. sheets. Shipped in crates ready for immediate nailing to studs. It is guaranteed not to swell, shrink, warp, crack, flake or blister. It is clean, sanitary and odorless; proof against moisture, cold, heat, and vermin; saves fuel and keeps out summer heat; also deadens sound.

It is suitable for dwellings, factories, new partitions in old buildings, finishing attics, porches, laundries, cellar ceilings, garages, etc.



Shows Construction of Bishopric Wall Board.

PRICE WALL BOARD AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6.40 per crate, or $2.50 per 100 square feet, f. o. b. New Orleans, La., Cincinnati, or Alma, Mich. We ship from nearest point.

T. W. Hanes, Carpenter and Contractor, Mounds, Ill., wrote August 15: "I have used 13 crates of Bishopric Wall Board, and the waste could be put in a hat."

Wm. Cooper, Taxidermist, Milo, Me., March 9, wrote the Philadelphia Farm Journal: "Your interesting paper has been a real bonanza to me. I wanted a cheap, warm method of lining my new work room. An advertisement in your paper gave me the very idea and material at a price that suited my pocket. I wrote to two firms who advertised with you, but selected 15,000 ft. of sheathing from the Bishopric Wall Board Mfg. Co. of Cincinnati. If the stuff was made on purpose, it could not suit me better; and a most prompt, obliging firm they are, too."

Cheaper Than Lumber. Saves 75% on Labor. Does away with Building Paper.

BISHOPRIC SHEATHING

Ideal Material for Cement Buildings or Stucco Exteriors. Proof against Dampness.

Bishopric Sheathing is made of same materials as Wall Board, but finish is not necessarily so fine, therefore costs less. It is of uniform thickness, insuring a perfectly even surface when applied.

Bishopric Sheathing is nailed to studs, with lath and asphalt side exposed. Over laths, weather boards are nailed or cement applied.



Shows construction of Bishopric Sheathing.

Arrow points to Asphalt Mastic into which laths are imbedded.

Bishopric Sheathing makes a more solid and substantial wall than lumber. There are no gaping joints; no widening cracks due to shrinkage; no knot holes.

The Asphalt Mastic in Bishopric Sheathing is a non-conductor, moisture cannot penetrate it. It is proof against vermin. The pests cannot bore through the tough, gummy Asphalt Mastic. In applying weather-boards over the laths, dead air space is left between the laths forming splendid insulation. Does away with the expense of building paper and cost of its application.



Wall Board and Sheathing are shipped in crates

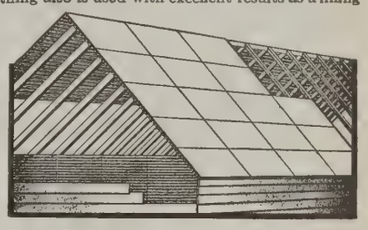
The cost of applying Bishopric Sheathing is but $2.50 per 1000 feet—A SAVING OF ABOUT 75 PER CENT. Furthermore, 1,000 square feet of wood sheathing covers but 750 feet of surface, 20% less being due to tongue and groove. In Bishopric Sheathing 1,000 square feet covers 1,000 square feet of space

Bishopric Sheathing insures comfort during the construction of the building. As soon as the building is closed in with Bishopric Sheathing, the men may work in comfort on the inside during bad weather, finishing the outside on suitable days. This insures continuous work, without loss of time, enabling the contractor to hold his men and complete the work in the least possible time.

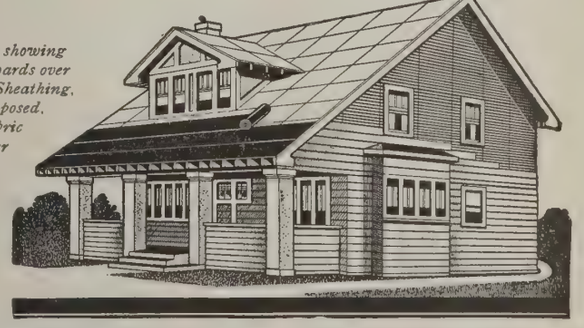
Bishopric Sheathing is used with equally splendid results under flooring and as a substitute for roofing boards. Used under floors, it serves as a sound deadener and keeps out dampness; used under the shingles, it keeps out summer heat.

ITS MANY USES—Bishopric Sheathing also is used with excellent results as a lining for dairy barns, ranch houses, poultry houses, driving stables or any out-door building where protection from the elements, Summer or Winter is desired.

Bishopric Sheathing is the ideal material for cement exterior or stucco work. Cement firmly adheres to the laths and Asphalt Mastic and makes a solid, smooth exterior. For factory or residence this form of cement or stucco construction is the cheapest and best known.



Shows Bishopric Sheathing over rafters ready for Bishopric Roofing, also Weather-boards over Bishopric Sheathing.



Ideal home showing Weather-boards over Bishopric Sheathing, lath side exposed, also Bishopric Roofing over Bishopric Sheathing. (smooth side of sheathing exposed)

PRICE SHEATHING AND SHIPMENT — Crate of 16 sheets, covering 256 square feet of surface, $6, or $2.35 per square of 100 square feet, f. o. b. New Orleans, La., Cincinnati or Alma, Mich. We ship from nearest point.

Write for Descriptive Booklet and Samples of Bishopric Wall Board, Bishopric Sheathing and Bishopric Roofing—All will be sent free.

The Mastic Wall Board and Roofing Manufacturing Co., 27 East Third Street CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PAINE LUMBER CO., LTD.

OSHKOSH, WISCONSIN, U. S. A.

These Plants Produce TWO-THIRDS of All



We Make Everything in Mill

OUR SPECIALTY

Korelock Veneered Doors

Cost but a little more than Pine

WRITE FOR CATALOGUE C

Whenever You See a Korelock Joint Think

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

PAINE LUMBER CO., LTD.

OSHKOSH, WISCONSIN, U. S. A.

the Standard Veneered Doors Used in the World



work in Any Kind of Wood

OUR SPECIALTY

Korelock Veneered Doors

Birch and Oak Doors Ready to Ship

WRITE FOR CATALOGUE C

of Paine Lumber Co. — The Originators

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Antifriction Ball Tip Butts

(Patent Pending)

Strongest, Best and Cheapest Antifriction Butts Made

GUARANTEE OF QUALITY STAMPED ON EVERY BUTT

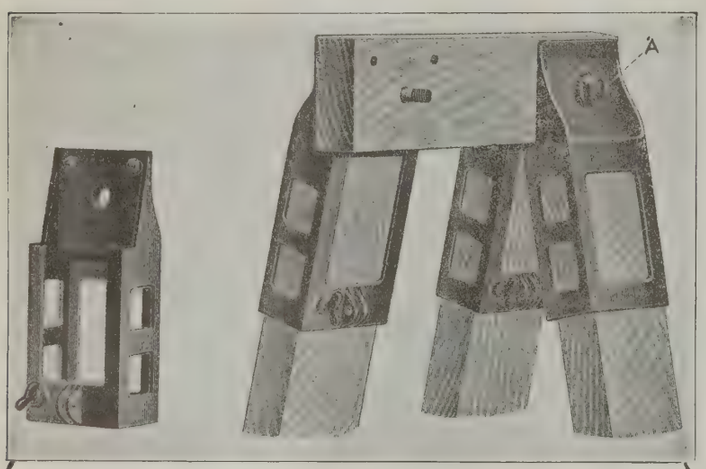
FURNISHED IN ALL STANDARD FINISHES

Makers of Strap and T Hinges, Barn Door Hangers and Track

McKINNEY MFG. COMPANY

WRITE FOR NEW 1911 CATALOGUE

Pittsburgh, Pa.



G. & M Trestle Irons

(Patented Aug. 25, 1903)

Made of best quality malleable iron, it is non-breakable, light and portable.

By removing bolts **A** trestle will fold together for convenience in transportation from one job to another or from one room to another. Also for storage purposes no space is lost.

G. & M. Trestle Irons enable anyone with saw and auger bit to set up trestle in 1-5 the time it takes a mechanic to make an ordinary trestle.

No planing required. Timbers 2x4 in the rough are all that are required.

For Sale by

ORR & LOCKETT HARDWARE Co

Established 1872

14-16 W. Randolph St.
CHICAGO

Also Agents for the **Acme Floor Scraping Outfit, Buck Bros.' Chisels, Barnes Foot Power Woodworking Machinery, Jennings Take Down Squares, Job Pugh Hand Made Auger Bits.**

Send for our Catalog A of CEMENT TOOLS.

Miller's Two Minute Lever Lock Mortiser

Chisels the opening for Locks and is the greatest time and labor saver



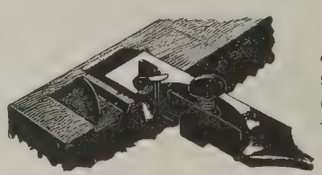
One builder wrote us last month: "You may expect an order for 3 machines as the carpenters are going crazy about my machine. The more I use it, the better I like it."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

are sent on trial to any reliable contracter and builder. Write for circulars and order now for spring work.



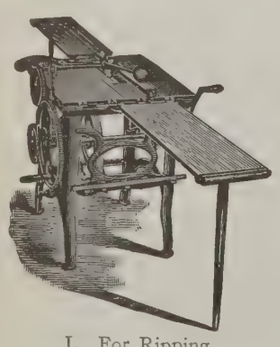
We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs and similar work—which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

Nevada Building, CINCINNATI, OHIO

Western Office, RIVERSIDE, CAL.

Carpenters! Builders!



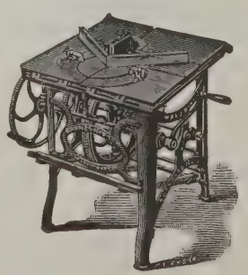
I. For Ripping.

Our new foot and hand power Circular Saw No. 4, the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

Solid Iron Table Planed Perfectly True.

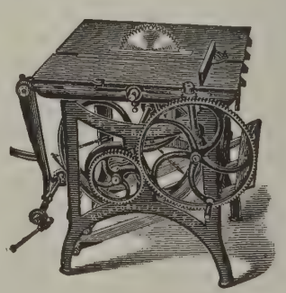
COUNTERSHAFT IF DESIRED.

Send for Our New Catalogue.



III. With Universal Mitre Gauge.

Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, etc.



II. For Cross Cutting.

W. F. & JOHN BARNES CO.

436 Ruby Street, ROCKFORD, ILL.

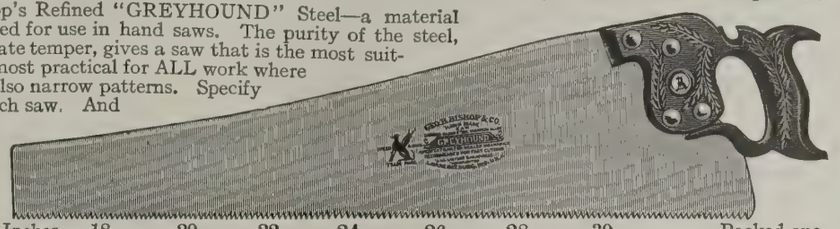
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

GREYHOUND HAND SAWS

SPEED & EASE
TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

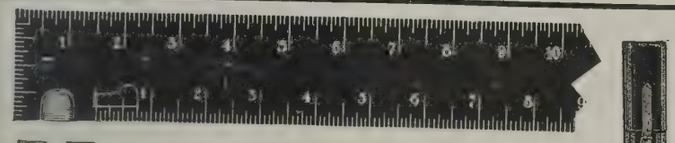
They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		in a Box

Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana

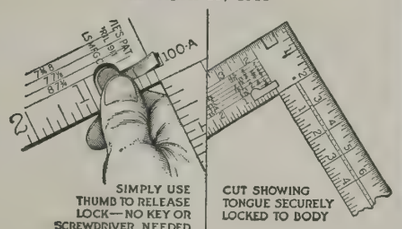






Pat. April 23, 1911

Spring



Locking Device, Pat. Applied for.

NICHOLLS NEW TAKE-DOWN SQUARE

Guaranteed Accurate and to Remain So

The main feature of our new Take-Down Square is that it will always stay true. It is so constructed that the tongue is held down into beveled bearings by a spring, and these bearings are made so as to take up the constant wear which comes in taking square apart and putting it together, thereby producing constant accuracy. Rust-proof canvas case with each square.

OUR NEW LOCKING DEVICE securely locks Tongue to Body and prevents Tongue from slipping out.

Does not lock with a key such as other makes of Take-down Squares, but is simply operated with the thumb.

No running to your Tool Box for a key, or "I forgot the key and left it home." NO KEY TO LOSE. ALWAYS READY. ALWAYS ACCURATE.

If your dealer does not handle our tools and will not order them for you, write us. We have something to offer. **We prepay express if ordered direct.**

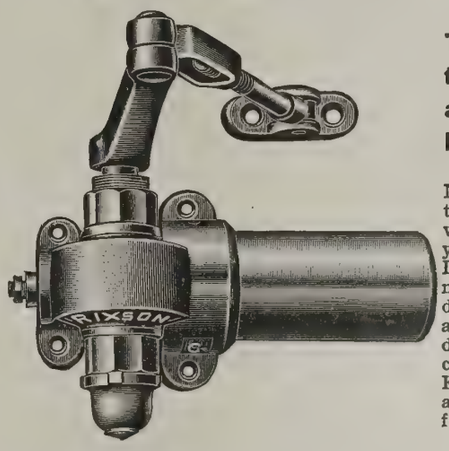
THE No. 100A HAS THE OCTAGON FRAMING RULE ON BACK

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

Add ten cents to the price of the No. 100R and 100A if 1¾ inch tongue is desired.

NICHOLLS MFG. CO., Ottumwa, Iowa

BE THE FIRST MAN IN YOUR TOWN



To Go After the Door Check and Spring Business

Now is the time to get the orders and do the work. We can supply your wants for the Best Door Check and Spring made—and for any size door. This Door Check and Spring will keep the door from slamming—close it so tight it will KEEP out THE COLD—and make a warm profit for you.

We carry the Largest Assortment of Builders' Hardware in the country. Let us show you

FREE Our illustrated catalog and net price list to contractors and material men. When sending for catalog please state whether you are a contractor, carpenter, or material man.

(We do not sell to contractors in Cook County, Ill.)



No. 1642 Storm Sash Hangers. Per dozen sets.....70c

REHM HARDWARE CO.
1503 BLUE ISLAND AVE.
Chicago, Ill.

No. 8 "Union" Combination Saw



A well-built light power machine, at a low cost. Has a wide range for work. Will rip stuff up to 3½ inches thick, also cut-off, miter, and with attachments, bore, edge-mould, grove, dado, etc.

The No. 8 Union Saw may be easily connected to electric motor or gasoline engine and complete outfit mounted on skids to move from one job to another.

Send for Catalogue A, describing our complete line of Foot, Hand and Light-Power Wood-Working Machinery.

THE SENECA FALLS MANUFACTURING CO.
629 Water Street **Seneca Falls, N. Y., U.S.A.**

275

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Advantages of a Portable Woodworker

Especially the "FAMOUS"

Stop hauling your millwork to the machine-shop—and hauling it back. Bring your machine-shop to your millwork! It's cheaper—and the saving goes into **your** pocket.

The FAMOUS Portable Woodworker is really a movable machine shop. When you've completed your contract on one job, move the machine to the next. Seven useful woodworking machines—practically all that a contractor requires—are combined into one. And a gasoline engine, complete with belting, is included in the outfit.

A Remarkable Machine

Combining all the remarkable features of the FAMOUS Universal Woodworker—over eight hundred, of which are in use—our Portable Woodworker is a real boon to contractors everywhere. Surfacing and edging, boring, band-saw work, ripping and cutting-off, sanding—all these, and more can be done on this machine **right at the place where your work is!** No planing-mill delays and **no unnecessary expense.**

The FAMOUS Portable Woodworker is mounted on skids and can be moved around without any trouble. A wheeled truck can also be furnished. The engine is three horse power, and batteries and belting come with it. This is by far the best proposition today in woodworking machinery. Write for full details.

The Sidney Tool Co.

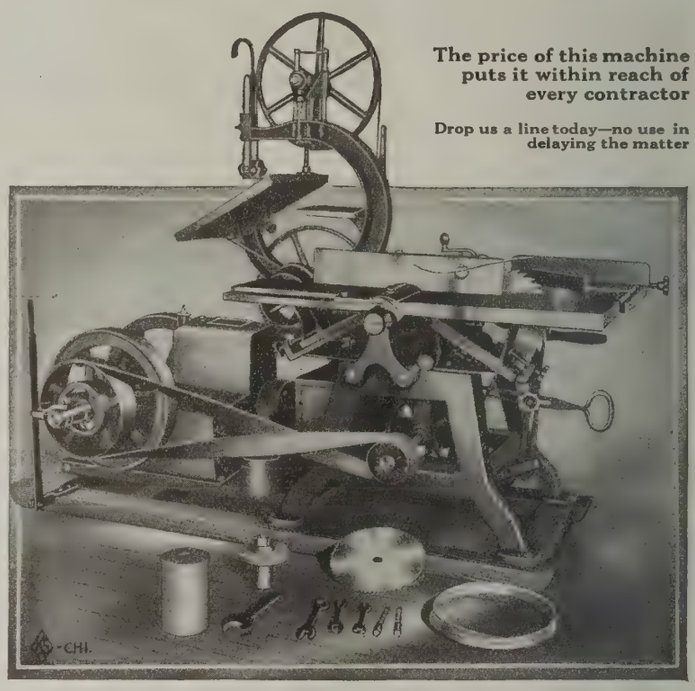
Sidney, Ohio

Several Woodworking Machines Combined in one

The machines embraced in the FAMOUS Portable Woodworker are:

- 8″ Jointer
- 20″ Band Saw
- Saw Table (carrying a 14″ saw blade) with raising and lowering arbor.
- Mitering Attachment
- Cut-off and Ripping Gauge
- Disc Sander
- Emery Grinder

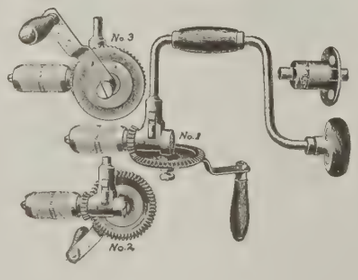
3 H. P. Gasoline Engine, Batteries — All Necessary Belting



The price of this machine puts it within reach of every contractor

Drop us a line today—no use in delaying the matter

You Can Drill a Straight Bore 1 Inch From Wall With This



DRILL BRACE No. 192

The gear, as shown by illustration, is attached or detached by a turn of a thumb screw, but what is not shown is that when set it is as rigid as if keyed on. Its possible adjustment to three positions gives the user 100% efficiency in any corner or in any position or angle.

The ratchet is an improved device, so arranged that both dogs can be thrown out of mesh, at the same time allowing free operation of drill gears.

With drill gear detached, the brace is our regular 10″ Sweep Tool with all its patented improvements—universal chuck, taking all sizes and shapes of shanks, patent ratchet, non-splitting, free acting center handle and ball-bearing head.

This Drill Brace looks and works better than the description sounds

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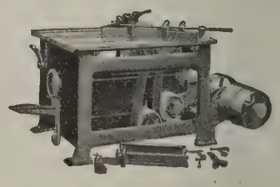
Have you read "TOOL PRACTICE," our free Booklet?

Millers Falls Co. 28 Warren Street NEW YORK

Woodworking Machinery

H.B. SMITH MACHINE COMPANY, SMITHVILLE, N.J.

Smith Combination Cross Cut Rip Saw and Dado Machine



Saw or Dado Head is brought into work by a foot treadle. Operator's hands are free to guide material, which necessarily increases capacity of workman and capacity.

The Head Stock carrying the saw arbor, operating on rollers having ball-bearings, moves easily and accurately on the ways.

The ways are adjustable for depth of cut.

The countershaft is attached and equipped with a tight and loose pulley, permitting the use of an endless belt.

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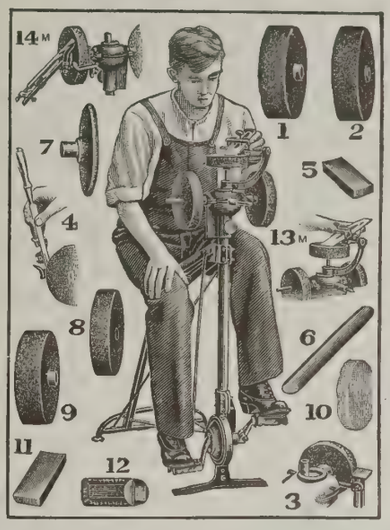
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SHARPENS ALL TOOLS AND CAN BE USED AS A TURNING LATHE, JIG AND RIP SAW, SANDER, POLISHER, ETC.

Will not draw temper

Luther Hummer Tool Grinder

30 days free trial



10 Times More Efficient Than Emery—25 Times Faster Than Grindstone

We want you to prove by 30 days' free trial of this machine how it saves lots of money, increases the amount of work accomplished and makes your work amazingly more easy. The Hummer makes it but a few moments' work to do the most difficult job of tool grinding, and with the patent tool rests your apprentice can do it as well as a high-priced mechanic. **Your tools will always have the proper edge,** and keen tools mean at least 20 per cent more work accomplished with a hundred per cent less effort. As a tool grinder alone it is a big profit maker, but it saves and earns money in other ways—as a jig saw, rip saw, sander, polisher, drill, etc.

Bevel Gear Shaft Drive, Angle Steel Frame, Ball Bearing, Gravity Feed Lubrication, Dust-Proof Bearings

The Hummer will last a lifetime—no chains to break or to be ground to pieces by dust and grit from the wheels. Its construction embraces 26 basic patents. It has 30 different attachments, which make it the most serviceable, easiest-running tool grinder ever built. ***It will outlast any number of grindstones or emery wheels.*** Engine power can be applied, but it runs 4,000 revolutions per minute by foot power as easily as pedaling a bicycle down hill. The angle iron frame is absolutely rigid, nothing to get out of order or wear out. ***The time it saves in tool sharpening, and the more and easier work it does, pays for the Luther Hummer over and over.*** But it saves money in still other ways.

Dimo-Grit—"The Wheel for Steel"

It saves tools. The Dimo-Grit wheels on the Hummer cut hardest steel as emery does soft copper. Dimo-Grit peels steel away in tiny shavings. It does ***not wear*** it away like emery or the grindstone—does not ***heat*** up the tool, requires no cooling with water, and there is ***no danger of drawing temper from tools.*** Few tools are ever worn out. They come to early old age by grinding. You will be surprised at the longer time Dimo-Grit wheels will make your tools last. Dimo-Grit is the latest artificial diamond abrasive, a twin product of Carborundum, but especially suitable for steel. Carborundum wheels furnished if desired.

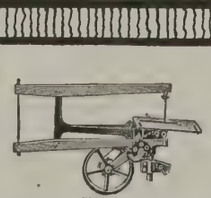
Thirty Days' Free Trial

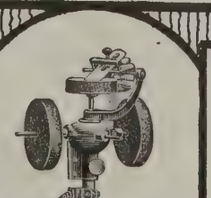
Either for the shop or the individual tool-user this Luther Hummer Tool Grinder is a big economy—a real money saver—a money maker. ***Prove*** it. It means money in your pocket to prove it, and ***we will let you prove it by 30 days' free trial, on your own work, on your own tools.*** Write today for 30 days' Free Trial Offer and 40-page illustrated booklet showing the many uses for the Hummer and the numerous ways it saves money. Write today for free trial offer and Free Booklet.

Luther Grinder Mfg. Co., 119 Stroh Bldg., Milwaukee, Wis.

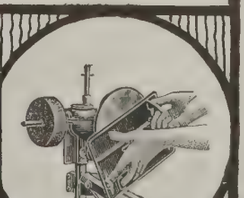

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Surfacing Iron

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Oak Flooring

Attracts your attention immediately and holds your admiration permanently.

Every **builder, owner** and **investor** should use OAK FLOORING, because its natural beauty combined with its **economical** and **durable** qualities makes it the **King of Flooring.** Any truthful landlord or architect will tell you that OAK FLOORING **increases the renting** and **selling values** of any building more than any other kind of flooring.

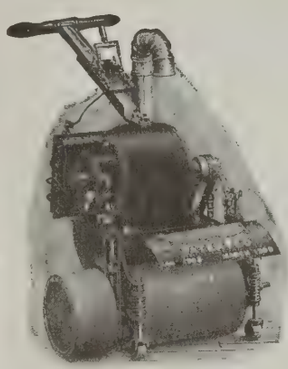
OAK FLOORING will harmonize with any kind of trim, furniture or color decoration, and is susceptible to any kind of finish. In color, it is **rich** and **cheerful,** and imparts an air of **refinement** and **elegance** to a home.

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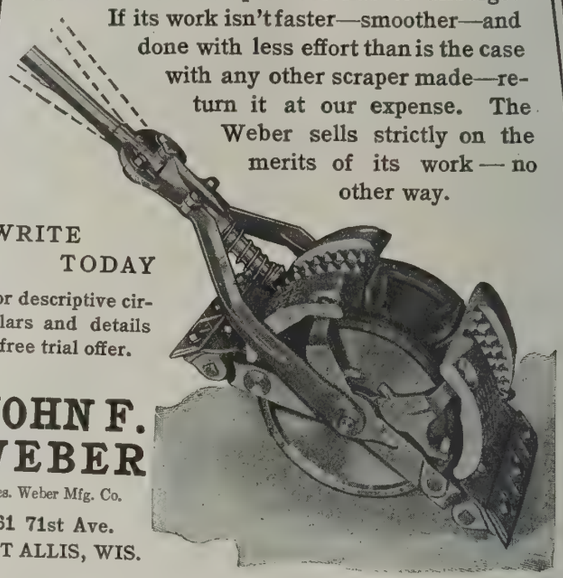
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The WEBER DOUBLE ACTING Floor Scraper

Be satisfied. Be sure you are. Know beyond question that the scraper YOU buy is good sterling quality—every inch of it. That's the Weber, but

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5 days free, then you'll know. Give it the hardest test a scraper ever has to undergo. If its work isn't faster—smoother—and done with less effort than is the case with any other scraper made—return it at our expense. The Weber sells strictly on the merits of its work — no other way.



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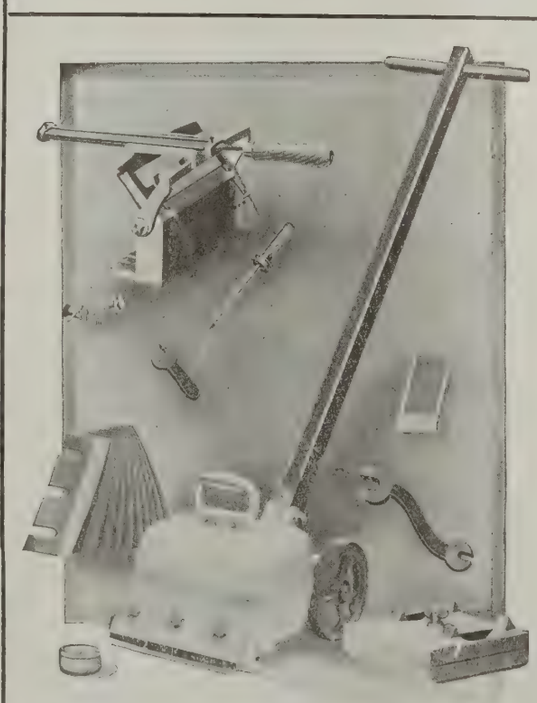
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The Acme Floor Scraping Outfit

and if the results are not satisfactory, box up the machines and send them back to me, and you will owe me nothing.

To any responsible contractor or carpenter I make this offer:

> "I will ship the **Acme Floor Scraping Outfit** to your address on one week's free trial. You can work with the machines and test them out in every possible manner, and if at the end of the seven days you are not satisfied with the results, just return the outfit at my expense."

Thousands of contractors have accepted this liberal offer during the past five years and have convinced themselves of the labor-saving possibilities of my equipment. If you have not investigated, then the time to do so is now. Don't put it off any longer, but write me to-day for booklet and full particulars.

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Burmite

Reg. U. S. Pat. Off.

The Material of Strength, Beauty and Service For ROOFING and SIDING

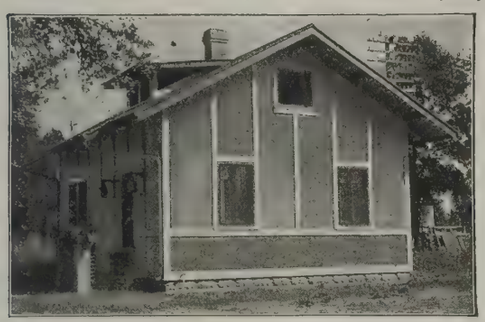
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Practical—Durable—Artistic—Inexpensive

It has perfect water-proofing qualities, and great resistance to all destructive agencies, INCLUDING FIRE.

To become acquainted with this up-to-date material, send for samples and Booklet (NB)



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If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



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Pearl and Main Streets

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WE WANT TO SEND YOU A SAMPLE

We want every carpenter and builder and home owner in America to know about and to have a sample of

UTILITY WALLBOARD



It is to your interest to have this sample and to become thoroughly familiar with this remarkable material.

Utility Wall Board marks the greatest advancement that has been made in interior building construction in a hundred years.

It is made of fibre—very hard and tough and durable. It is waterproofed on both sides. Being a non-conductor, it is largely heat and cold and sound proof.

It is very easily put on—nailed right to the studding and takes the place of both lath and plaster.

It is the only wall board on which you can safely use wall paper. At the same time it lends itself admirably to tinting and stenciling, or other forms of decoration. Made in various widths and lengths to meet all requirements of interior finishing.

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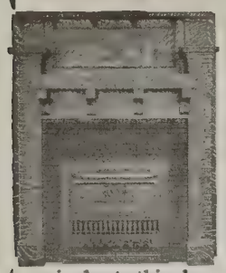
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This Quarter-Sawed Oak Mantel, $27



Called No. 1142. Height, 6 ft. 1 in.; width, 4 ft. 10 in. Wall plates to 5 ft. Pilasters 6½ in. Tile opening, 42x42 in. Profile, 5 in. Stock finish, golden polish, but we can match or give other finish without additional charge, including best coal grate, summer front, ash pan, tile facing and 18in. hearth (you can have enameled or dull finish tile), also hooks and plates for fastening to wall.

Best Gas Grate instead of Coal Grate..... $30.30

Or No. 1143 with French Bevel Plate Mirror, instead of wood panel, **$3.00** additional.

Mail us your order, inserting price, and be surprised at this bargain. **Special booklet displaying similar bargains** mailed **FREE** upon request.

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Finials and Weather Vanes

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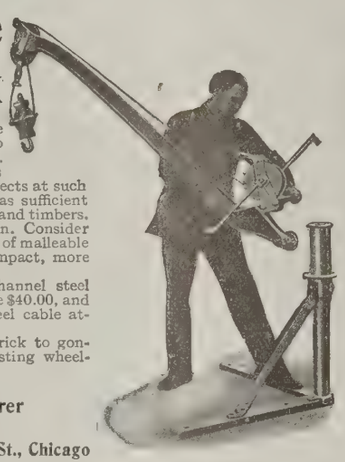
Our line of stock designs is very complete in style and size, and finial bases can be readily changed to fit the shape and pitch of any tower at slight additional cost.

Estimates promptly furnished on special designs.

Complete illustrated catalog mailed on request.

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Derrick complete with three way block, channel steel brackets, bolts for attaching to building, price $40.00, and four and one-half cents per ft. for crucible steel cable attached. Drum capacity 300 ft.

Special platform and chains for attaching derrick to gondola railroad cars, price $15. Chains for hoisting wheelbarrows, price $2.00.

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Taylor Portable Steel Derricks
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The Buckeye Electric Blue Printing Machine

Will eliminate all delays, making your blue prints at a moment's notice regardless of weather conditions. So simply and thoroughly constructed that a boy or girl can operate it, producing perfect prints at a cost of ½ cent per sq. ft. It is the most efficient and lowest priced machine on the market.

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ALWAYS READY FOR INSTANT USE

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Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

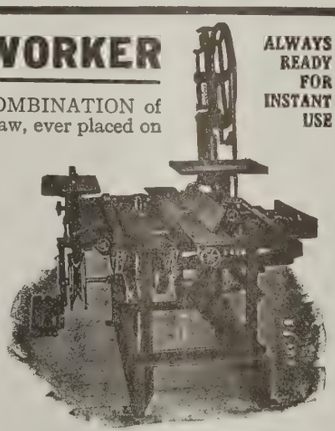
Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws.

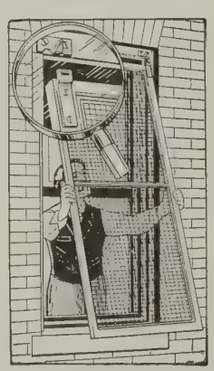
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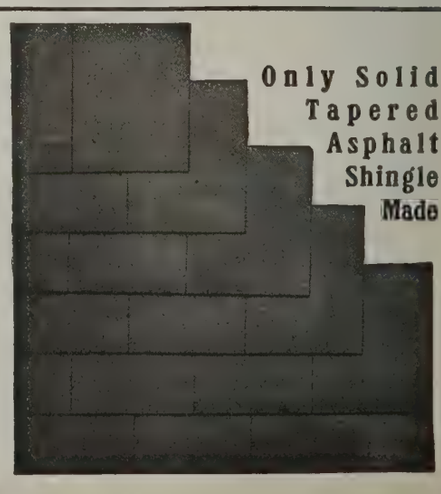
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And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

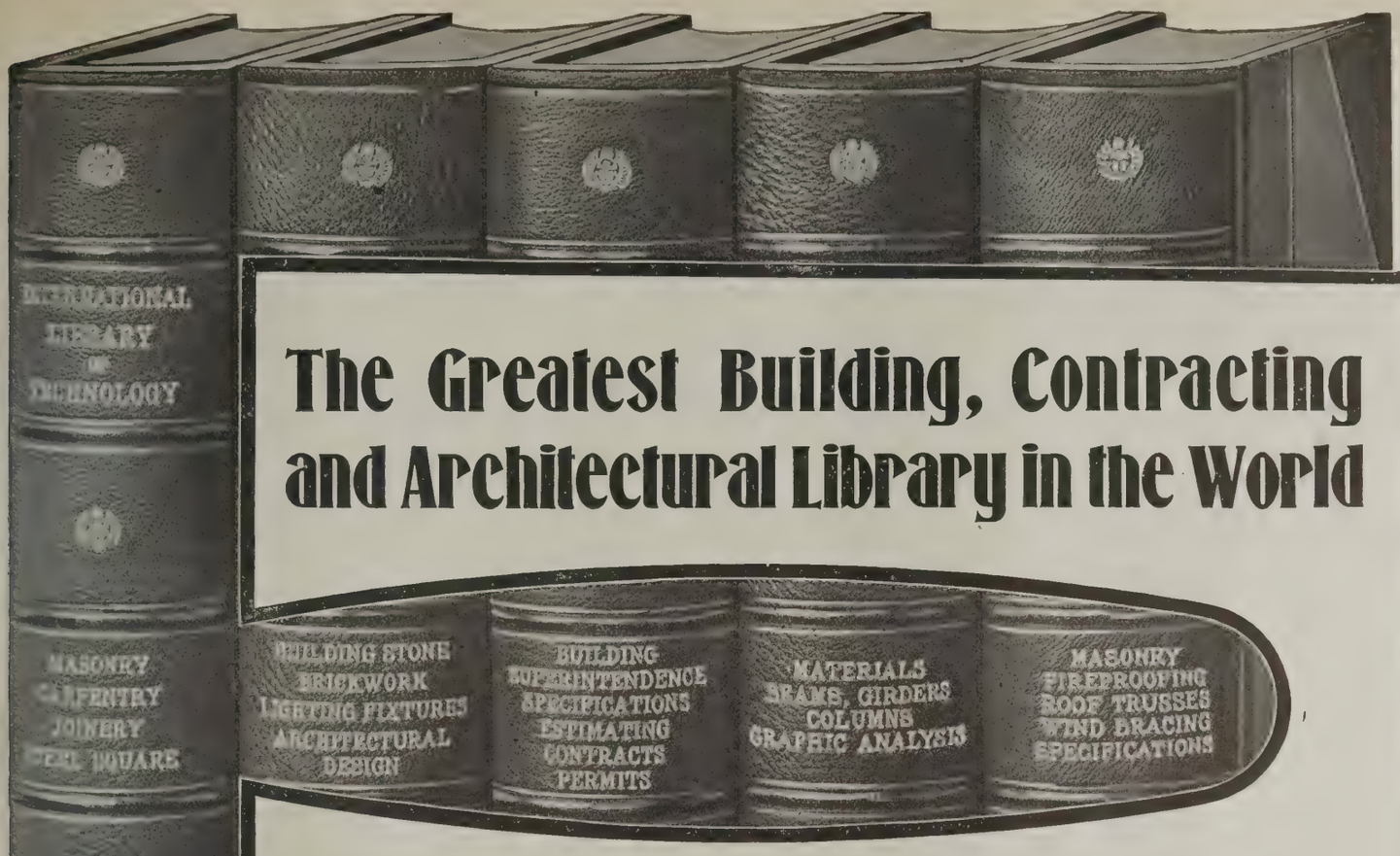
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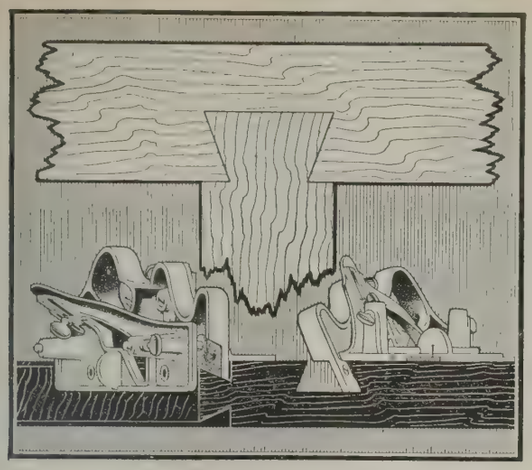
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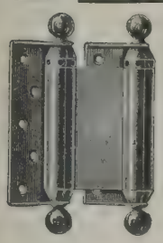
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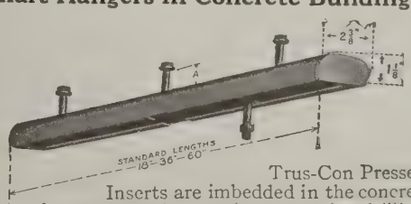
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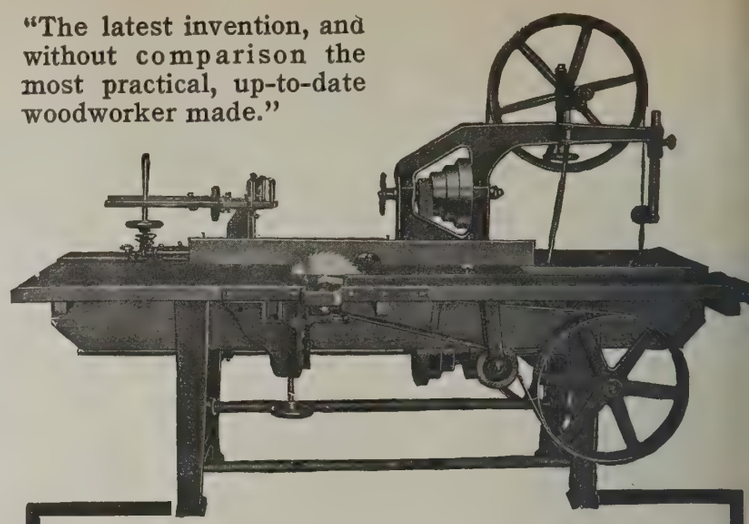
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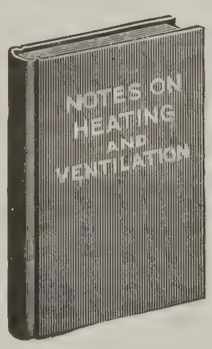


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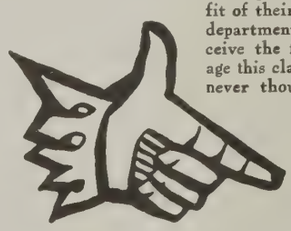
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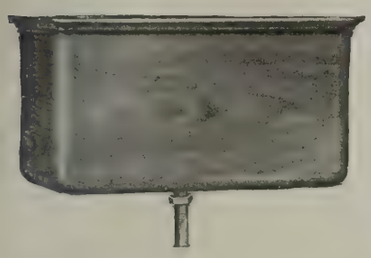
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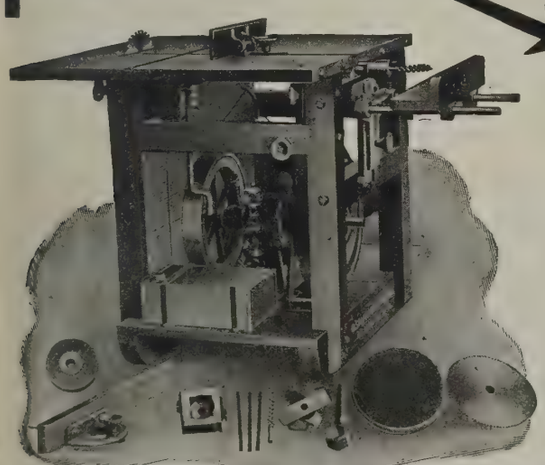
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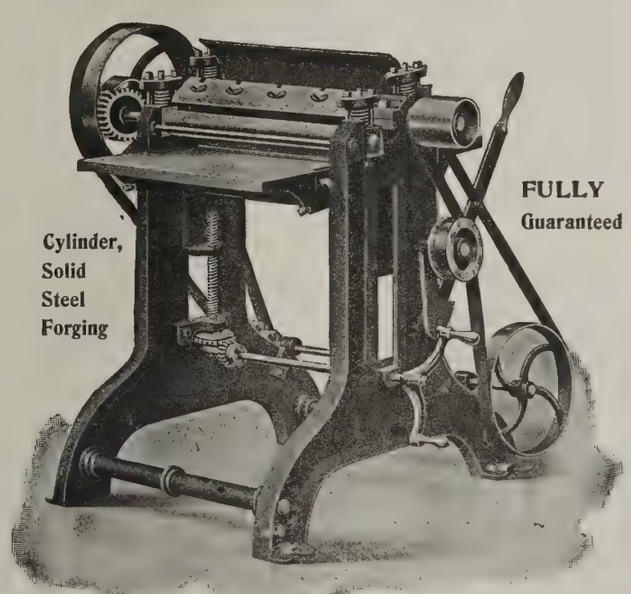
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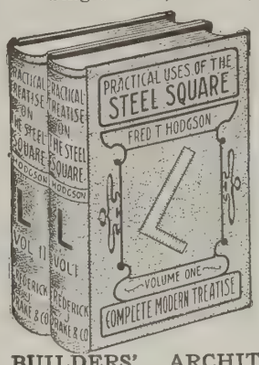
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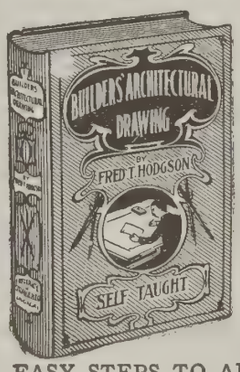
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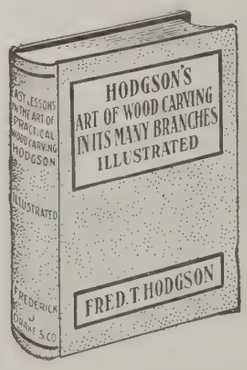
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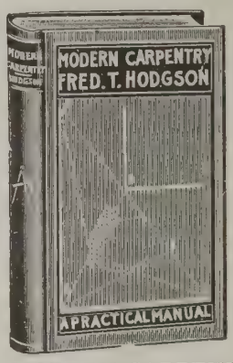
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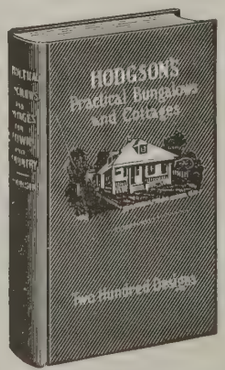
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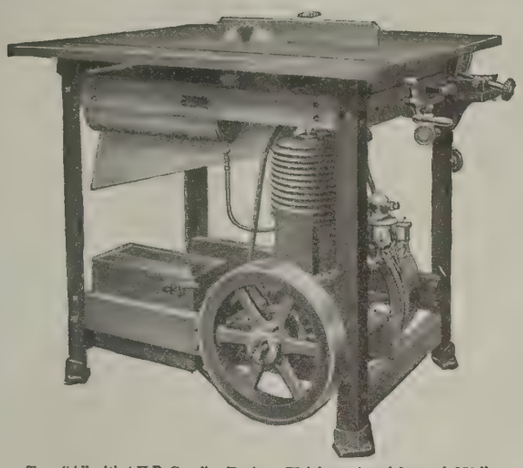
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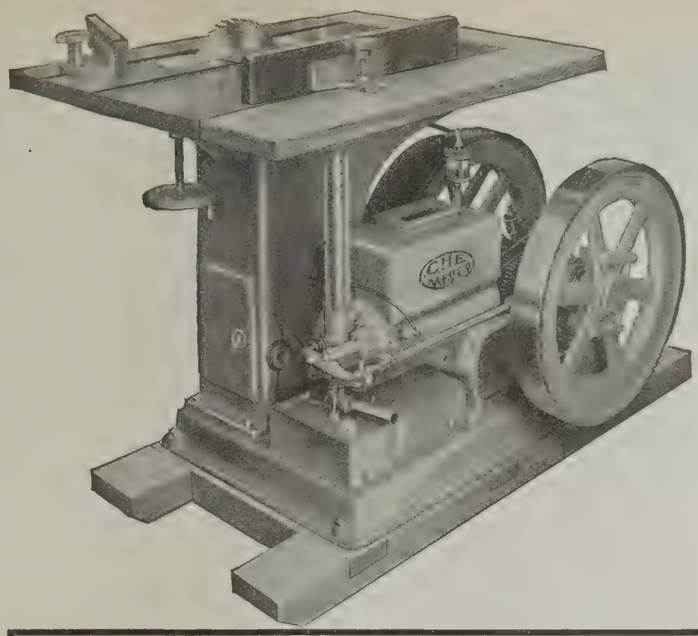
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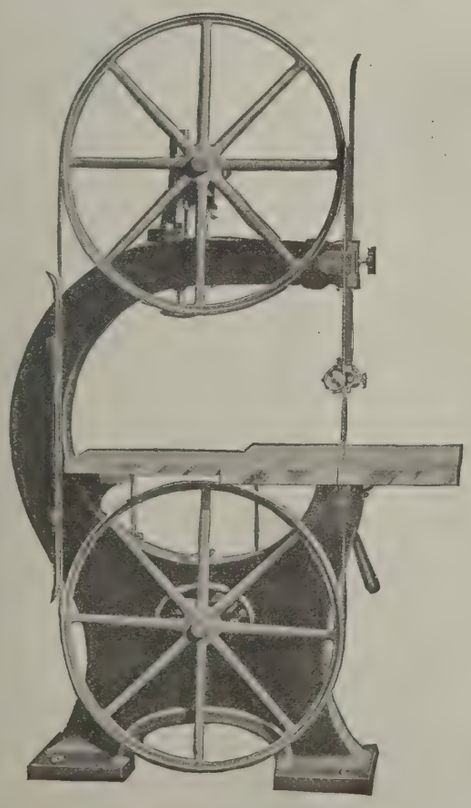
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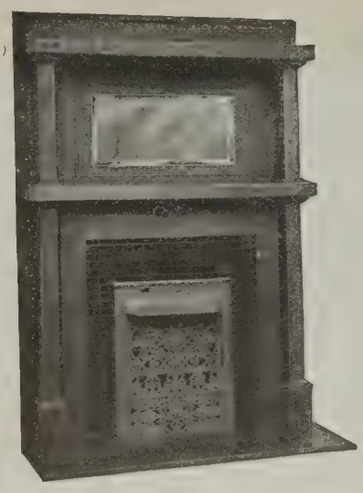
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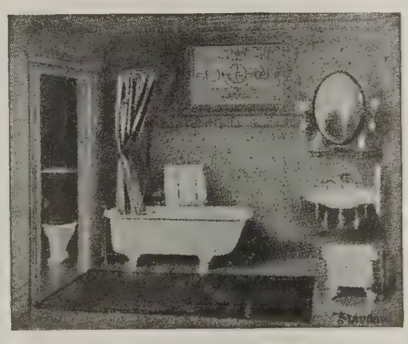
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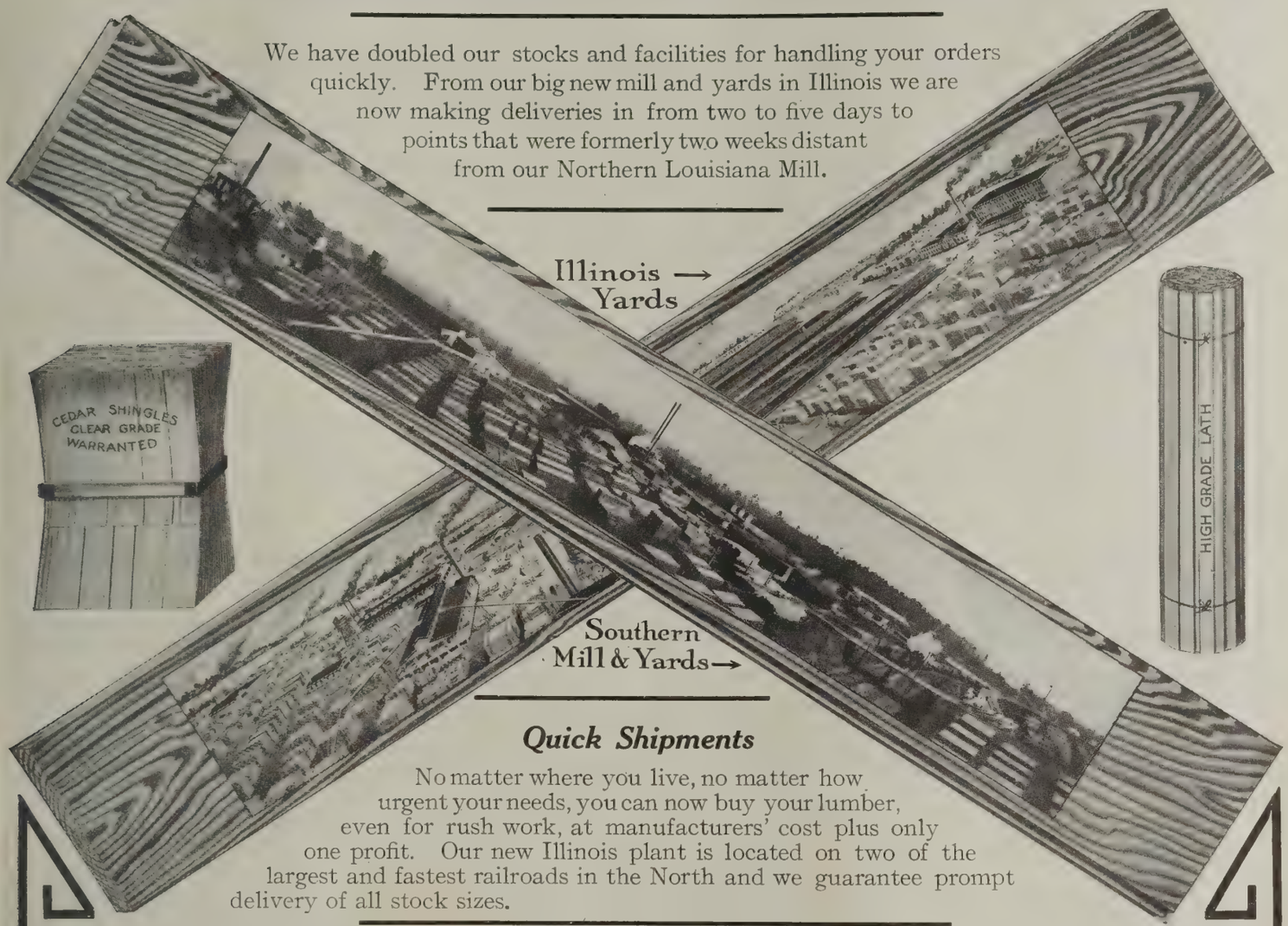
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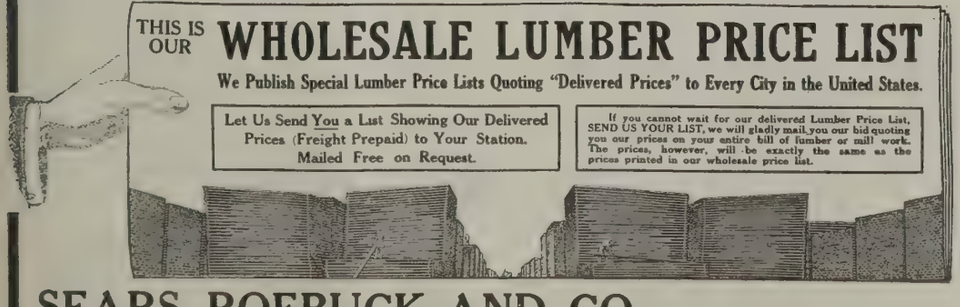
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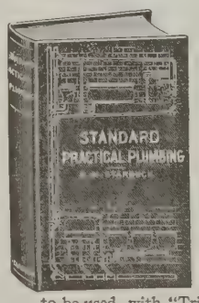
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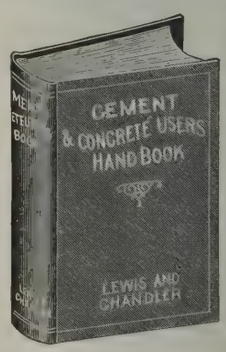
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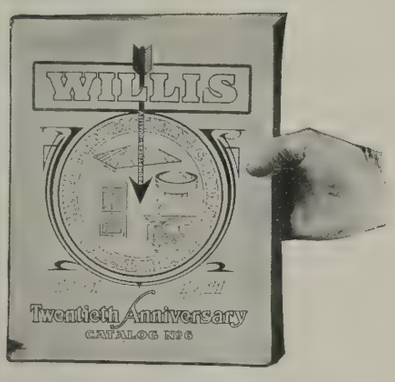
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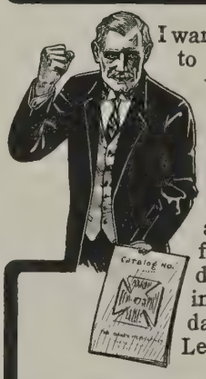
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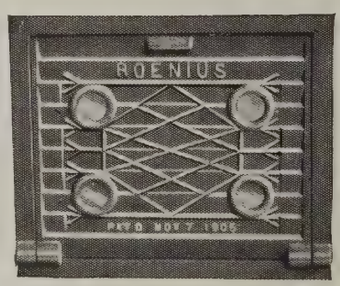
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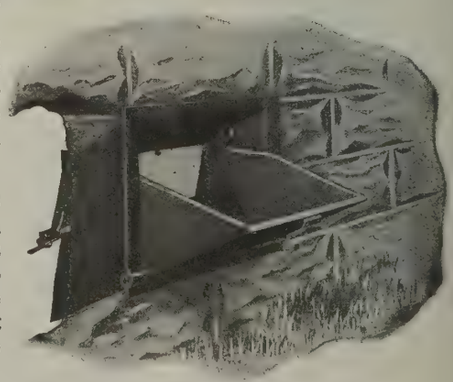


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Concrete Machinery, Tools and Molds of all kinds.



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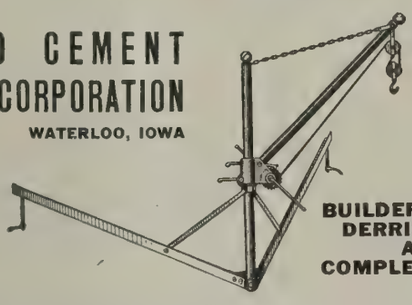
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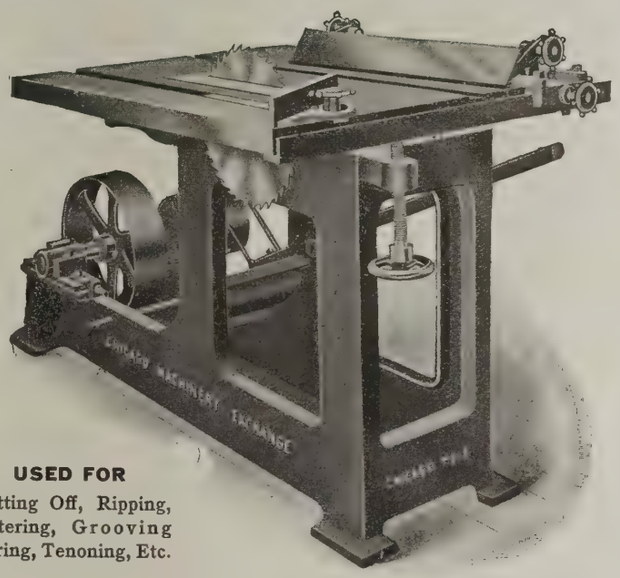
Send for Catalogue B

THE ASHLAND STEEL RANGE & MFG. CO.

ASHLAND, O.

MASHLAND MIXER

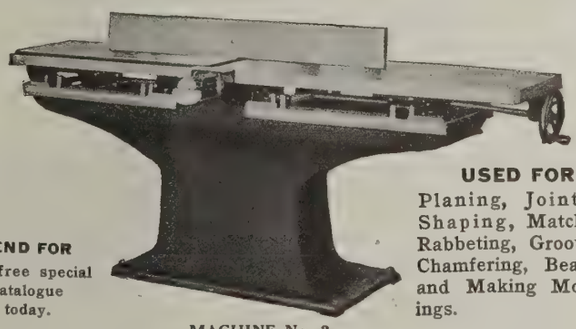
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These two machines are always ready for work without any changing. They are a big bargain at $170.00. This price includes belt for saw arbor, countershafts, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼in., 5-16in., ⅜in., ½in ¾in.—and pair of jointer knives. Ask for price on one if you cannot use both.



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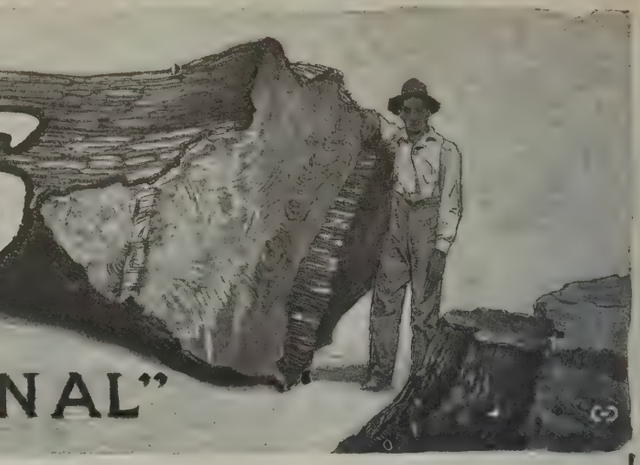
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HE WHO USES CYPRESS BUILDS BUT ONCE

CYPRESS



"THE WOOD ETERNAL"

CYPRESS DEFIES DECAY

SO MANY PEOPLE KNOW
so little about woods
(and their relative values — How is it with you?)

CYPRESS LASTS PRACTICALLY FOREVER

SO MANY PEOPLE THINK

that "LUMBER IS LUMBER"—(How often do YOUR CUSTOMERS *specify the kind* of wood they want you to use?)

SO MANY PEOPLE BELIEVE

THAT FREQUENT *REPAIR BILLS* ARE *"NECESSARY EVILS"*

that we believe we are doing a public service in informing BOTH BUILDERS AND THEIR CLIENTS on

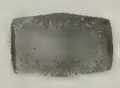
CYPRESS

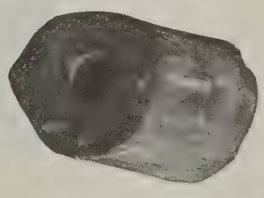
("THE WOOD ETERNAL")

HERE IS CYPRESS *VS.* AN IRON PLUG:

About 110 years ago, when Louisiana was a French Province, the Water Mains of New Orleans were CYPRESS logs, 18 feet long by 22 inches diameter, with a 5-inch hole bored lengthwise. These were joined by short iron tubes, tapered at both ends. A few years ago these were replaced by the most modern system. Below is a photograph of a section of one of the CYPRESS mains just as it was dug up—as sound as ever after 100 years contact with wet earth.

Below is a photograph of one of the iron connections just as dug up—most of them rusted past all usefulness.

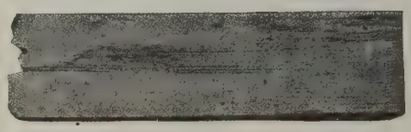




HERE IS CYPRESS *VS.* WEATHER:

A photograph of a CYPRESS SHINGLE from the Austen Homestead, Staten Island, N. Y., built in 1710, and at last accounts still occupied by descendants of its original builders, with the original CYPRESS roof practically intact.

"He who uses CYPRESS *builds but once."*



CYPRESS is in truth "the wood eternal." If you are putting up a palace or a pasture-fence, and want to build it "FOR KEEPS"—USE CYPRESS. ***USE CYPRESS.*** **USE CYPRESS.**

There will continue to be a liberal education (and a wonderful INVESTMENT value for *everyone*) in this CYPRESS advertising —and in the detailed information and reliable counsel to be had promptly *WITHOUT COST*, if you will *WRITE US YOUR OWN NEEDS* (big or little), and *ASK YOUR OWN QUESTIONS* of the **"ALL-ROUND HELPS DEPARTMENT."**

Send at once for list of 32 VOLS. of the famous CYPRESS POCKET LIBRARY. Any (or all) volumes FREE to you in a hurry for your reliable guidance on "THE WOOD everybody is asking about."

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

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Probably your lumberman sells CYPRESS; if not, WRITE US, and WE WILL TELL YOU THE DEALER HANDIEST TO YOU

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UNCLE SAM SPEAKS ANOTHER GOOD WORD FOR

"THE WOOD ETERNAL" **CYPRESS** *"THE WOOD ETERNAL"*

Department of Agriculture, Forest Service, Bulletin 95, Page 44, issued June 30, 1911, says of *Cypress:*

"The properties which fit it for such wide use are the freedom of the wood from knots and other defects . . . and the *long period which the wood may be expected to last.* To this might be added handsome appearance, which frequently has much to do with popularizing a wood."



Further on CYPRESS, the same Government Report says: "The wood contains little resin and thus affords *a good surface for paint,* which it holds well . . . It is a popular wood where it is subjected to dampness and heat. It shrinks, swells or warps but little . . . For the parts of houses exposed to the weather it serves equally well."



Both quotations above are from Bulletin 95 (page 44), U. S. Dept. of Agr. (Forest Service), June 30, 1911.

"The Money You Don't Have to Spend on Repairs is ALL PROFIT."

When planning new improvements or repairs to old ones, just remember—*"With CYPRESS you BUILD BUT ONCE."*

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It takes an E. C. S. Keen Kutter Special Slim Taper File to make a good job of a fine tooth saw. From the start these files are made expressly for this work. They reach the bottom of the teeth no matter how fine, and cut true and quickly without a stutter or jump.

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Special Slim Taper Files

are accurately cut by unerring machinery on blanks of the best tool steel. Special tempering gives them unequalled hardness and toughness. Every tooth is of the same depth; every file is inspected and tested before leaving the factory, and is fully guaranteed. A set of these files should be included in every mechanic's kit.



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It has been compiled by experts and will show you the one best way to get the best results from every kind of a saw. There is nothing of greater importance than a correct knowledge of the proper care and use of tools, among which the saw, to give the best results, demands the most expert attention. You should write for your free copy today. It will give you a better knowledge of the diseases and proper treatment of saws. Send postal for Saw Points Booklet No. 7.

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STAIN AND PRESERVE YOUR ROOFS

A handsomely stained roof gives distinction to the commonest house, and the rich, velvety moss-green and tile-red shades of

CABOT'S Shingle Stains

not only beautify the shingles, but thoroughly preserve them. They are made of Creosote, "the best wood preservative known," and the finest and strongest colors, ground in linseed oil. They cost half as much as paint, can be applied at half the labor cost, and are suitable for shingles, siding, and other exterior woodwork. *You can get Cabot's Stains all over the country. Send for samples and name of nearest agent.*



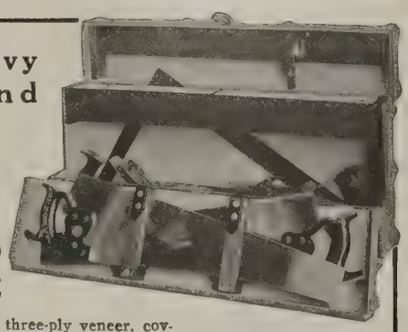
Stained with Cabot's Shingle Stains
Train & Williams, Architects, Los Angeles, Cal.

SAMUEL CABOT, Inc., Manfg. Chemists, Boston, Mass. 350 Dearborn Av., Chicago

Don't Lug a Heavy Tool Box Around But

CARRY YOUR TOOLS IN THE INDESTRUCTO

CARPENTERS' TOOL CASE

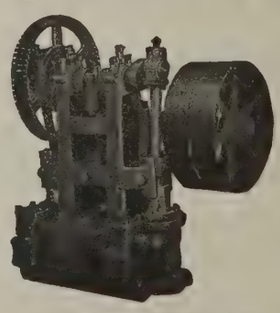


It is made in suitcase style—of three-ply veneer, covered with strong canvas and painted, all edges bound in steel, reinforced corners, secure locks and catches and strong handle. The Indestructo is the handsomest tool case manufactured. It is light, very strong and the inside is so well arranged with separate compartments for saws, planes, level, square, chisels, bits, etc., that the cutting edges can not be injured. Tools can be quickly found and put away. It is made in two lengths, for 26 and 28 inch saws. Special sizes to order. Send for prices.

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Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

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Hand and Power Pumps for All Uses

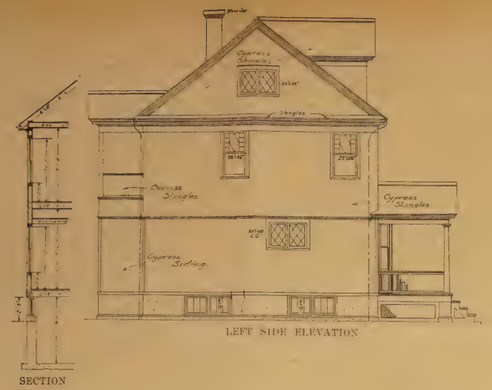
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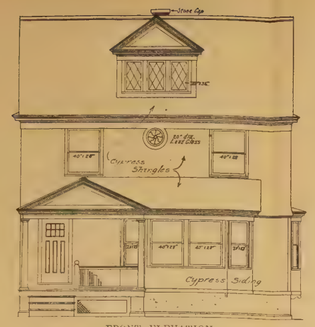


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SECTION

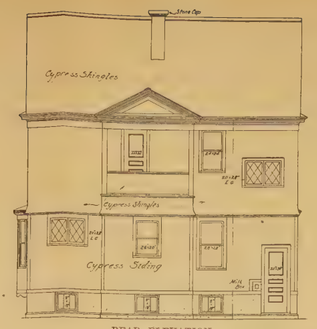
LEFT SIDE ELEVATION



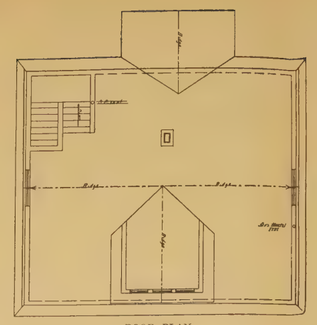
FRONT ELEVATION



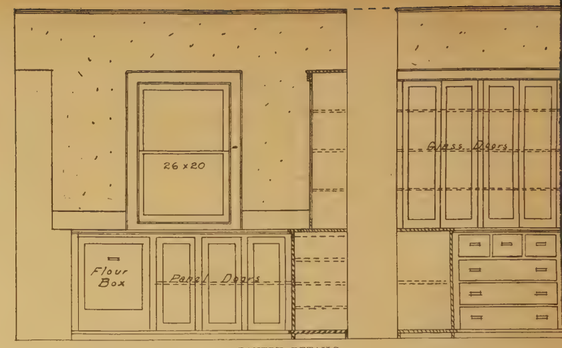
RIGHT SIDE ELEVATION



REAR ELEVATION



ROOF PLAN



PANTRY DETAILS

SUPPLEMENT TO

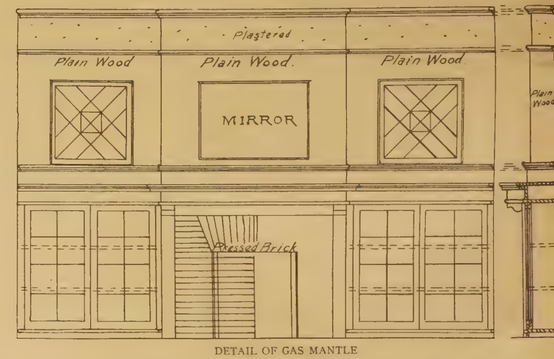
THE NATIONAL BUILDER

NOVEMBER, 1911

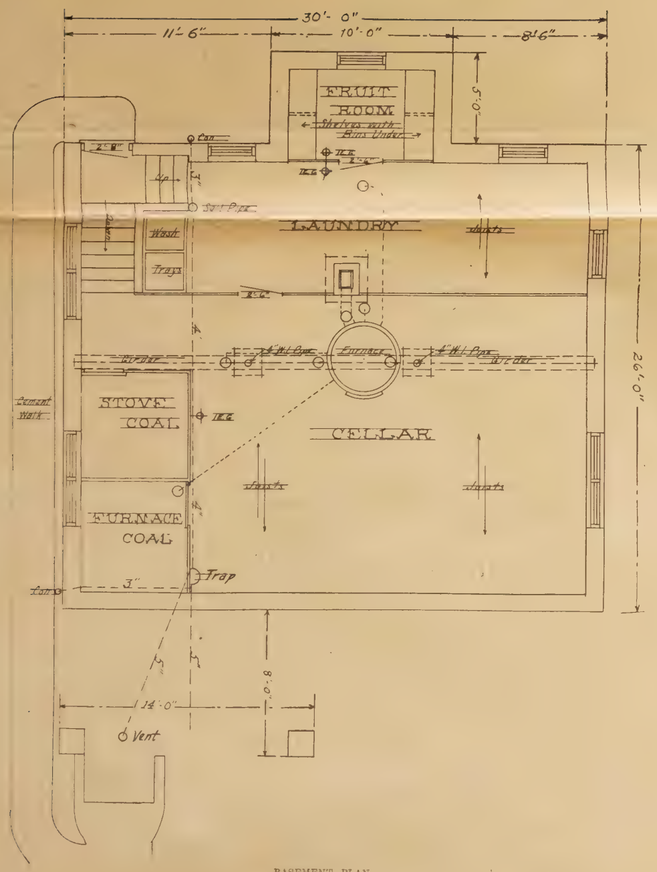
NATIONAL BUILDER DESIGN No. 347, THE CYPRESS SHINGLE HOUSE No. 2

SCALE FOR FLOOR PLANS, ¼ INCH EQUALS 1 FOOT. SCALE FOR ROOF PLAN AND ELEVATIONS, ⅛ INCH EQUALS 1 FOOT. DETAILS, ¾ INCH EQUALS 1 FOOT.

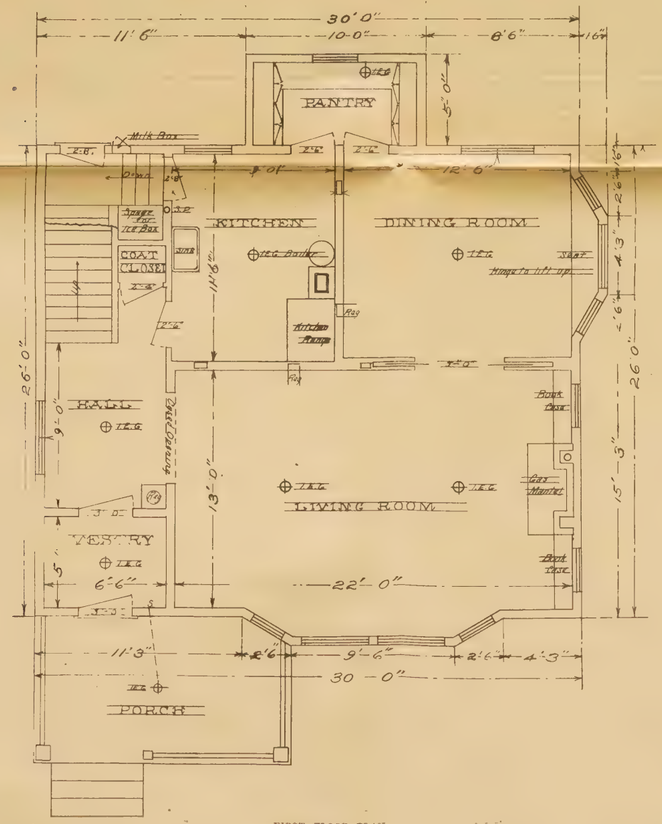
FOR ESTIMATE, SEE PAGE 29



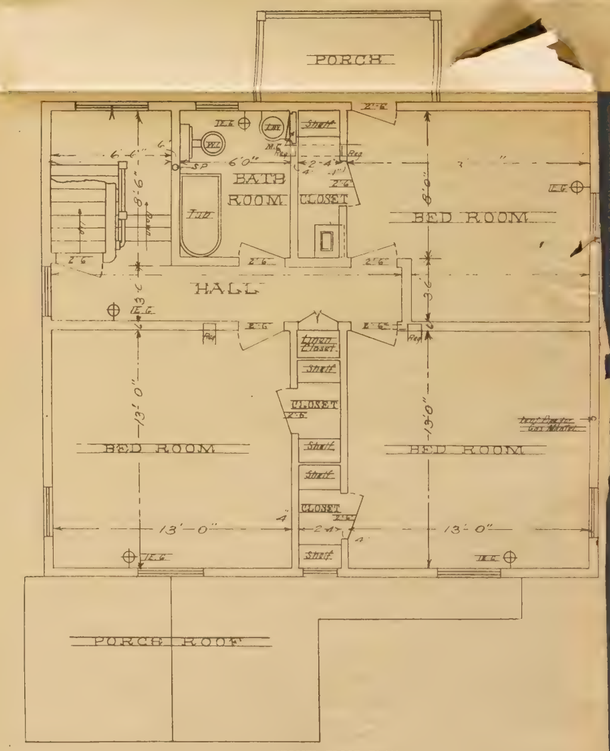
DETAIL OF GAS MANTLE



BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

THE NATIONAL BUILDER

Vol. 52 CHICAGO, NOVEMBER, 1911 No. 11



THE CYPRESS SHINGLE HOUSE No. 2 built at Rochester, N. Y.*

NATIONAL BUILDER DESIGN No. 347

Frank L. Wadsworth, Architect, Rochester, N. Y.

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $3,911.41

Note That This House was Built from Plans Reversed.

Estimate of the CYPRESS SHINGLE HOUSE No. 2

By I. P. HICKS

EXCAVATING AND MASONRY.

184	yards excavating, 35c	$ 64.40
90	yards cement cellar floor, 50c	45.00
39	lineal ft. 8x12 flue chimney, $1	39.00
1,150	cubic ft. concrete foundation wall, 25c	289.00
	Chimney cap	2.00
	Total excavating and masonry	$439.40

LUMBER BILL.

		Feet
3	6x8x10 ft. girder	120
2	6x6x26 ft. sills	156
4	6x6x16 ft. sills	192
3	6x6x10 ft. sills	90
25	2x8x14 ft. first floor joists	475
25	2x8x12 ft. first floor joists	400
4	2x8x10 ft. first floor joists	54
30	2x8x12 ft. second floor joists	480
6	2x8x14 ft. second floor joists	115
20	2x8x12 ft. second floor joists	320
28	2x6x14 ft. ceiling joists	392
32	2x4x12 ft. ceiling joists	252
8	2x8x16 ft. porch joists	168
6	2x8x10 ft. porch joists	81
46	2x6x18 ft. rafters	748
16	2x6x16 ft. rafters	256
176	2x4x18 ft. outside studs	2,112

*Materials figured at Omaha prices. Carpenter labor figured at 40 cents an hour.



LIVING ROOM.

120	2x4x16 ft. partitions and plates	1,320
20	2x4x10 ft. porch	130
8	2x6x14 ft. porch	112
20	2x4x16 ft. dormers, etc	220
30	1x6x12 ft. No. 1 cornices	180
20	1x4x10 ft. No. 1 cornices	64
16	1x4x12 ft. No. 1 cornice backing	64
	Total feet dimension	$8,501
8,501	ft. framing lumber at $27	$229.52
2,300	ft. 8 in. Y. P. lap, rough floors, $27	62.10
2,600	ft. 10 in. Y. P. sheathing, outside walls, $27	70.20
1,450	ft. 6 in. Y. P. sheathing, roofs, $27	39.15
30	m. clear cypress shingles, 4	120.00
1,250	ft. ½x4 inch cypress siding, $32	40.00
1,060	ft. star Y. P. flg., attic, $30	31.80
300	ft. ⅜x2¼, face maple flg., $60	18.00
1,900	ft. ⅜x2¼ face plain R. oak flg., $85	161.15
150	ft. 1x4x8 ft. clear fir flg., $45	6.75
68	ft. 1x4x16 ft. clear fir flg., $45	3.06
150	ft. ⅝x4x8 ft. clear fir ceiling, $32	4.80
68	ft. ⅝x4x10 ft. clear fir ceiling, $32	2.17
340	lineal ft. 1x12x12 to 16 ft. cypress finish cornice, $45	15.30
340	lineal ft. 1x10x12 to 16 ft. cypress finish, $45	12.78
340	lineal ft. 1x6x12 to 16 ft. cypress finish, $45	7.65
120	lineal ft. 8 inch cypress finish, $45	3.60
80	lineal ft. 4 inch cypress finish, $45	1.18
300	lineal ft. lattice, 60 cents	1.80
24	lineal ft. 1⅛x12x12 ft. cypress finish, $50	1.20
	Total lumber bill	$832.21

MILL WORK.

4	cellar wd. frames, 8x18, 3 lt., $2	$ 8.00
3	twin wd. frames, 8x18, 3 lt., $4	12.00
10	cellar sash, 8x18, 3 lt., $1.50	15.00
2	cellar dr. frames, $2.25	4.50
2	cellar drs., 2 ft. 6 in. x 6 ft. 6 in., 1⅜, $2.40	4.80
5	twin sash frames, 20x28, $3	15.00
2	sash frames, 24x24, $1.50	3.00
1	triple sash frame, 20x36	4.80
1	window frame, 24x24, 2 lt	2.25
1	window frame, 26x20, 2 lt	2.25
1	window frame, 28x28, 2 lt	2.25
4	window frames, 28x26, 2 lt., $2.25	9.00
1	window frame, 38x28	2.50
2	window frames, 20x28, $2.25	4.50
2	window frames, 40x28, $2.50	5.00
1	window frame, 40x28	5.00
2	window frames, 20x28, $2.25	4.50
1	circle frame, 20 in. L	3.00
10	sash, 20x28, leaded, $2.50	25.00
2	sash, 24x24, leaded, $2.50	5.00
3	sash, 20x36, divided, $2.75	8.25
1	window, 24x24, 2 lt	1.75
1	window, 26x20, 2 lt	1.75
1	window, 28x28, 2 lt	2.50
4	windows, 28x26, top divided, $3	12.00
1	window, 38x28, 2 lt	3.00
4	windows, 20x28, 2 lt., $2	8.00
4	windows, 40x28, 2 lt., $3.50	14.00
1	circle sash, 20 in., leaded	2.50
2	porch columns, 8x8x8 ft., $3	6.00
1	porch newel, 5x5x4 ft	1.00
1	piece porch rail top, 14 ft., 6 cents	.84
1	piece porch rail top, 8 ft., 6 cents	.48
1	piece porch rail, bottom, 8 ft., 6 cents	.48
1	piece porch rail bottom, 14 ft., 6 cents	.84
66	balusters, 1¾x1¾x20 inch, 4 cents	2.64
340	ft. 3½ inch crown mold, 2 cents	6.80
420	ft. 2 inch bed mold, 1 cent	4.20
200	ft. 1½ inch bed mold, ¾ cent	1.50
100	ft. ⅞ cove mold, ½ cent	.50
80	ft. quarter round, ½ cent	.40
2	brackets, 50 cents	1.00
120	ft. lineal, 1⅛x6 in., outside base, 3 cents	3.60
1	O. S. door frame, 3 ft. 0 in. x 7 ft. 0 in., 1¾ in	3.00
1	O. S. door frame, 2 ft. 8 in. x 6 ft. 8 in., 1⅜ in	2.50
1	set door jambs, 3 ft. 0 in. x 7 ft. 0 in., cypress	.90
1	cased opening, 5 ft. 0 in. x 7 ft. 0 in., cypress	1.00
1	set jambs, sliding doors, cypress	2.00



DINING ROOM.

2	sets jambs, 2 ft. 8 in. x 6 ft. 8 in., cypress, 80 cents	1.60
11	sets jambs, 2 ft. 6 in. x 6 ft. 8 in., cypress, 70 cents	7.70
1	sets jambs, 2 ft. 4 in. x 6 ft. 8 in., cypress	.70
1	O. S. door frame, 2 ft. 6 in. x 6 ft. 8 in., cypress	2.50
520	ft. inside base, 3 cents, cypress	15.60
520	ft. floor mold, ½ cent	2.60
330	ft. picture mold, 1½ cents	4.95
1	door, 3 ft. 0 in. x 7 ft. 0 in., 1¾, front	18.00
1	vestibule door, 3 ft. 0 in. x 7 ft. 0 in., 1⅜	16.00
3	doors, 2 ft. 8 in. x 6 ft. 8 in., 1⅜, $3.50	10.50
1	door, 2 ft. 6 in. x 6 ft. 8 in., 1⅜	3.00
11	doors, 2 ft. 6 in. x 6 ft. 8 in., 1⅜, $3	33.00
1	door, 2 ft. 4 in. x 6 ft. 8 in., 1⅜	2.75
2	sliding doors, 2 ft. 6 in. x 7 ft. 0 in., 1¾	10.00
80	plinth blocks, 8 cents	6.40
768	ft. casing, 12 ft. doors, 2 cents	15.30
320	ft. casing, 10 ft. windows, 2 cents	6.40
310	ft. head casing, 2 cents	6.20
310	ft. cap mold, 2 cents	6.20
310	ft. fillet, ½ cent	1.55
96	ft. window stool, 2 cents	1.92
96	ft. apron, 2 cents	1.92
448	ft. window stops, 1¼ cents	5.60
360	ft. door stops, 1½ cents	4.80
	Front stairs	52.00
	Attic stairs	15.00
	Basement stairs	12.00
	Mantel and book cases	100.00
	Pantry cases	40.00
	Medicine case	6.00
	Total mill work	$641.03

CARPENTER LABOR.

8,500	ft. framing lumber, $10	$ 85.00
6,350	ft. sheathing, $10	63.50
30	m. shingles, $2	60.00
1,250	ft. siding, $1.50	18.75
1,060	ft. attic floor, $1.50	15.90
2,200	ft. main floors, $2.00	44.00
2,200	ft. smoothing, $1.50	33.00
218	ft. porch floor, $1.50	3.27
218	ft. porch ceiling, $1.50	3.27
330	lineal ft. cornice, 12 cents	39.60
	Porch work, front	18.00
	Porch work, rear	12.00
	Cellar windows	10.00
	Cellar doors	4.00
	Cellar partitions	6.00
	Doors	70.00
	Windows	75.00
520	ft. base, 5 cents	26.00
330	ft. picture mold	4.45
	Front stairs	23.00
	Attic stairs	10.00
	Cellar stairs	6.00
	Pantry work	22.00
	Bookcase work	12.00
	Incidentals, 10 per cent	66.47
	Total carpenter labor	$731.21

RECAPITULATION.

Excavating and masonry	$439.40
Lumber bill	832.21
Mill work	641.03
Carpenter labor	731.21
Hardware	65.00
Tin work	45.00
Plastering 780 yards, 28 cents	216.40
Structural iron	15.00
Plumbing	310.00
Electric wiring	50.00
Painting	220.00
Heating, furnace	160.00
Incidentals, 5 per cent	186.16
Total estimate	$3,911.41

Approximately this house contains 38,000 cubic feet, which makes the cost about 10 1/3 cents per cubic foot.

EDITORIAL NOTES AND COMMENTS

What with floods, fires, railroad wrecks, automobile accidents, losses at sea, deaths from collapse of buildings and defective scaffolds, we would almost be led to believe the earth would soon become depopulated.

The great bulk of humanity takes little or no heed of this continual drain and so it goes on apace, but if a puff of smoke or the crack of a rifle takes place on the coast of Africa, or a few shots destroy the lives of a dozen or more heathen Chinese, the papers blaze it forth to the whole country in striking headlines, and the woes and losses of the Native American are soon overlooked and forgotten, until another flood, shipwreck or railway disaster comes to the front again to remind us that some other natives have been sacrificed by carelessness or greed on the altar of a never satisfied Moloch.

A few weeks ago, a public speaker, Mr. F. H. Schwedtman said that the total number killed, wounded, and missing in the United States in the six bloodiest battles of the Civil War was less than 105,000 men, while the total number killed and injured upon railways during the year ending June 30, 1906, was 108,324.

Notwithstanding this great loss of life and the regular losses occurring daily to working men, by accidents that are continually bringing poverty and untold miseries to thousands of worthy citizens and children, the highest court of New York unanimously annulled a workmen's accident compensation act, which involved the element of compulsion. The act was limited to hazardous trades and required employers to compensate injured workmen or their families regardless of negligence or responsibility for the deaths or injuries; and this was held by the court to constitute the taking of employers' property without "due process of law."

The question now is can the ruling of the New York court obtain in other states? We are inclined to believe it can be rendered in-operative, and that eventually the law of compulsory compensation will be accepted in every state in the Union. Recently the Supreme Court of the State of Washington, passing on a similar cmopulsory compensation act, sustained it as valid, sound and constitutional. The Washington act is also limited to contribute to a fund from which the state disburses fixed payments to injured workmen or families of killed workmen. The Washington court had the New York case and decision before it and very carefully considered the alleged constitutional objections to any kind or scheme of compulsory compensation. It deliberately declared that "It could not yield its consent to the view" taken by the New York court. It agreed with those eminent lawyers, teachers of law, sociologists and economists who severely criticised the New York decision and its technical construction of the phrase "due process of law."

The New York case could not be carried to the United States Supreme Court, but the Washington case can and doubtless will be taken to that tribunal. We may, therefore, look for a thorough and authoritative discussion of the meaning of "due process of law" and the validity of the kind of industrial compensation statutes, now demanded by enlightened public opinion and indorsed by progressive employers.

The old idea, that a workman would injure himself to get a generous compensation, has been found untenable in countries like Great Britain and Germany, where the workers enjoy the most modern legislation in this direction. It has also been found out that while factory inspection results, generally speaking, in protection of machinery after an accident has happened, or in case of very glaring danger, workmen's compensation legislation has resulted in the adoption of the most modern protective devices available, in time to prevent accidents. This is natural, as an employer finds it cheaper to protect his employees than to pay compensation. Surely the reducing of the dangers of employment, the lessening of the number of the maimed and crippled in industry, cannot but meet with the approval of all reformers, who have the welfare of the workman at heart.

The lack of men not only skilled of hand but developed mentally has been a feature of modern industrialism. It is so easy for a mere lad to "get a job" in a shop where he learns only the mechanical part of the trade that the high school or grammar school graduate considers it degrading to start at the bottom with the younger boys. At the same time there is abundant opportunity for those who will combine book knowledge with shop training. Manual training schools were a step in the right direction, and the apprentice system helps, but it was left to Professor Herman Schneider of the University of Cincinnati to devise a plan which would give the student both practice and theory. His plan was first applied to the technical students of his university in such a way that the shops of the city took charge of the practical training and the university taught the theory.

By this method the university is relieved of the expense of laboratories and shops with expensive machinery, which becomes more or less obsolete in a few years. The students receive a practical training which no school could possibly furnish, as they are part of a commercially operated plant, and push and energy are necessary to hold their places in the shop organization.

The system appealed strongly to several manufacturers of Fitchburg, Mass., who recognized the need of a similar school in their city. As a result the Simonds Manufacturing Company, manufacturers of saws and knives; the Fitchburg Steam Engine Company, manufacturers of steam engines; the Bath Grinder Company, manufacturers of grinding machinery; the Blake Steam Pump and Condenser Company, manufacturers of pumping machinery; the Cowdrey Machine Company, manufacturers of special and woodworking machinery; the Putnam Machine Company, manufacturers of lathes, planers, railroad tools and general machinery; the Fitchburg Machine Company, manufacturers of the "Lo-swing" lathe; the Brown Steam Engine Company, manufacturers of steam engines; the Jennison Company, tinsmiths and piping engineers; and the L. H. Goodnow Company, iron founders, arranged with the school authorities to work together in training young men for shop work. On the one hand the city was not obliged to pay out one dollar for the shop training, and on the other hand the manufacturers agreed to pay considerably more than apprentice wages to the students while in the shops. Practically every other week was spent in the shops, and at the end of four years the boy had a trade, had earned on the average eleven cents per hour while working, and was a student at the public schools at the same time. Every boy who wished to could continue his shop work after his four-year course was over, and as he knew just what the shop practice was, he was far better fitted for the work.

For the three years this system has been in operation in Fitchburg there have been few indications that the idea was not a success. Of course, some boys dropped out, as they would out of business, but on the whole the results are such as to warrant an extension of the system. The manufacturer is really getting a chance at the pick of the boys for his shop, drafting rooms, offices, etc., and the boy is contented because he is a man in the shop among men, earning money and learning. The antagonism of some workmen to apprentices is scarcely noticed, for their own boys are frequently candidates for the shop classes. The extension of the Professor Schneider's plan, or the Fitchburg plan, could well be adopted in many other cities and would go far toward settling the industrial unrest which periodically seems to sweep the country. With educated men in the shops and shop-trained men in the office, there would be far less cause for complaints of injustice toward either employer or employe.

The astonishing transformation that can be effected by an intelligent system of afforestation is strikingly illustrated by what has happened in the Department of Lands in France. At the close of the Eighteenth century about 2,500,000 acres in that region were little more than shifting sand dunes and disease-breeding marshes. But the planting of pine trees has made the desert rejoice and blossom as the rose. At the present time these lands are among the richest, most productive, and healthful in all France. Even the character of the climate of the region has been modified, becoming milder and more balmy. A thin layer of clay beneath the sandy upper surface of the soil, formerly impervious to water, has been piereced by the pine roots, until a thorough drainage is established to the spongy earth that lies below.

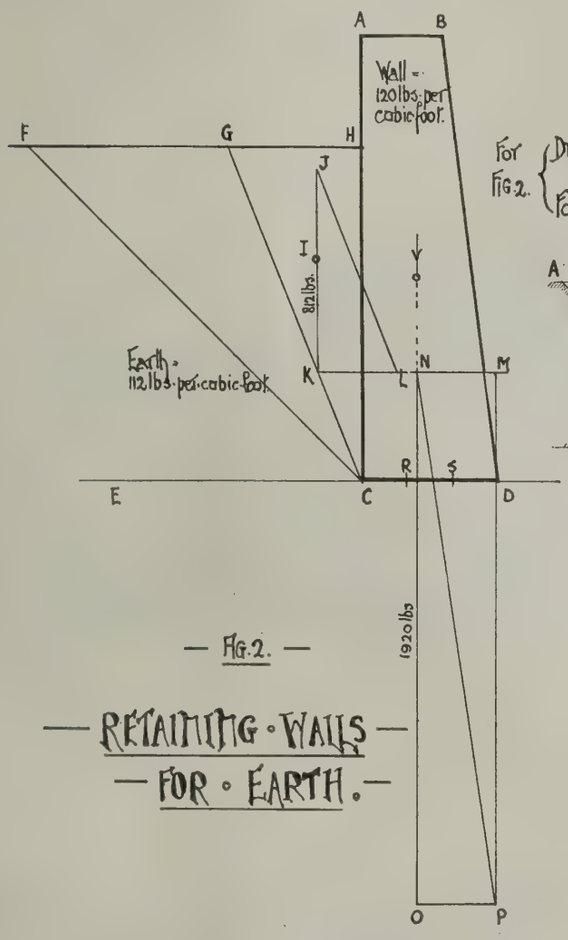
LEAVES FROM A STUDENT'S NOTEBOOK—No. 6

By GEO. METSON

RETAINING WALLS FOR EARTH.

JUST as in designing a dam to retain water, it is easiest to assume the dimensions of the wall, and then to check it for stability by finding the resultant of the forces, so the same system is simplest in dealing with walls to retain earth; but it is first necessary to ascertain the line of rupture, and the maximum of the horizontal thrust.

First dealing with the line or plane of rupture. If earth be tipped from a wagon, it forms a certain natural angle; similarly if a mound of earth is left exposed to the weather, it falls particle by particle until it forms the natural angle of such earth. The angle so formed with the horizontal is called the "angle of repose."



— FIG. 2. —

— RETAINING WALLS — FOR EARTH. —

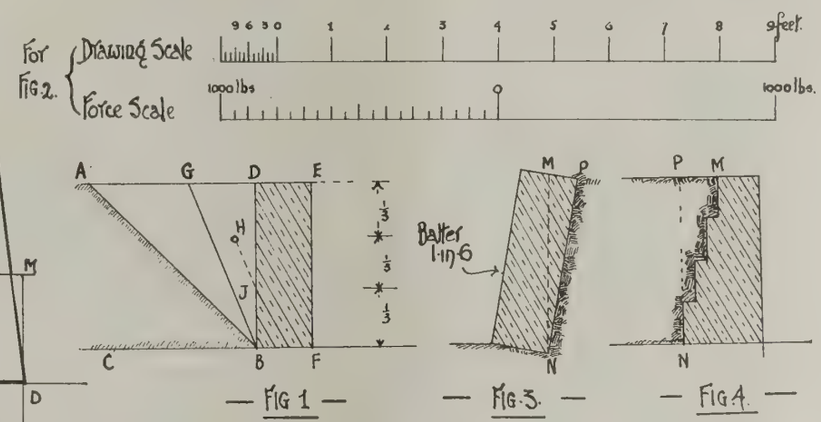
The following table gives the approximate angles of repose, and the weight per cubic foot of various earths.

Nature of soil.	Natural angle of slope with the horizontal line = angle of repose.	Weight per cubic foot in pounds.
Gravel	40°	112
Dry sand	38°	92
Sand	22°	116
Vegetable earth	28°	83
Compact earth	50°	100
Shingle	39°	141
Rubble	45°	153
Clay well drained	45°	112
Clay wet	16°	124

In Fig. ABC is the angle of repose, then ABD is the complement, and if DEFB is the proposed retaining wall it is clear that the earth ABC cannot exert a force on it. It has been established by eminent engineers that the whole of the complement ABD does not exert a force, but that it is the wedged-shape mass between the wall and a line bisecting the complement ABD that tends to break away and overturn the wall. In Fig. 1 this would be GBD. GB is termed then the plane of rupture. If the wedged-shape mass GBD should move, it would slide down this plane, and would act as a wedge on the wall and force it out horizontally.

The force of this wedge GBD will be parallel to the plane and the mass of it can be considered as concentrated at its center of gravity, through which the force will act. In Fig. 1, H is the center of gravity and HJ the line of direction of the force, intersecting the wall at J. This point J is always one-third the vertical distance of the earth up the wall. If the horizontal reaction of the wall at the point J is not equal to the force acting on HJ the wall will overturn.

An example can now be worked out. Let it be required to



— FIG 1 — — FIG 3. — — FIG 4 —

determine the stability of the masonry wall ABCD in Fig. 2, when the earth weighs 100 pounds per cubic foot and its angle of repose is 45°.

First set out the angle of repose 45° = FCE. Bisect its complement FCH to obtain the line of rupture GC. The wedge of earth to be considered is GCH. This mass will act through its center of gravity I. Through I drop G perpendicular to the plane of rupture meetng it in K (always 1-3 up from base); a horizontal line through K will give the direction of the resultant of this force as KL. Draw KJ to represent the weight of the wedge of earth to any convenient scale. Set out the angle KJL equal to the angle GCH (or 90° — angle of repose, divided by 2). JL will cut KL in L; when KL equals the magnitude and direction of the force exerted by the mass of the wedged-shape earth GCH.

The weight of the wall will exert a force through its center of gravity X. From N, where the direction of the force of the wall meets the line denoting the direction of the force of the earth, drop a perpendicular, making NO equal to the weight of the wall (to the same scale as used for KJ). Make NM equal to KL, i. e., to the magnitude of the resultant of the force of the earth, and complete the parallelogram MNOP and join NP which line represents the direction of the combined forces. For the wall to be stable it is generally considered necessary this diagonal should cut the base of the wall within the middle third (R. S. is the middle third of the base in Fig. 2).

The following general notes should be kept in mind.

The batter of a retaining wall should not be too great, otherwise water will find its way into the brick or masonry joints. In any case the wall should be built with cement, and it is best to have a soakage of from 9 to 12 inches in thickness at the back of the wall, formed of gravel, hard coal or other porous substance to allow the water to find its way to the weepholes which should be provided about every 8 feet apart. The weepholes should discharge into a properly formed channel and from there be connected to a proper surface water drain.

Earth that when sodden is practically fluid, must be treated as such, and the wall be calculated for as a dam.

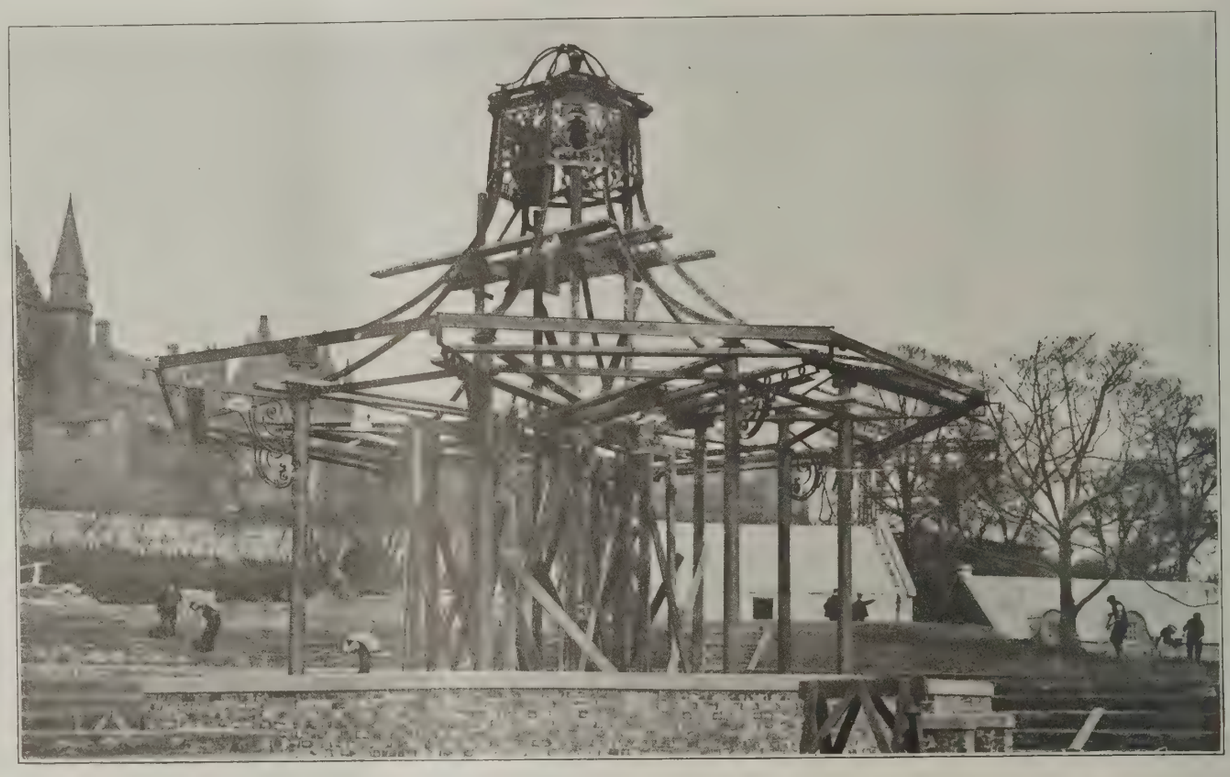
In a retaining wall of the section shown in Fig. 3, in calculating the weight of the wall the portion MNP must not be reckoned. For one of the sections shown in Fig. 4 the weight must be taken as the weight of the wall together with the weight of the earth on the wall side of the line PN.

CONSTRUCTION OF TERRACED BAND STAND

By JOHN F. DUNLOP

THE terrace bandstand which has been erected in Kelvingrove Park for the Scottish National Exhibition and is to remain the property of the Glasgow Corporation has produced fascinating results.

The base of the stand is formed of pressed brick and finished with a red sandstone cope, on the top of which is erected the wrought-iron bandstand.



The choice of the site, which is partly on ground sloping towards one of the carriage drives, is a very happy one, and the whole arrangement is a vast improvement on the old style of bandstand where only a small portion of the audience were able to see what was going on.

Fig. 1 shows the plan of the terrace and Fig. 2, the section in which the various steps have been turned on the end, so as to follow the sloping surface of the ground.

The terrace throughout is of concrete four inches thick, which has been laid on a footing consisting of shapeless ashlar stones and pieces of hard rock, the least fit for cutting, and small fragments of stone, which have been rejected as quarry debris.

The craftsmanship required for this work was perfectly simple for rough labor only sufficed.

The most important part of the constructive feature was the cutting out of the various stages of step on the ground, and the fixing of the timber framing to form the breast of the terraces.

The boarding had to be very securely fixed to prevent bending under the weight of the concrete, and was coated with a strong solution of soft soap to prevent the adhesion of the concrete.

The plastic concrete was made up of Portland cement and broken bricks, which had been well wetted with water before mixing, turned over, and allowed to drain so that the surfaces would be damp, but not wet, when required for use. In mixing the material, after being properly gauged, it was twice mixed in a dry state and was ridged around a central cavity prepared to receive the water, which was applied from a watering can with a hose, and the concrete afterwards mixed twice.

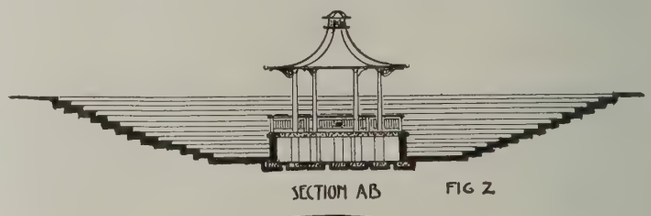
For setting the concrete in position, care was taken that none of it was thrown from a height to prevent the larger and heavier portions becoming separated from the remainder of the falling material and the air included rendering it less compact.

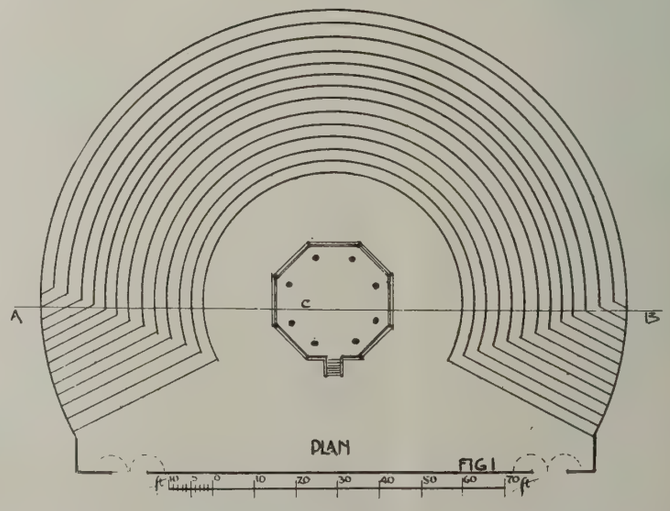
Immediately after the removal of the wood framing, the horizontal and vertical surfaces of the steps were finished with cement, Fig. 3.

The bandstand, which is in the center of the circular gallery, is built on a concrete foundation, the wall being in brickwork built in Flemish bond with asphalt damp-proof course introduced at the ground level.

Internally, the brick piers, which are the main support for the castiron columns supporting the structural iron work of the roof are square in section and are carried up to the underside of the concrete floor.

Fig. 4 shows a detail at *C* in which the construction of the roof is shown. Here modern architecture has progressed and is progressing, only we are allowing our structural engineers to take the lead. It is encouraging, however, that the general outline and design of detail was prepared in this case by an architect and that the whole being composed of ordinary sections of steel placed to-





gether in an artistic manner has given a bandstand which is as characteristic of the material of which it is built as a building in brick, wood, or any other material.

Fig. 5 shows the erection of the structural iron work, the roof trusses which supported the various wood purlins being covered with boarding.

The roof is covered with red composite slates, which have produced a very pleasing effect.

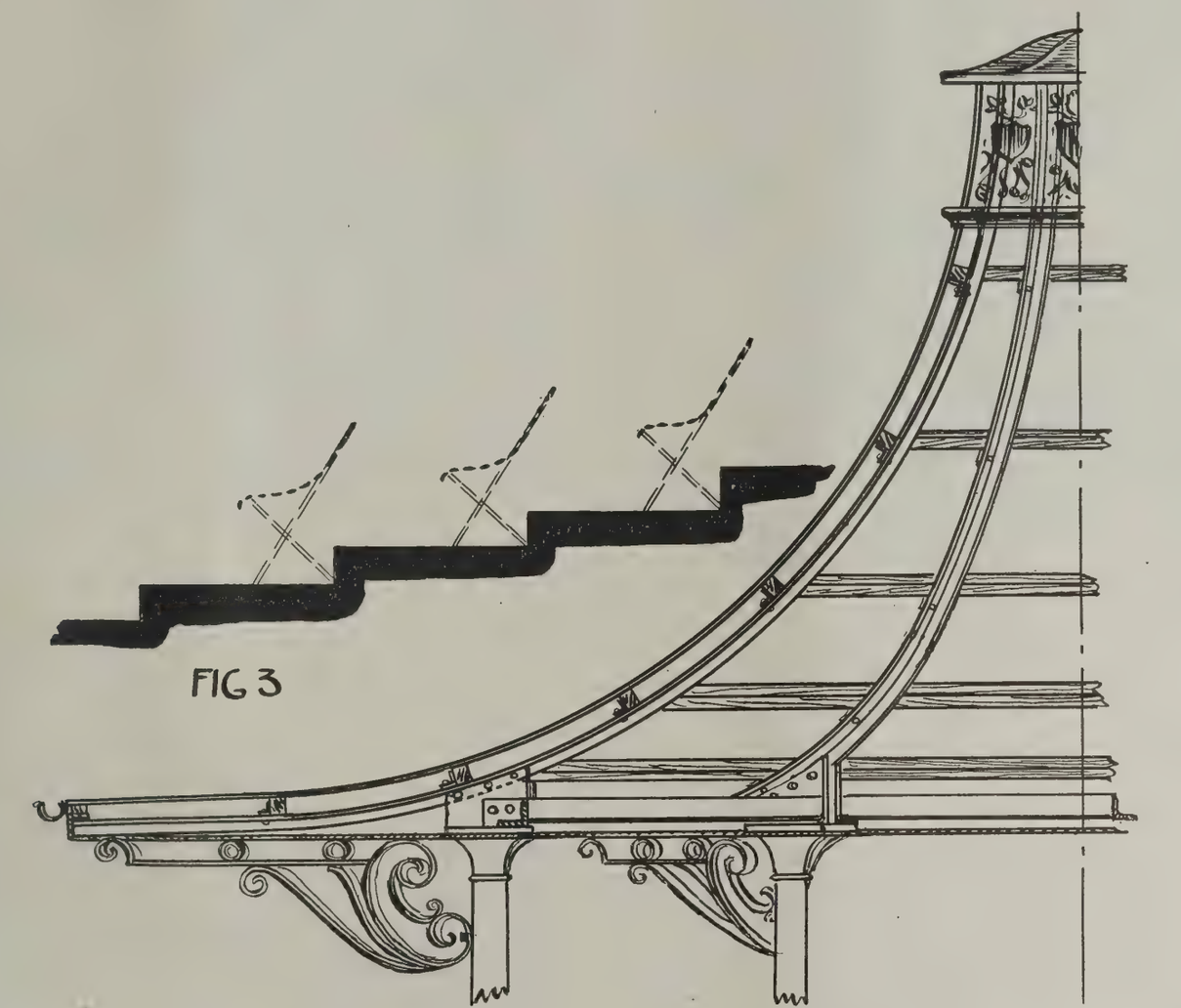
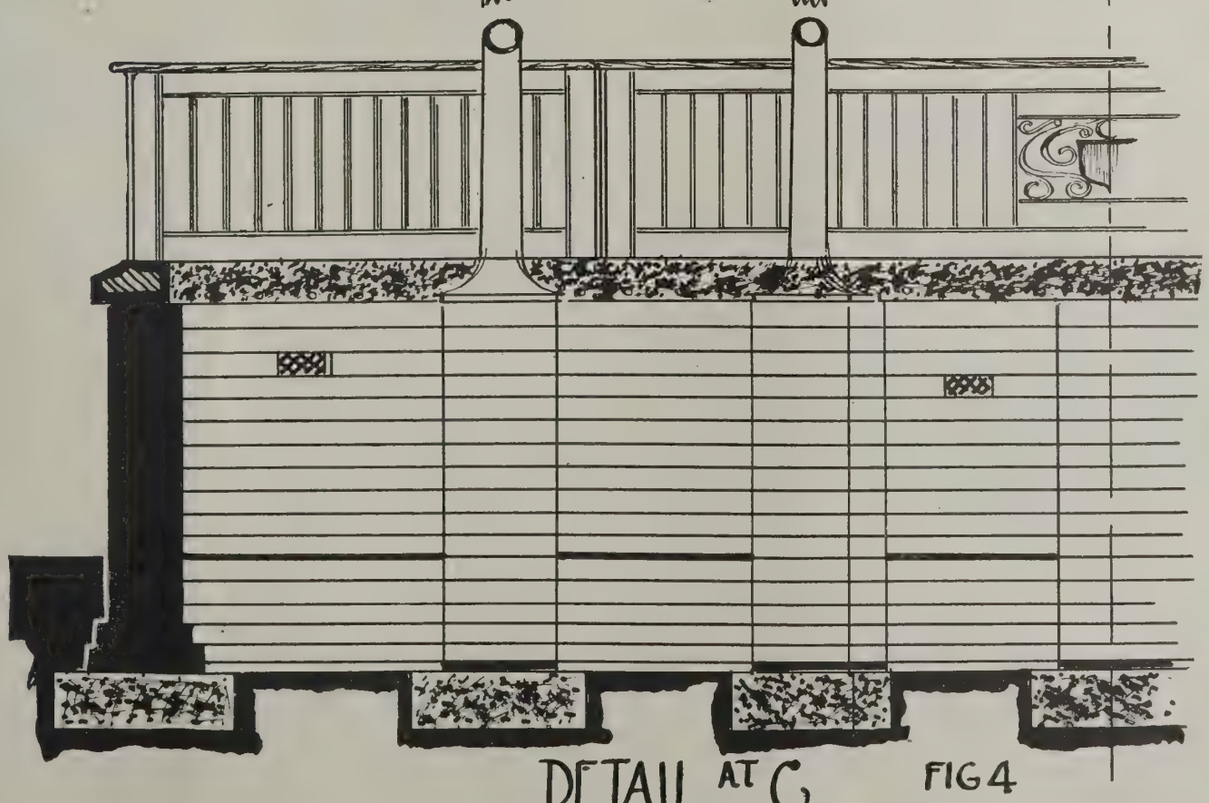


FIG 3



DETAIL AT C FIG 4

ROOFING WITH THE STEEL SQUARE

By J. H. B.

ALTHOUGH the roof dealt with in the present article has framed principals, with tie beams and collars, there will require little explanation beyond what has already been given, the principal rafters themselves being connected to the tie beams with mortise-and-tenon joints, and in practice the usual iron straps would be fixed.

The angles of the rafters where they come to the ties, in a roof of square pitch such as this, will be 45 degrees, which means that it will be given correctly if the square is placed on the wood

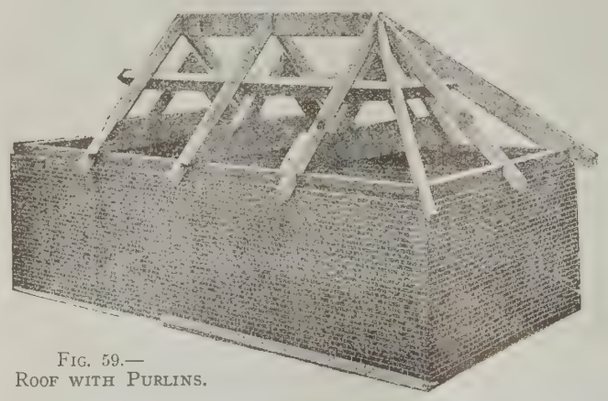


FIG. 59.—ROOF WITH PURLINS.

to the 12-in. line on each arm. This will also apply to the shoulders of the collar beam and the mortises to take the same. The principal rafters are usually mortised and tenoned, or halved together at the top. In either case it means square joints only.

The ends of the tie beams will project over the plates, and must be cut off at an angle of 45 degrees. As they should finish level with the back of the rafters, the width of the building to the outside edges of the wall plates, plus the backing of the rafters, measured at an angle of 45 degrees, will give the correct length to the longest points.

In the case of a roof with gables, the purlins are an extremely simple matter; but with a hipped roof such as that shown in the photographs, Figs. 59 and 60, they should be mitred at the hips. And it is the correct angles at the mitres which require getting correctly. These are by no means easy to get by any rule-of-thumb methods, and the same remark applies to getting the correct lengths.

Theoretically, the correct position of the purlins is midway between the plate and ridge, but practically it is as well to place

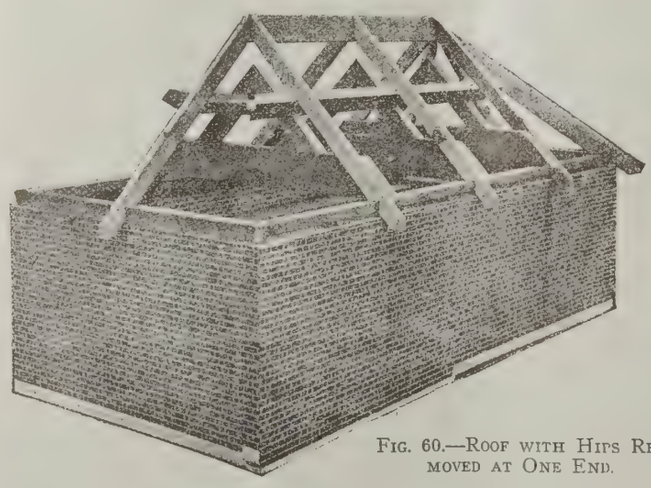


FIG. 60.—ROOF WITH HIPS REMOVED AT ONE END.

it somewhat closer to the ridge, as shown in the section Fig. 61, as otherwise the collar beam is brought very low down.

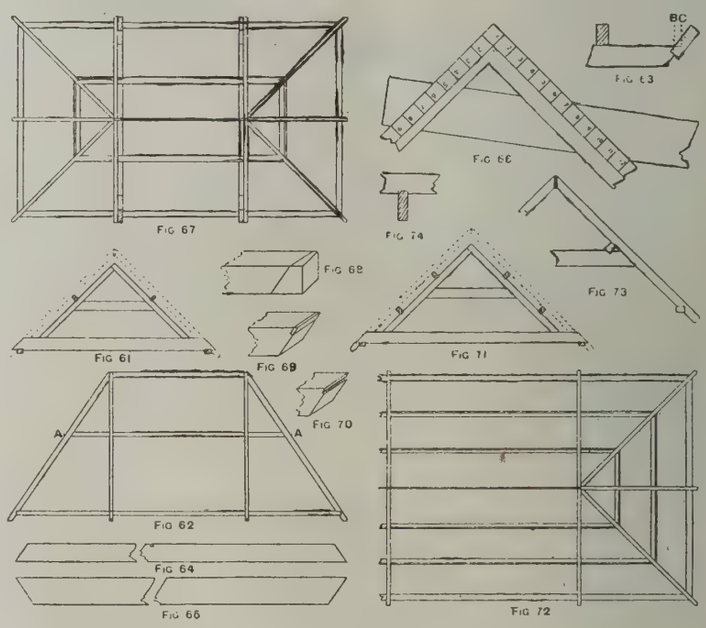
The correct length of the purlins may be obtained in two different ways. One way is by developing one side of the roof, as Fig. 62, and marking the purlin as shown, at the height it has to be fixed to. The measurement from the two points A will then be the length to the outside and the top of the hip rafters; but as the purlin will come down from the top of the latter, a distance equal to the depth of the common rafters, this must be allowed for, as in Fig. 63, where line B shows the length up to the hip, and line C the actual length required to come halfway on to the thickness of the hip.

In a roof of square pitch, such as is now being dealt with, the bevel of the top and side cuts on the purlin comes the same as shown in Figs. 64 and 65, the one showing the edge and the other the flat. The correct angle is obtained by placing the square to the 12- and 9-in. marks, as in Fig. 66. The reduction in length of the hip required when taking the measurements from Fig. 62 can easily be worked out as Fig. 63, by using the square as in Fig. 66.

The length of the end purlins will be found in the same way as that of the side ones, by developing the end of the roof, and the angle will, of course, work out the same as the others. An alternative method of obtaining the length of the purlins, and one which has the advantage of giving both side and end at the same time, is shown in Fig. 67. A complete plan of the roof is drawn to a fairly large scale, with the purlins in position, when the lengths can be taken halfway on to the hips at both sides and ends. This will be found to come perfectly correct, the angles being worked by the square in the same way as given above.

As the hip rafters will in all cases be of greater depth than the ordinary rafters, the purlins will require fitting to them, the depth of the notch from the end of the purlin being in all cases equal to half the thickness of the hip rafter, the depth of the other varying according to the width of the latter. It is, however, easily worked out as in Fig. 63.

In cutting the ends of the purlins, the dead length should



first be cut to. The end as shown marked in Fig. 68 should be cut off and the notch marked as in Fig. 69, the notch cut being as in Fig 70.

The purlins can always be placed slightly higher or lower in the roof if cut too short or too long. This, however, is not workmanlike, and of course it will not do to get over a mistake in this way with both the side and end purlins, or they will not intersect.

If double purlins are to be used in a roof as in section, Fig. 71, the lengths may be obtained by either method given above. Perhaps working by the plan is the best way, as in Fig. 72. The purlins should be placed as nearly equidistant from plate and ridge as possible; the angles will, of course, be the same as when single purlins are used, although the lengths are different.

In a collar-beam roof of a lighter kind, framed without separate principals, as Fig. 73, the purlins are laid in notches cut for them in the collar beam, over which the purlins should fit, as in Fig. 74 (though they sometimes are not made to do so). In this case the purlins must be made correct in length, as they cannot be raised or lowered to rectify an error, the position being fixed by the framed-in collar beam.

It will be noticed that the purlins have been shown at right angles to the rafters, not vertical as they are often placed under the mistaken idea that the pressure on them is vertical, and this position is thus stronger. The pressure on a roof is at right angles to the rafters; thus the purlin should be placed edgeways to this pressure, so that it may withstand it as far as possible.



A SEATTLE BUNGALOW

Designed and Built by JUD YOHO

THIS bungalow is built on a new and unusually interesting plan, especially suited to a narrow lot. On the ground, the building is 24 ft. by 42 ft. 6 inches, not including porches, and the compactness and absence of waste space is accountable for the very low price for which it was built. This house has been



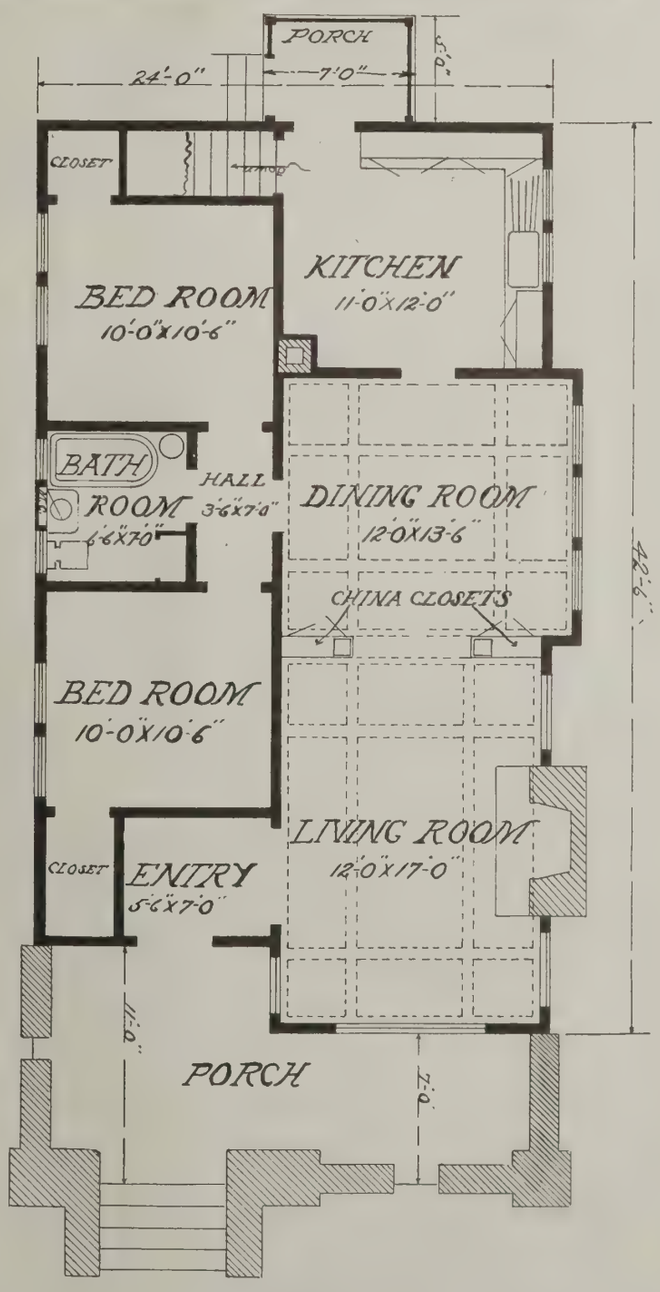
built a number of times for $1,600, although it would probably cost more in places not so favorably situated for lumber and other materials.

Five rooms are provided on the ground floor, and there is sufficient space in the upper story for two more small rooms. These could, with considerable advantage, be finished off in wall board, or similar wall covering, making excellent space for play-rooms or storage.

Many conveniences are provided in the rooms. The arch between the living room and dining room contains built-in china closets with adjustable shelves. The kitchen and bath-room have an enameled plaster wainscoat five feet high, marked off in imitation of white tile. Every requirement of a small family is well met.

For the exterior, the re-sawed siding makes a pleasing appearance and the use of clinker brick in fantastic arrangement relieves the lines of the porch and chimney. The porch has a cement floor.

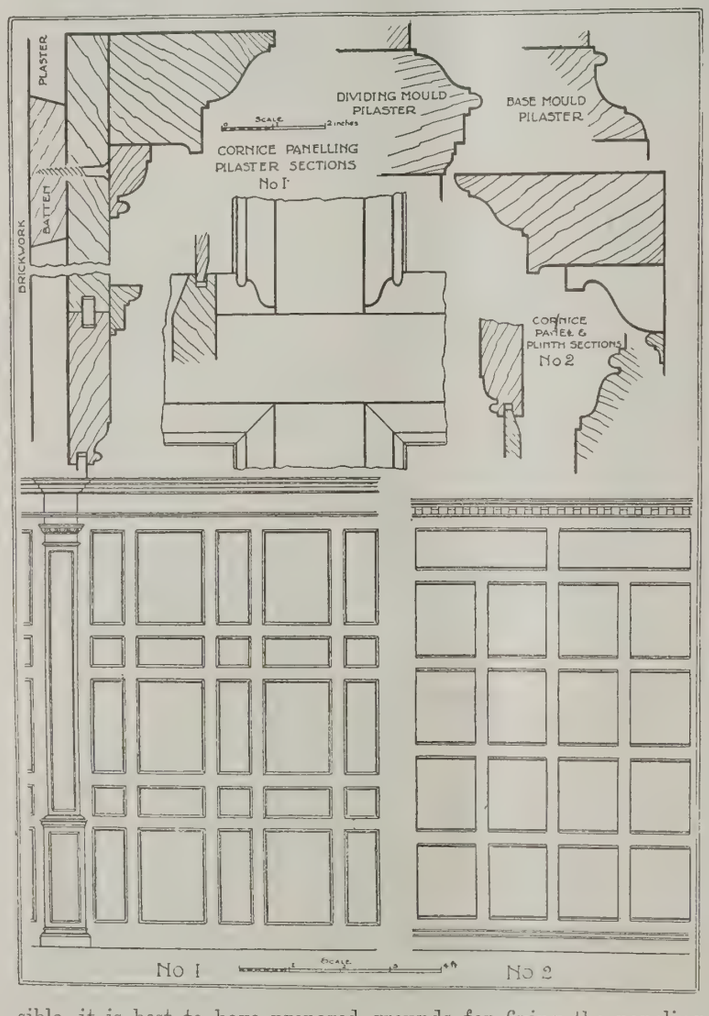
While the general tone of the exterior is that of dark brown pine, the unusually wide verge boards and outside casings are painted a light tan, which greatly offsets the darker color.



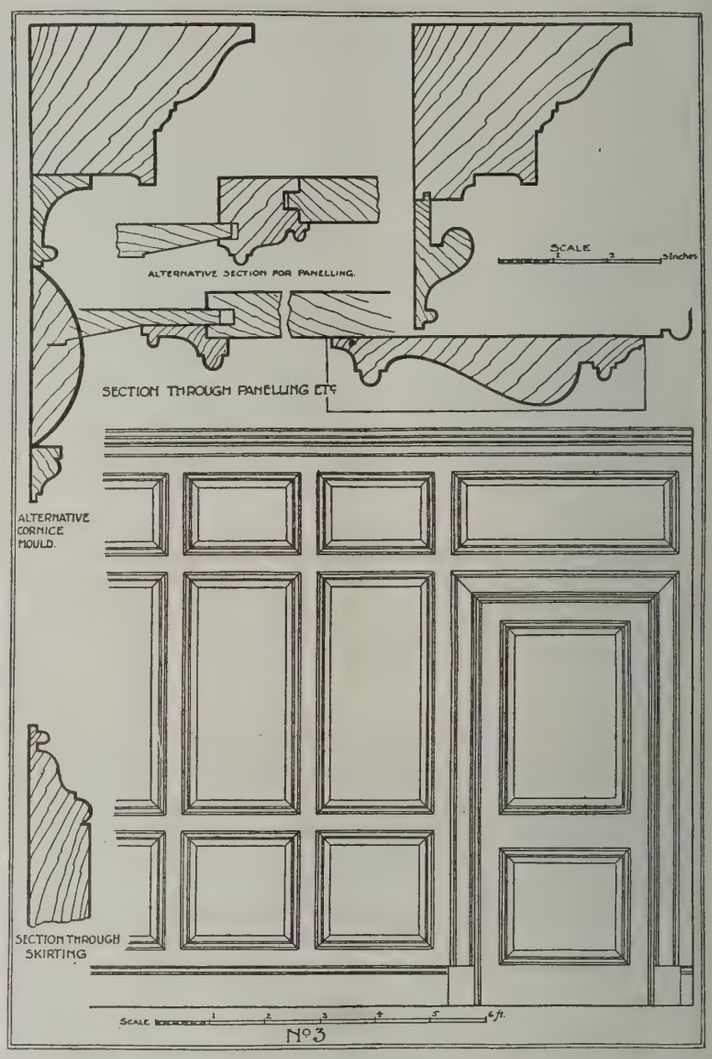
PANELING: ITS CONSTRUCTION AND FIXING

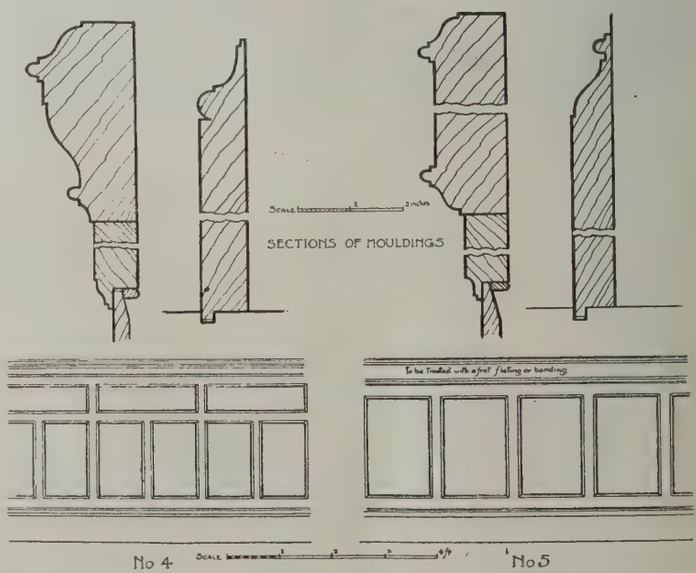
From The Cabinet Maker and Furnisher—All Rights Reserved

IN THE early years of the 16th century paneling became a somewhat common form of covering for the interior walls of the best houses, and even today we have nothing better or more artistic as a background. The edges of the framing were almost always moulded; at first the mould was formed on the framing, but later separate mouldings were mitred and applied around the panels. No. 1 scheme shows the panels with a moulding on three sides, finishing on a bevel at the bottom for convenience in dusting. This bevel is a survival of the weathering on exterior work of the Gothic period. As regards thickness, the panels should be handtight in the grooves, which should be made deep enough to allow the panels to swell. To break the monotony of the design, pilasters are often introduced to emphasize important features of the room, such as windows and doors. The old paneling was usually carried down to the floor with a plinth or skirting. In first-class work, when a skirting is used, it is provided with a tongue at the bottom edge which fits into a groove cut in the floor, thus if shrinkage takes place, there is no open joint. If it is possible, it is best to have prepared grounds for fixing the paneling to the walls. These consist of a series of battens fixed to the wall before plastering, in a favorable position for the screws. The battens are generally 3 in. by ¾ in., and have beveled edges, as shown in the illustration. In cases where the walls are not prepared as described, plugs are used, and the paneling is screwed to these, and thus secured to the walls. Often a room has to be measured for fitments and paneling when the building is still in the brick-work stage; 1½ in. should be taken off each measurement to allow for this, as the plaster on each wall will be ¾ in. thick when the work is finished.



Small panels are characteristic of nearly all paneling down to about the middle of the 17th century, after which the panels were much larger and surmounted by heavier mouldings. The great width of the panels in the paneling made during the second half of the 17th century, and its splendid condition today as regards freedom from shakes and warping, is remarkable of the workman cognisant of the varying conditions found in much of the wood now used. The details and general dimensions as shown on Scheme 3 would harmonize with the furniture of the latter part of the 17th century. It will be noted that a picture moulding forms the bottom of one of the cornice sections; this is an unusual feature in old work, but a very useful one in modern times. The





cornices of the period under consideration were generally elaborately carved, and often a molded chair rail was fixed between the lowest and upper panels. In the alternative section the panels are raised above the framing; this plan was often followed. Perhaps the most fitting form of wall decoration for an 18th century interior is a dado of paneling, the walls being covered with paper or damask, surmounted by a modeled plaster freize and cornice. The dado is generally painted white, but where hard woods are used it is, of course, possible to carry out the decoration in harmony with, rather than in contrast to, the furniture. For instance, the introduction of a fret in the freize of a dado for a Chippendale drawing-room, fluting and paterae for a room in Adam's style, and bandings and inlaid lines for Hepplewhite and Sheraton. Taking the walls as a background for furniture, a white dado is very much to be preferred from a decorative point of view. In much of the best-class work mahogany finished white is the material used. Unfortunately, it frequently happens that paneling has to be fixed in position before the building is quite dry; as a precaution against the expansion of the woodwork from dampness, the back of the paneling is treated with lead paint.

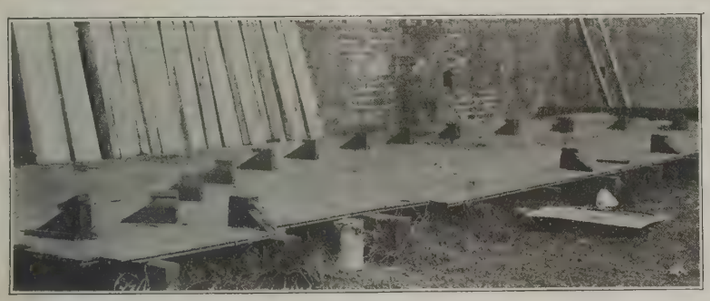
THE CONSTRUCTION OF BELFAST TRUSSES

By J. W. OVEREND

ONE of the best adaptable roofs and roof trusses for temporary structures, and not only the latter, but for permanent buildings also is the segmental curvilinear roof used first at Belfast in Ireland, hence the name.

Where timber construction is largely used it is very adaptable and the only drawback to it being used more is the absence of any architectural features in it, although by careful design this objection can be got rid of, especially at the gable ends.

On the other hand the advantages are many, the trusses can be built up cheaply, short pieces being used for the lattice bars; the curved form enables the rain-water to flow quickly away, the trusses are lightly constructed, lightness combining with great strength,



and here it may be remarked that the curvature for strength is greatest, when the trusses in height at the center are less than half circle, in fact some builders have the segmental height to the half height of the semi-circle height of the span to be crossed.

Again the building up of the trusses economizes material, they can be used for large spans that are in positions where iron pillars for supporting purposes cannot well be used, and if properly made and built up they will last the life of any other ordinary truss or trusses.

For motor garages, sheds for air ships, bi-planes, skating rinks, cinematograph halls, etc., they are often used.

Although the trusses can be built up in the builder's yard, the general practice is to build them up on the site of the building itself.

A platform is usually made of tongued and grooved floor boards, and on this is marked out the curvilinear shape of the truss, etc., the boards resting on battens, and it may here be remarked that the boards for the covering of the roof are often utilized for this purpose.

After having marked out the form, etc., on the setting out board, guide blocks are fixed on same with one side or edge at right angles to board in order to receive thrust of curved pieces or rafters, on the external side when being built up.

Photograph No. 1 illustrates the method generally adopted of fixing blocks on board; although not shown in the photograph, it is as well to use twin blocks for the sandwich tie beams, allowance being made for camber, and to keep the flitched beams "camber wise" until the lattice bars are fixed into position. The roof shown in illustration No. 2 was for a clear span of 36 feet, and the number of trusses used for same was 29, placed 10 feet apart, covering an area of 300 feet by 35 feet, for a building to be used for the making of galvanized tanks, etc.

The sandwich tie beams were made of pitch pine, the lattice bars and curved rafters of red deal, the twin tie beams being composed of two 9-inch by 2-inch pieces of timber bolted together at suitable places; the skeleton struts or lacings were 3 inches by 1 inch, while the curved rafters were made up of four pieces of 2-inch by 2-inch square material sandwiched together in couples. In fixing the rafters the same are pulled to the guide blocks, and either spiked or bolted to the lattices.

In the construction or building up of the trusses on the fixing board, the lacing pieces which form the herring bone strutting in the trusses are carried forward in order to form the pockets into which rest, and are fixed the purlins as seen in Fig. 2.

The lattices themselves should be at an angle of about 60 degrees to the tie beam, and at the intersection of crossing of the bars, bolts could be placed in, although this is unnecessary, as the stresses at that particular part are practically nil, and any lateral movement would be due to the twisting of the material itself.

After being made on the ground the trusses are lifted bodily into position, the purlins then being dropped into the pockets provided. In some cases struts are fixed directly under the purlins and birdsmouthed on to the tie beams. This is a preventative for any lateral motion occurring.

In this particular case this roof was an extension of a building already in place and bearing for the carrying of the tie beams was provided at one end, while the other end is carrying on an 11-inch by 4-inch horizontal wood plate or lintel which is halved together at various places throughout its length.

This plate is supported by brick piers (seen in Fig. 2) 14 inches square and these again have their base on a sandstone template.

A good method is to plane the lattices and members of the trusses, and paint same before building the trusses up. This preserves same wonderfully, and makes them in a condition to be painted afterwards periodically.

For the covering of the roof 1-inch tongued and grooved boards could be used, these also should have two to three coats of paint before being fixed. On the top of these can be used many of the



various roofing felts as advertised by many makers of such coverings, and particular attention should be given to seeing that the flat headed nails by which the covering is attached to the boards do not come opposite the joints of the roof boarding, that is at intervals where the joining of the covering occurs.

If properly built up, well spiked, small bolts used at various places in the trusses, also straps at the connection between the tie beam and curved rafter, these trusses and this form of roof construction can be made very serviceable either for temporary or permanent structures.

MECHANICS' LIENS ON BUILDINGS NOT COMPLETED

By W. J. STANTON

THE decisions of the courts are not entirely harmonious upon the question as to what will, or will not, defeat a claim of lien by a sub-contractor, materialman or laborer, where there is a failure to complete the building according to the terms of the contract. The right to a lien in any particular case depends upon the wording of the statute. There may be a failure to complete the building because it was not built according to the terms of the contract, or within the term therein specified; or because of its severance from the freehold, or removal, or destruction by fire, wind or water before completion. It is clear, however, with respect to abandonment, that the right of a materialman to a mechanic's lien depends on whether he furnished material on the credit of the structure of which it was to form a part, and whether it was of the kind and quality specified in the contract of the owner with the builder; and does not depend on the conduct of the builder after the materials have been furnished. The abandonment of the contract by the builder will not, in such a case, deprive the materialman of his lien.

Parties intending to assert liens rather that rely upon the personal credit of the debtor must be vigilant to ascertain when the work is completed or abandoned, and not be too early or too late in filing their statements, because the premature filing of a statement for a lien on a building is as ineffective as one filed after the statutory limitation has expired. In determining the question when work is completed or abandoned, one case has said that "the court should not take a technical or narrow view, but should save to the parties entitled to liens any rights they may justly have, under a fair and equitable construction of the facts and law applicable thereto." And it would seem inequitable and contrary to the spirit of the law to hold that parties are absolutely barred of all rights to the lien law where the work is permanently stopped or abandoned without fault of such parties, as such a construction would place materialmen and laborers at the mercy of the dishonesty, fickleness or misfortunes of the owner or contractor. It has, therefore, been held that, in case of abandonment of the enterprise, the building is to be deemed completed, so far as concerns the rights of the parties not in fault, to file and assert their liens.

The time of presentation of the claim is material under a statute prescribing when it must be presented. If such time is fixed at ten days after the contract let by the owner shall have been fully completed, the time allowed for presenting the claim must be computed from the completion of the work under such contract, as its completion need not be the completion of the contemplated improvement. It may be that only a part of the work done has been let, or that the completion of the structure is not in present contemplation. If the principal contractor abandons his contract the work under it must be regarded as completed within the meaning of the statute, else the sub-contractor could not enforce his lien at all when the owner has seen fit to pay off the contractor. But in such a case the sub-contractor must present his claim within ten days after such abandonment, and cannot postpone the presentation until the work is completed under a new contract with a stranger to the first one, or is completed by the owner himself.

With reference to the completion of the building, the contractor and sub-contractor should be considered as substantially one and the same person, as between them and the owner of the property. The building should be considered as completed when, and only when, the contractor has completed his part thereof. The sub-contractor's rights are based solely upon his contract made with the contractor. The contractor, and not the owner of the building, is the sub-contractor's debtor, and the sub-contractor has no right to claim that the building has been completed, until the contractor under whom he claims has such right. Under the contract between the owner and the contractor the owner agrees to pay the contractor a certain sum for constructing the building, and this sum is a fund which may be held under the statutes for payment, so far as it will go, of all the claims of the various sub-contractors, for work and materials furnished by them to the contractor, who is the principal and head of them all; and all the parties entitled to payment or contribution out of this fund should be able to reach the fund and get their proportionate shares thereof, at the same time, or within the same period of time. Besides, one sub-contractor ought not to be able to reach this fund and appropriate it to the extent of his claim before another sub-contractor can reach it.

The amount of all the claims of all the sub-contractors can be ascertained only after all the work and materials have been furnished, and after the building has been completed so far as the contractor is required to complete the same; for the whole of the work may in fact be done by sub-contractors only, or the last item of work performed or materials furnished may be performed or furnished by a sub-contractor. The building, in such a case, would be completed by a sub-contractor, and the sub-contractor completing the building or furnishing the last item of work or material therefor is entitled to his proportionate share of the general fund equally with the sub-contractor who furnished the first item or work or material, or any intermediate portion thereof. Of course, when the contractor has furnished through himself or his sub-contractors, all the work and material which he had agreed to furnish, then the building is completed, so far as he is concerned, and is also completed so far as all the sub-contractors under him are concerned; and the contractor and each of the sub-contractors may then file their respective statements for liens, and each will then become entitled to his proportionate share of the fund.

The statutes of some states make a cessation from labor for a certain number of days upon any unfinished contract as equivalent to a completion thereof, for all who claim a lien by virtue of that contract, as fully as though that contract was completed. Under such contracts it is immaterial whether the building is subsequently completed by the owner or not, or if completed, whether such completion is effected by the owner directly, or through a contract with another. For the purpose of creating a lien thereon through the terms of the unfinished contract, the cessation of labor under the contract for the number of days specified is a statutory completion of the building which sets the time running within which the claim of lien must be filed. The claim under such circumstances must be filed within thirty days after such time commences to run, although it may be filed within thirty days from the actual completion of the building.

A subsequent contract by the owner, after an abandonment of the original contract is, as it were, for the construction of a different building. Hence, if the original contractor under a building contract gives to the owners of the building written notice that he abandons the contract, and that he declines to proceed further in its execution, and thereafter does no work upon the building, whereupon the owner contracts with another builder to complete the building, it is necessary for those claiming mechanics' liens by virtue of the original contract to file them within the time provided by the statute after there has been a cessation of labor for the number of days specified.

A sub-contractor's right to a lien is not necessarily defeated by the contractor's abandonment of the work, and the owner may be held for the balance due. If a materialman files his lien when nothing is due the contractor, who afterwards abandons his contract without just cause, and the owner completes the building for less than the contract price, under a provision of the contract authorizing it, and stipulating that the cost should be deducted from the contract price, the lien attaches to the extent of the difference between the cost of completion and the amount paid on the contract when the lien was filed.

The law does not allow a contractor, mechanic or materialman to violate a contract and claim a lien for work done, because of an apprehension or fear that he will not receive his pay at the time for payment. If he quits work under such circumstances the owner's real estate cannot be subjected to a lien even for the work already done, as there has not been a compliance with his contract by the person claiming the lien which is a prerequisite to the attaching of the lien. A materialman's right to a lien, as against the owner, for materials furnished the contractor, depends for its existence upon the fact of an indebtedness from the owner to the contractor at the time of or subsequent to the notice. If, therefore, the contract for the erection and completion of the building is entire, and the contractor is to be paid as the work progresses, but he abandons it before it is completed, he loses the right which he would have had to the full compensation agreed upon, although the owners may complete the building for less than the difference between what they have agreed to pay and what they have paid.



No. 560.

THREE LOS ANGELES BUNGALOWS

While California has for a long time been considered the home of the one-story house, other sections of the country are realizing the advantages of this style. With little or no modifications, these California bungalows may be adapted to any section of the country and their attractive appearance and plan make them very desirable homes.



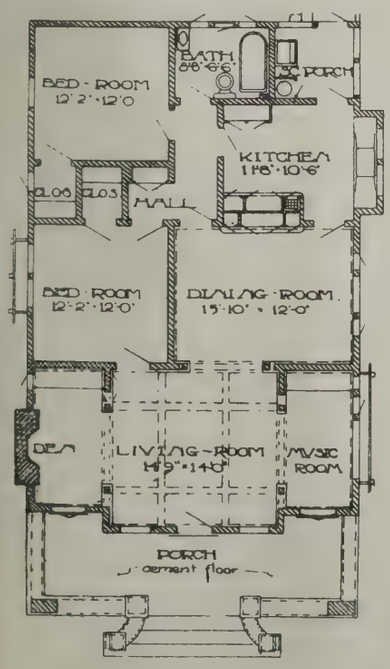
No. 501.

Through the courtesy of the Los Angeles Investment Company of Los Angeles, Cal., we are permitted to reproduce these plans and photographs of the completed buildings. While the appearance of each is unique from the manner of utilizing the materials at hand, the cost is kept within reasonable limits. It is claimed that as built in Los Angeles, the cost of the buildings was as follows: No. 560 was built for $3,100, although the builder claims the cost could be reduced somewhat by using cheaper materials. The simple but artistic No. 240B cost about $1,900, while No. 501 cost $2,600.

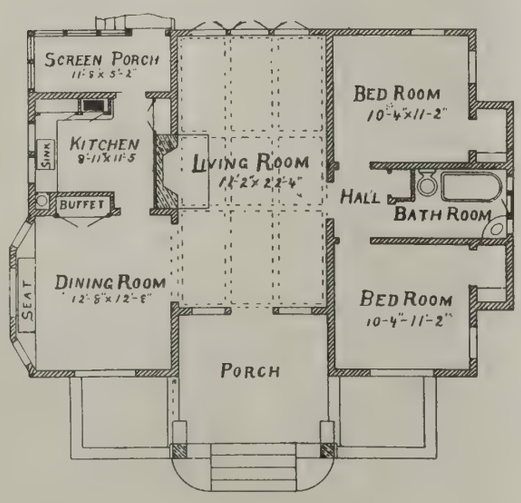


No. 240B.

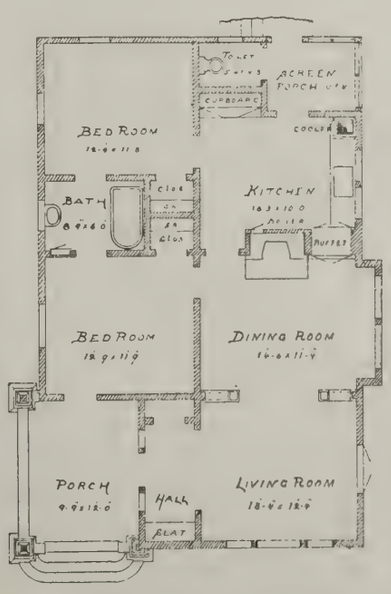
It is noted that each of these buildings is exceptionally complete as regards interior finish, such as mantels, buffets, cupboards, closets, plumbing, etc., making the house ready for occupancy.



PLAN NO. 560.



PLAN NO. 501.



PLAN NO. 240B.

THE SHARPENING OF WOODWORKING TOOLS

THE TOOLS used for woodworking are ground and sharpened to more acute angles than those used for cutting harder substances, such as metal. The most suitable angle for any given tool is decided by the character of the material it has to cut. As there is a considerable difference in the hardness of different kinds of wood, the tools used for cutting it vary also in their cutting angles, tools used for soft wood being more acute than those for hard. This does not mean that tools must be kept specially for each kind of wood, or must be reground to suit each. A patternmaker working with soft pine or a joiner working chiefly with whitewood or cypress would sharpen their tools suitably for these woods and use them on hard woods occasionally, but if their work was chiefly with hard wood they would find the tool edge too acute. They would become dull very quickly, and if heavy cuts were taken would get broken and notched. A more obtuse angle would give a more durable cutting edge.

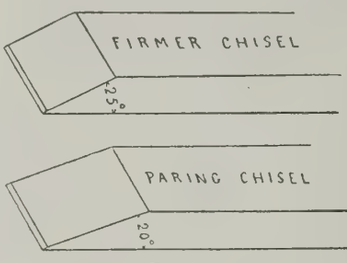
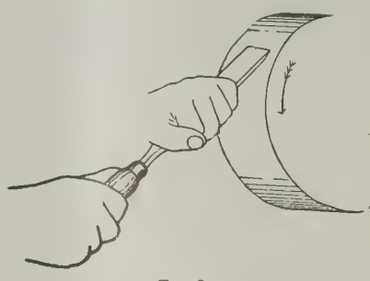
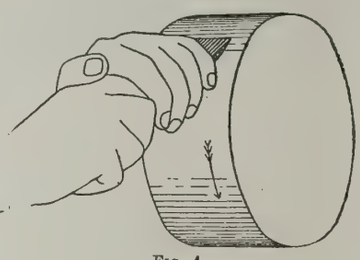


FIG. 1.


FIG. 3.


FIG. 4.

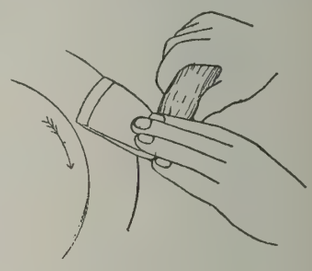

FIG. 5.

Fig. 1 shows two chisel edges, one ground for hard wood and the other for soft. Another reason for the difference is that the firmer chisel is intended for rougher work than the paring chisel, and is often driven with a mallet. It is the chisel used for ordinary work, and is shorter and thicker than the one intended for paring. The difference in their angles is often greater than illustrated. The angles are not measured in any way, but the workman judges by his eye when they are about right as he grinds them.

In all cases the angle of sharpening on the oilstone has to be more obtuse than the grinding angle. This is necessary in order to save labor and time in sharpening. The ground facet of a chisel extends perhaps half an inch from the edge, and if this facet was laid flat on the oilstone and rubbed till the edge was keen, it would be a very slow process, for the oilstone cuts very slowly

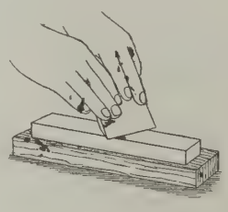

FIG. 2.

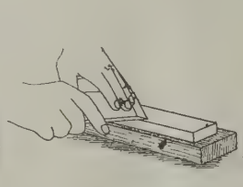
indeed, compared with the grindstone. By tilting the chisel slightly a very narrow facet is rubbed, just sufficient to make the edge keen and leave most of the ground facet untouched. This narrow facet made by rubbing on the oilstone is shown by the double lines close together at the edges of the chisels in Fig. 1. After repeated sharpenings without grinding the chisel edge becomes thick, as in Fig. 2, and regrinding is necessary. The sharpening angle on a newly-ground tool can be almost the same as the grinding angle; but as the edge wears back, as in Fig 2, the chisel has to be tilted more and more on the oilstone to avoid a wide sharpening facet.

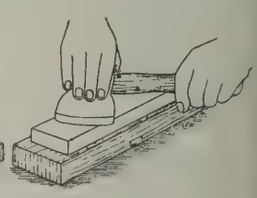
Grinding is a simple matter, requiring chiefly a knowledge of the most suitable angle to grind it. It is done either on a grindstone or emery wheel. In the latter case great care must be taken not to heat the tool. The pressure must be very light and the tool should be frequently removed and examined. An emery wheel on which water can be used is preferable to a dry one. A grindstone cuts slowly and the pressure on the tool must be comparatively heavy. Water is always used on it to prevent the stone from glazing. A person accustomed to the work will grind a tool more neatly than a beginner. The facet should be straight and uniform, not broken up into a number of flats with an edge perhaps not keen or not straight. In the latter respect a plane-iron is much more difficult to deal with than a chisel because of the greater width and the necessity of a correct edge, slightly curved, or bellied, more or less according to the kind of plane. A chisel can simply be ground straight at its edge, and it does not matter if it is not quite at right angles with the sides of the chisel. Figs. 3, 4 and 5 show tools being ground—a chisel, plane-iron and hatchet respectively. They are generally moved to and fro sideways on the stone to lessen risk of glazing and unequal wear. It is usual to let the stone revolve towards the tool, so that burr which forms when the edge is thin shall not cling and make it difficult to properly examine the edge as the grinding proceeds.

Grinding leaves a rough edge quite unsuitable for cutting wood, and it must be followed by sharpening on an oilstone and in some cases still further by stropping on leather. Some workmen use two oilstones, one coarse and the other fine; but one stone of suitable grade is sufficient unless a very wide range of work is done. It is a waste of time to put a very keen edge on a tool used for rough work. A coarse, quick-cutting stone should be used for the purpose. Carpenters and joiners use coarse and medium stones, of which there is considerable variety, both natural and artificial. The Canada is a popular stone because it is cheap, but it wears away fast. The Charnley Forest is a well-known English stone, very durable, but rather slower cutting than some workmen like. The Yellow Lake is another very much like it, but slightly cheaper and quicker. The Turkey stone is quarried in Turkey. It is rather expensive and brittle, and too fine for most classes of woodwork. India stones are artificial, made in three grades, and are expensive. The Washita is a popular American stone of good quality at moderate price. The Arkansas is the most expensive stone on the market and is the best for very fine work. It is too slow and too costly for the average woodworker. Now, however, all ordinary stones seem to be obsolete, as Carborundum has the advantages of much faster cutting surfaces, and being an artificial product is made in a number of grades of fineness, from coarse grinders to the finest razor hones.

In using an oilstone a little oil is put on its surface and the tool tilted to the correct angle, is rubbed backwards and forwards on it with moderate pressure. At intervals it is turned over, and the other face of the steel rubbed slightly to remove burr. Figs. 6 and 7 show these two operations with a plane-iron. A chisel is treated similarly. Fig. 8 shows a hatchet being sharpened. This, being ground on both sides, must be tilted accordingly for sharpening instead of lying flat one way, like the plane-iron in Fig. 7. For splitting wood it is not essential to do more than grind a hatchet, but as a rule they are sharpened, and otherwise will not cut chips properly. Sometimes instead of rubbing the


FIG. 6.


FIG. 7.


FIG. 8.

hatchet on the stone, the reverse process of rubbing the stone on the hatchet is preferred.

Gouges, especially those ground on the inside, are more troublesome to sharpen than tools with straight cutting edges. An oilstone slip is required for the insides of gouges. When the gouge is ground on the outside the slip is used as in Fig. 9 to remove burr only. When it is ground on the inside the slip is used as in Fig. 10, and burr on the outside is removed by rubbing on the back of the gouge on the oilstone. Sometimes the inside gouge is held in the hands for sharpening, like the outside gouge in Fig.

9, but with the slip tilted to the angle. The method shown in Fig. 10, with the gouge bearing on the edge of a bench, is generally preferred, as there is less risk of cutting the fingers. Another way is to put the slip in a vise and rub the gouge on it. In grinding outside gouges a constant rolling movement of the gouge on the stone is necessary, and in sharpening on the oilstone there must be both rolling and reciprocal movement. This is quite easy with a little practice. An inside gouge is more troublesome to deal with. Generally they are ground on one edge of the grindstone, and neat grinding is almost impossible unless the rounding of the edge happens to correspond with the curve of the gouge. Special stones are sometimes used, having a series of beads to fit gouges of different curvatures. Sometimes a revolving cone of emery or wood covered with emery is used for grinding inside

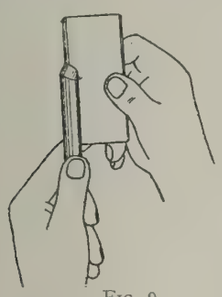


Fig. 9.

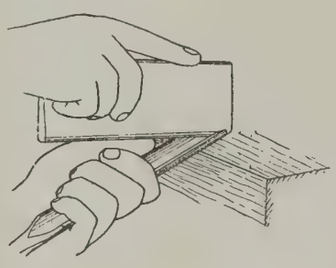


Fig. 10.

gouges, those of quick curvature being done near the apex of the cone, while flatter ones find a surface to fit them nearer the base where the diameter is large.

Saws are sharpened with a file, as in Fig. 11, the saw being held in a vise. The file used is of triangular section as indicated by the dotted triangle in Fig. 12. This fits the teeth of ordinary saws of all sizes, and files the front of one tooth and the back of the next one simultaneously. The correct rake for the teeth must be maintained, and also the correct slope for the file in plan, as shown by dotted lines. That shown is correct for ordinary purposes and soft wood. For hard wood the file is held more nearly at right angles in plan, giving practically square edges instead of rather acute ones to the teeth. For ripping with the grain the teeth are given more rake—that is, the triangle in the side view in Fig. 12 would be tilted more forward to undercut the fronts of the teeth. Rip-saws cannot be used for cross-cutting, but the

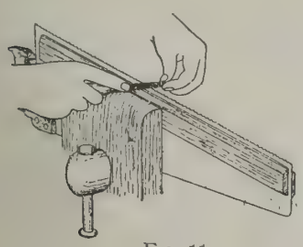


Fig. 11.

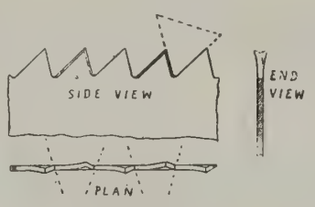


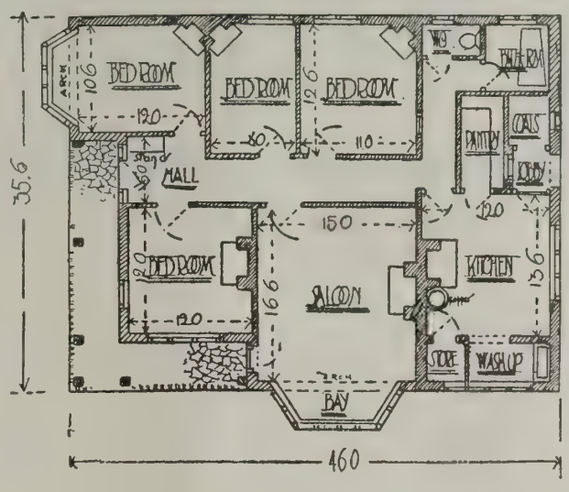
Fig. 12.

teeth in Fig. 12, intended primarily for cross-cutting, can be used for ripping if necessary. Variations in size of saws and teeth make no difference in the shape and angles of the latter, those of a large hand-saw being of the same form as those of a fine dovetail saw. Saw-teeth occasionally require setting as well as filing, especially when intended for cutting soft wood. The amount of set is shown in plan and end view in Fig. 12. The teeth are bent alternately to each side, so that the blade will follow easily through the wood. For hard and dry wood little or no set is necessary. It is imparted by bending with a slotted saw-set or by punching with the saw laid on a block of wood, or by means of other setting appliances of various kinds. In sharpening the teeth it is best to file too little rather than too much if the operator is attempting it for the first time. When teeth have been spoilt by unskilful filing it is troublesome to get them correct and uniform again. When they are correct, but merely dull, the existing angles are a useful and reliable guide to the file and should be carefully followed.

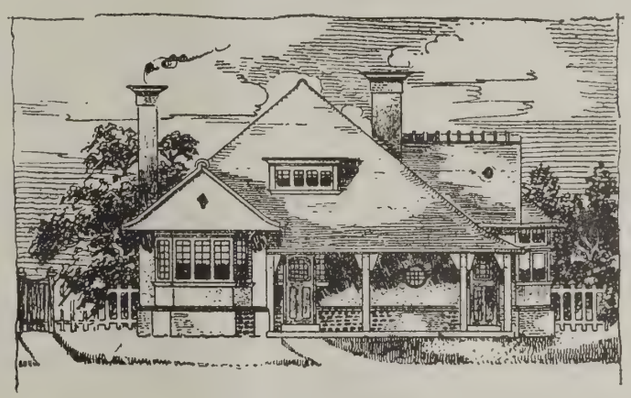
Bits for boring are sharpened with suitable oilstone slips preceded by filing if very dull. In some cases filing alone is sufficient. A slip is used for spoke shaves and other tools which cannot be conveniently rubbed on the large oilstone. With the exception of saws, all cutting angles are about the same as the chisels shown in Fig. 1.

AN ENGLISH BUNGALOW

Designed by H. BINGOLD

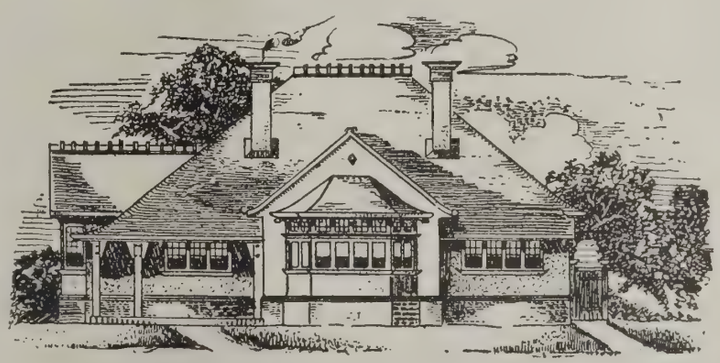


THIS arrangement of six rooms on one floor is somewhat unusual in this country, but it has several advantages. The side entrances add privacy to the house, and allow more window space on the front. All the rooms are reached from the



well-lighted hall, and the kitchen surroundings are well separated from the rest of the house, and at the same time readily accessible.

It will be noted that each bedroom has a fireplace, a distinctly English convenience, which would be appreciated in many parts of this country when the nights are damp or cool. When the



garden is properly developed, the bedrooms on that side possess an added charm of seclusion.

The attic is not intended to be used as here designed, but it could be easily fitted up for additional bedrooms or a play room.

Michael Dugan, a journeyman plumber, was sent by his employer to the Hightower mansion to repair a gas leak in the drawing room. When the butler admitted him he said to Dugan:

"You are requested to be careful of the floors. They have just been polished."

"They's no danger iv me slippin' on thim," replied Dugan, "I hov spikes in me shoes."—Paint, Art and Drug Review.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

BUILDER'S COURSE IN ARCHITECTURAL DRAWING

By RALPH F. WINDOES

WE WILL now undertake the drawing of the four elevations. An elevation, it should be understood, is simply a projection of the different sides of a building upon the vertical planes. It is not merely given for "looks" but it includes some characteristics that cannot be shown upon the floor plans. Elevations are always made from the plans and are governed entirely by them. The plans may give the location of the windows and doors, give the size of the building and a number of other things, but it remains for the elevations to show the height of the floors and the height of the building, the appearance of the windows and doors, etc.

The front elevation is generally drawn first, then the right side, then the left side and lastly the rear, though there seems to be no good reason why this order is followed. The front elevation is generally accompanied by a vertical section whic gives the ceiling heights of the different floors, the sizes of the lumber used, the window heights from each floor, the material used in the foundation, etc.

No definite rules can be laid down for the student to follow while drawing his elevations, but there are a number of things which he should observe.

His ceiling heights should be determined with a consideration to "cozyness" and cost of heating. The old fashioned house with a high ceiling is fast becoming a thing of the past. There is nothing "cozy" about it and it costs considerable to heat that unused space.

He must establish a grade line that does not put his building down in a hole, or up in the air. If the basement is too far below ground it is hard to light and is generally damp. If too high it puts his first floor up disagreeably high, and the basement is liable to be cold in winter.

His windows should be at a convenient distance from the floor. His porch floors should be lower than his house floors, with a little slant away from the house. The porch columns should not be too numerous, but should still conform to the general lines of the building. They should not cut off a view from the windows or doors if it is possible to prevent this.

The shape of the roof is decided entirely by the draftsman. It may be hip, gable or curb, though the mansard roof is often used on high cost dwellings. The pitch he may also decide upon. Most modern houses have a half-pitch roof. That is, the span is half the rise of the roof.

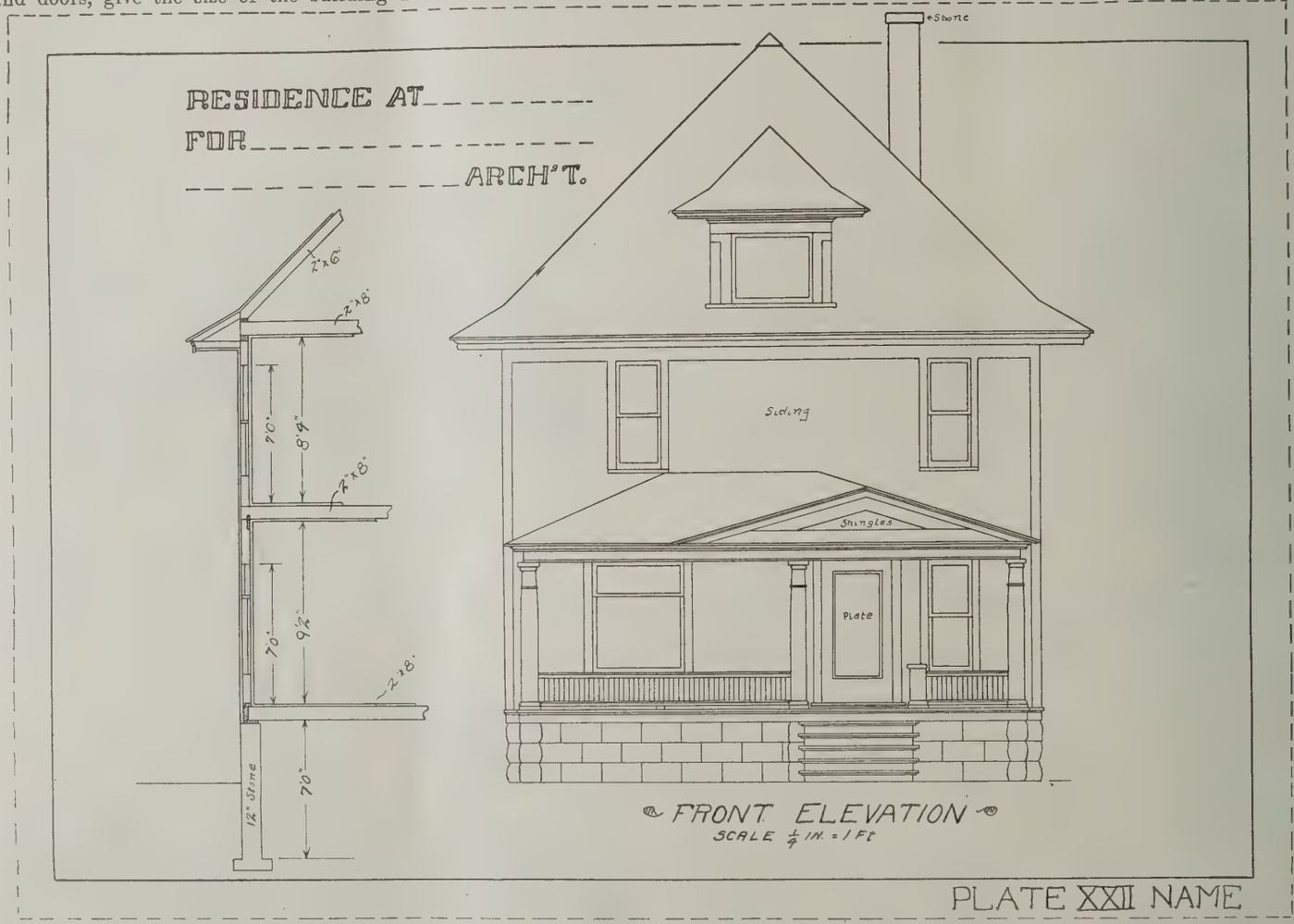


PLATE XXII.

FRONT ELEVATION.

Begin the drawing with the vertical section shown. Notice the dimensions given, the method of showing interior and exterior finish, the cornice, plates, etc.

When this is completed establish your grade lines. The one here shown is about 30 in. from the top of the foundation. Draw a vertical axis for the elevation and work from it. Take all of the dimensions of width and thickness needed from the floor plans, also the height of the doors and windows. Notice that one of the porch columns is cut off so that it does not obstruct the view from the door and window. Put the casing and the rest of the trim in as shown, and put on the roof. This is a hip roof of one-half pitch. Notice how the cornice is built up and is not a continuation of the rafters. The dormer should have a hip roof of the same pitch to conform with the house roof. Take its dimensions from the roof plan. When a hanging gutter is used it is customary to omit it from the elevations. Do not forget to show the chimney and remember to place any necessary information upon the elevations that cannot be put upon the plans.

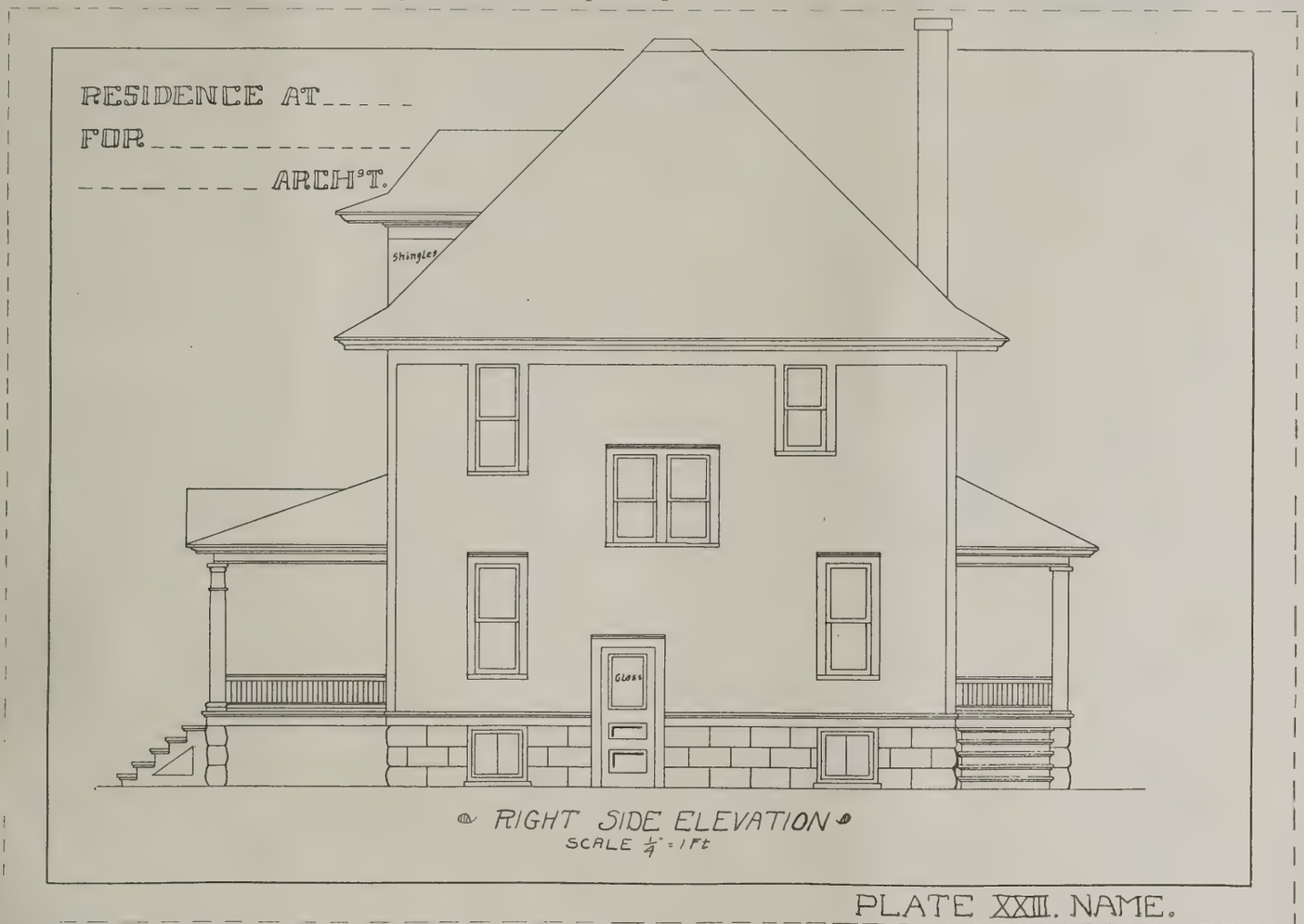


PLATE XXIII. NAME.

PLATE XXIII.

RIGHT SIDE ELEVATION.

Little need be said concerning the drawing of this elevation as the method is similar to that of the front elevation. Notice the heights of your windows in this elevation. The bath room window and the two stair windows are not as high as the others. The grade door shows a glass, and two wooden panels.

Of course, the principal heights on this elevation will be the same as on the front elevation, so the draftsman can save much time by placing his front elevation where he can project its dimensions over to the side. If his drawing board is too small he may have part of the front elevation sheet under his drawing of the side elevation.

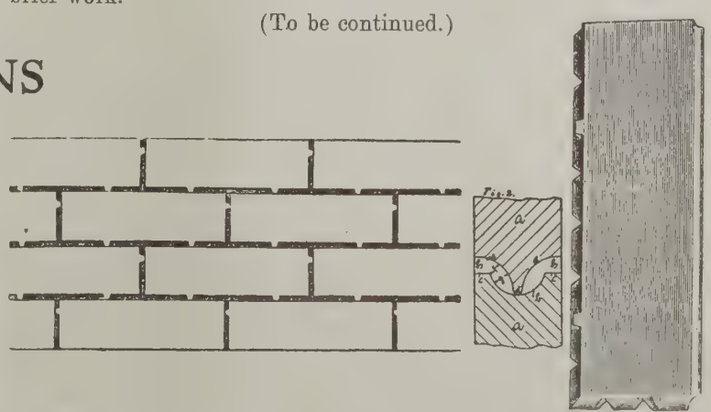
It must be realized that there will be a number of little problems that will occur in the student's work in this course that have not been mentioned in our discussions. Some of these have been omitted intentionally for want of space and others because they have appeared so simple that we have left it to the common sense and judgment of the student to supply them. He must realize that if he were working with an architect, he could not ask the latter the way out of every little difficulty that beset him, but that he would have to figure them out for himself. And remember that the same difficulties would not occur to every student and that it would be impossible to solve all of the possible ones in our brief work.

(To be continued.)

GYPSUM BLOCK PARTITIONS

ONE difficulty with the thin partition walls of gypsum cement, etc., made in slab form or otherwise, is that being made with a very considerable percentage of uncombined water, and usually delivered shortly after manufacture, they take too long a time to dry out naturally, so that papering or painting them must be postponed, or artificial means of drying them out be employed.

One way of getting around this difficulty is shown in practical form in the Dresden Hygiene Exposition, and here illustrated. The slabs employed are 100x33 1/3 centimeters = 90"x30" in surface dimensions, and of any desired thickness, and their faces are as rough as it is practical to make them, to permit of plastering upon them and to facilitate drying. Their edges are tongued and grooved but the tongue is very thin at the edge, and is nicked at intervals, so that air passages are left, which, as well as the grooves, are closed with mortar or plaster when the wall has dried out—a process which takes place more rapidly than where only one side of the slabs is exposed to the air. The exhibitor is Wilhelm Schugk, of Dresden.



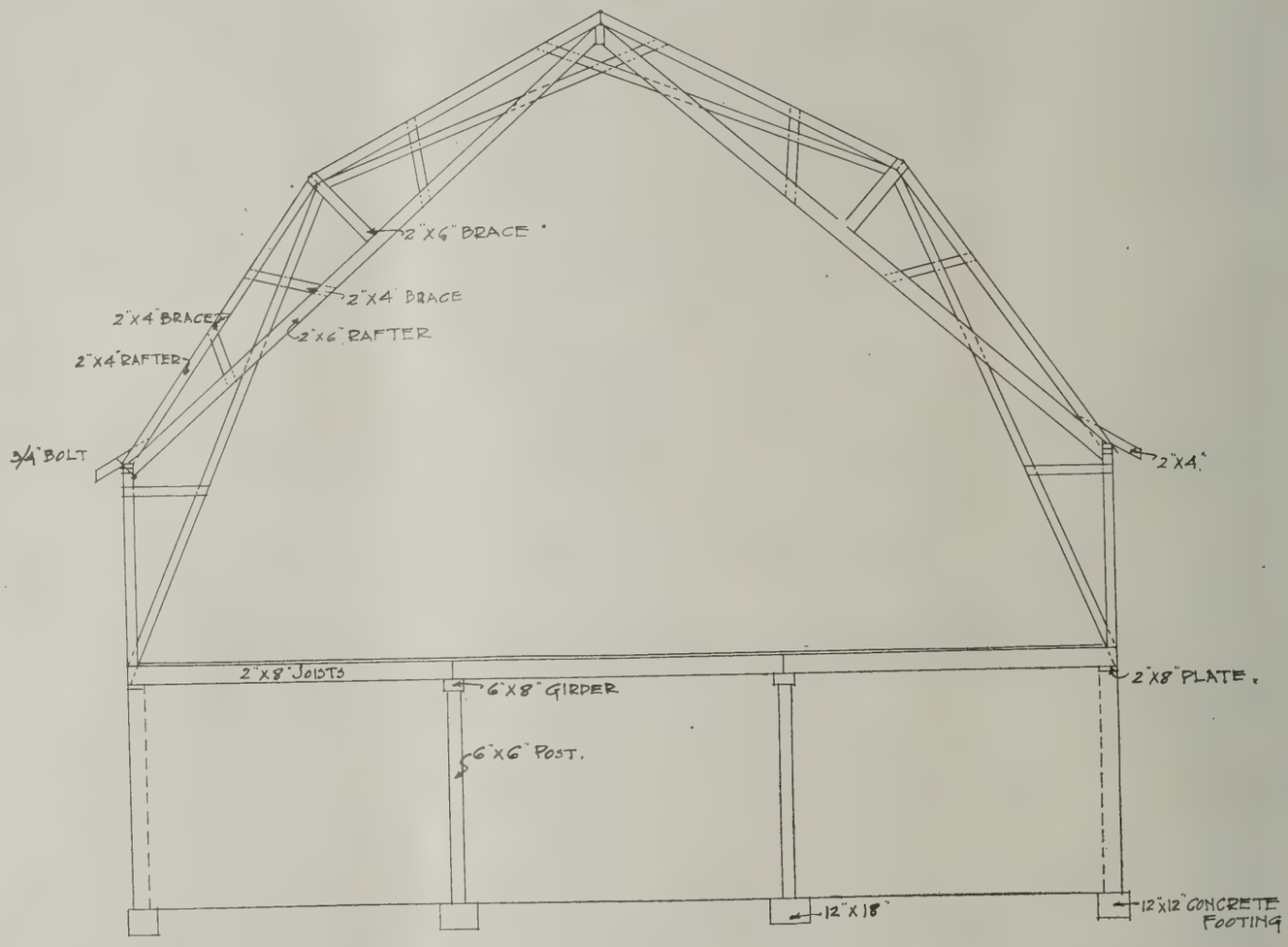


OUR READERS' PAGES



[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]

ANSWERS



CROSS SECTION OF SELF-SUPPORTING GAMBREL ROOF.

CONCRETE BARN SPAN ROOF.

From R. E., Albion, Nebr.

Replying to "A. O. P.," Eastwood, Minn. I am submitting a roof design which can be built of 2x4s and 2x4 braces.

Five trusses will be required to carry a roof of 60′ 0″ length, with purlius cut in between the trusses to carry sheathing boards, which should be nailed on diagonally.

HOW MUCH PAINT?

From "Dauber," Chicago, Ill. In answer to Carpenter's wife, Sedley, Sask., I submit the following general rule, which will give her some idea of the quantity of paint required to cover any given area. It is impossible to give a rule that will apply in all cases, as the amount varies with the kind and thickness of the paint, the kind of wood or other material to which it is applied, the age of the surface, etc. The following is an approximate rule: Divide the number of square feet of surface by 200. The result will be the number of gallons of liquid paint required to give two coats; or divide by 18 and the result will be the number of pounds of pure ground white lead required to give three coats.

MEASUREMENT OF BRICKWORK.

From "Contractor," Rochester, N. Y. Replying to A. G. McF., Smith Falls, Ont., the usual custom here is if the contract is given and the owner agrees to find all the bond timbers, he has no claim on the bricklayer for unused bricks caused by the placing of the timbers. It is generally supposed that placing and setting the bond timbers, and furnishing mortar for same, costs as much as the bricks are worth, and sometimes more. I am inclined to think that without some special agreement, there can be no claim made on the bricklayer for bricks that should have taken the place of the bond-timbers.

LENGTH OF RAFTERS.

From C. A. M., Chicago, Ill., to E. D. Z., Fitchburg, Mass.

The manner of finding the lengths of rafters is comparatively simple and is fully shown in a great many books and has been described a great many times in the columns of the NATIONAL BUILDER. For instance, on page 49 of the June BUILDER you will find nearly a page showing how the lengths of rafters can be obtained by the use of a steel square. This shows not only common rafters but hips and valleys as well.

BACKING A HIP.

From "Jura," Windsor, Ont.:

There are many ways of "backing hips," one of the best of which is shown in Fig. 1. Here let A B, B C be the common rafters, A C the span of the roof, and D E F the plan of the hip. From E set off the height of the roof E H, E G, equal to E B and

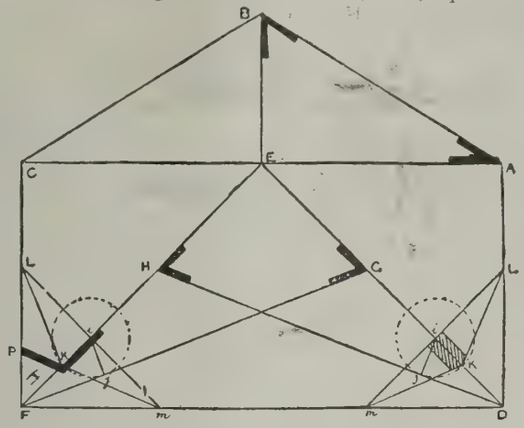


Fig. 1.

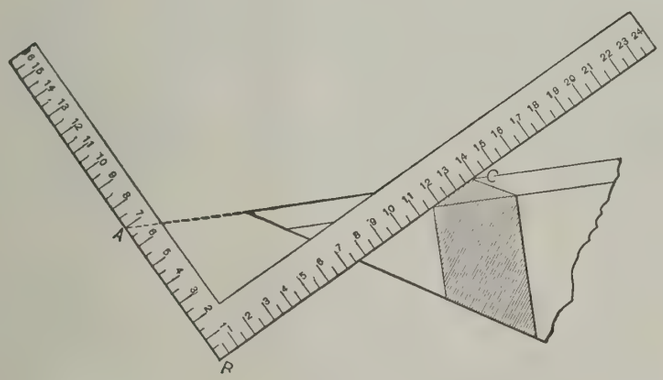


Fig. 2.

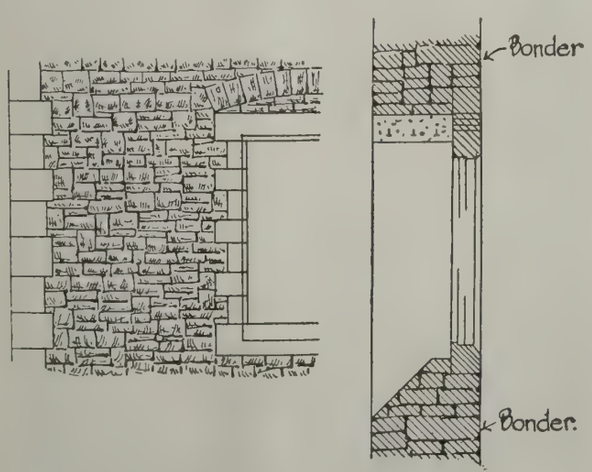
join H D, G F, then H D, G F are the hip rafters. In order to find the bevel of the back of these from any point j in F G draw the perpendicular ji, cutting E F in i, and through i draw perpendicular E F the line Lm, cutting F C and F D in L and M; make i K equal to i j, and joint K L, K m and the angle E K P is the angle of the back of the hip rafter.

Figs. 2 and 3 show two other methods which are so obvious as to require no further explanation.

UNCOURSED RUBBLE, ASHLAR QUOIN.

From "Mason," Scranton, Pa.:

For the benefit of "Perplexed," I submit the inclosed illustrations which show a very good example of Uncoursed Rubble, Ashlar Quoin, etc.



Uncoursed Rubble, Ashlar Quoin.

SIDE CUT OF HIP AGAINST RIDGE.

From "Lloyd S," York, Pa. In reply to Engineer, Edmonton, Alta., I may say, hip rafters are laid out the same as common rafters, except that 17 inches is used for run instead of 12 inches as for the common rafter, because it requires 17 inches run for the hip rafter to equal 12 inches run for the common rafter, or because 17 inches is the hypotenuse of 12 inches square. Lay the square on the side of the stick at the top end, as shown in plan (Fig. 5), with 6 inches and 17 inches the pitch hip rafter, and mark the down bevel A B. Find the exact thickness of the stick at this end, and set it off at right angles to the down bevel A B, and mark the top

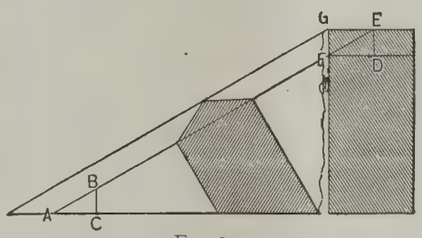


Fig. 3.

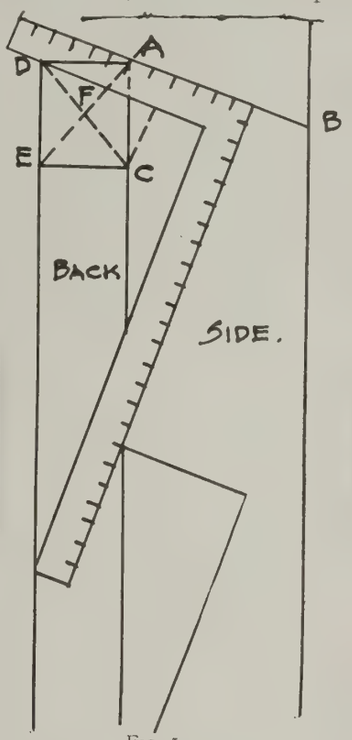


Fig. 5.

corner of the stick at C. Square across the back of the stick C to the opposite side E. Mark the diagonal A E. Cut to marks E A B, which will give the side and down bevels against the ridge poles; if the hip rafter is to fit against the corner of deck plate then square across the back from A to D, and lay out the opposite side the same as above, and mark diagonal, D C. Cut to marks A B, to the center F, and D B on opposite side of center F. If the hip is to fit against the straight ridge pole, cut through one way only, either right or left, as may be required, or as first laid out. This will complete the lay out of the top end of the hip rafter.

QUESTIONS

HOME-MADE REFRIGERATORS.

From E. G. M.:

Would like it if you would give me some information through your paper on how to build an ordinary refrigerator.

CEMENT FLOORS IN DWELLING HOUSES.

From W. H. C., Des Moines, Iowa:

I am endeavoring to get some information concerning the practicability of using cement floors on the second and third stories of a dwelling house, and it occurred to me that possibly you might be able and willing to give me some information on this matter. I would appreciate it very much if you can do this, and also if you can refer me to any people who have had experience in this matter.

PLACING HINGES ON DOORS.

From "Frank C. N." Ponoka, Alta., Canada. Please inform me as to the proper distances to place the hanging hinges, on top, and on bottom of doors of different sizes; also how high should door locks be from the floor? I would also like to have some detailed information regarding the construction of eye-brow windows on roofs.

HIP AND VALLEY RAFTERS.

From "John T. F.," Rochester, N. Y. What is the proper way to obtain the check cuts for a hip or valley rafter? Some workmen contend that the length of hip and run of roof are the proper figures on the square to use, while others use the length of common rafter on run of roof, which method also gives cuts for jack rafters as well. Which of these methods is the proper one?

DOVETAILING.

From "S. J. C.," Brooklyn, N. Y.

I would be pleased if some reader would illustrate a good and easy method of making dovetail joints for drawers, boxes and similar work, and describe the process.

MORTISE & TENON JOINTS.

From A. S. W., Peoria, Ill.

I would like to ask through the NATIONAL BUILDER if some brother reader will give some information on the proper proportions and laying out of mortise and tenon work. I believe there is some standard rule to go by. I have some large heavy door stuff with the panels made of D. & M. material, these doors being so large and heavy I intend to make them on the job. And would appreciate some pointers, as I will not get to them before about January 1st. I hope some fellow reader will reply in time for the December number.

ESTIMATING FLOORING.

From W. C. A., Chicago,

Editor NATIONAL BUILDER.

Dear Sir:

Will you kindly publish the methods used by lumber men for figuring D. & M. lumber, or in other words, how much must we buy of the various widths to cover say a 100 square feet of surface. This information will, I am sure, interest a large number of your readers, as it seems very confusing to many.

MEASURING FOR GLASS.

From W. A. H., Gillespie, Ill.:

Please answer through the columns of your valuable paper the following questions: Some time ago I ordered from a planing mill four single sash 18 inches by 42 inches, 1⅜-inch thick leaded glass. When the sash came they were 4 inches wider and 5 inches longer than I ordered. The mill claims to have taken the size I gave for the glass size. I claim the sash are wrong. Will you please advise which is right and what the rules are in regard to ordering material of this character?

AMATEUR WOOD CARVING

So much has been written on the subject of wood carving that we are pleased to show some examples of amateur work. The





three cuts shown on this page are the work of Mr. Chas. Saffer of Erie, Pa., and show a good understanding of the beautiful art of carving.

Wood carving is one of the arts which call for a great deal of thought and care, and offers a free field for the artistic imagination. The finished carvings may be used as ornaments to otherwise plain furniture, or may decorate the trim, stairs, mantels, etc., of the house. The exposure of the grain by carving often brings out many beautiful variations of the grain of the wood which would otherwise remain hidden.

We feel that the designs offered from time to time in the magazine are of great value to any one interested in this line of work.



TWO MODERN CONCRETE BUNGALOWS

(From drawings submitted in a competition by the Cement Products Exhibition Company, Chicago, Ill.)

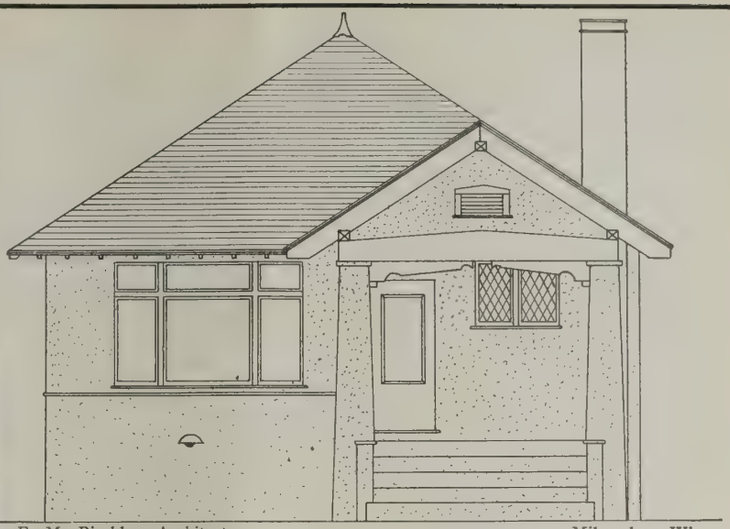
As a competition rarely restricts the draftsman as much as a private owner does, it is possible in plans of this character to display to the fullest extent the ideals in design and construction.

The drawings by Mr. Wilcox embody many excellent features in the way of closets, cupboards, and general arrangement, and show the possibilities of a practically square house. With concrete block walls, reinforced concrete floors and roof, the cost is estimated at $4,230.00, exclusive of plumbing, heating and lighting fixtures.

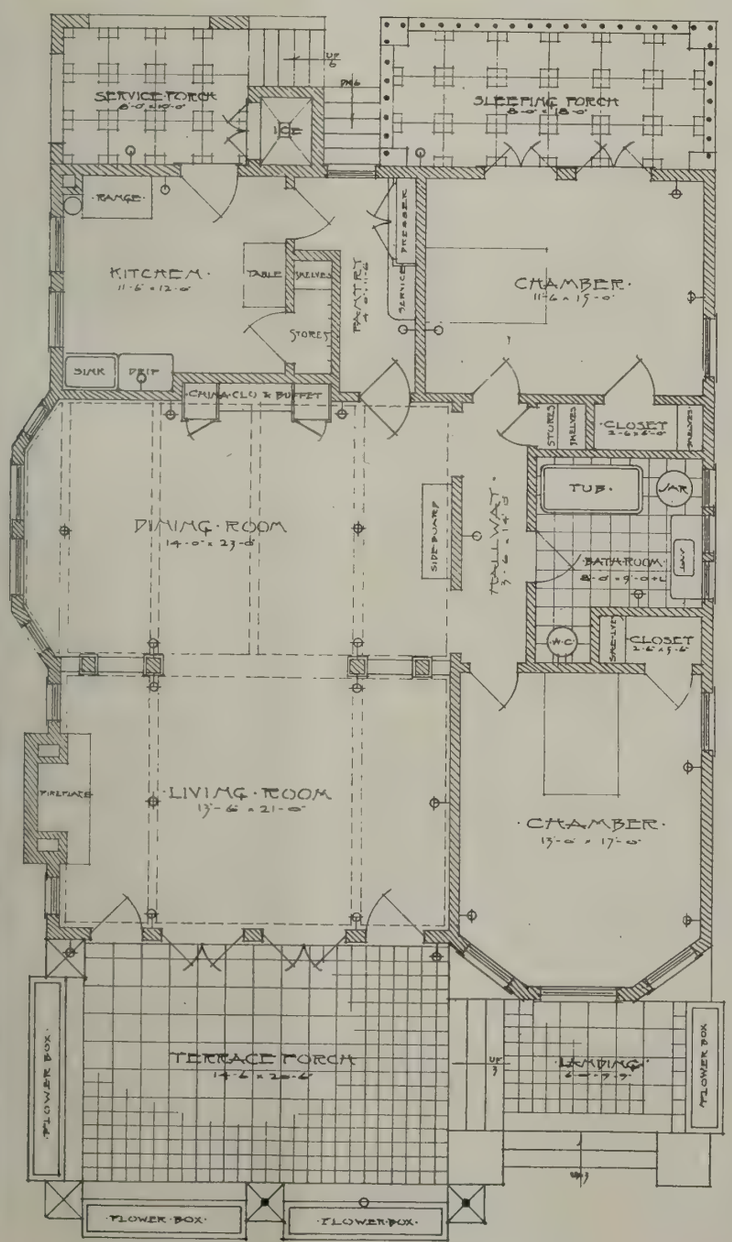
Mr. Birchler, by economy in design and materials, using monolithic walls and floors and roof, wood partitions, etc., keeps the estimate of his design down to $2,076.00.

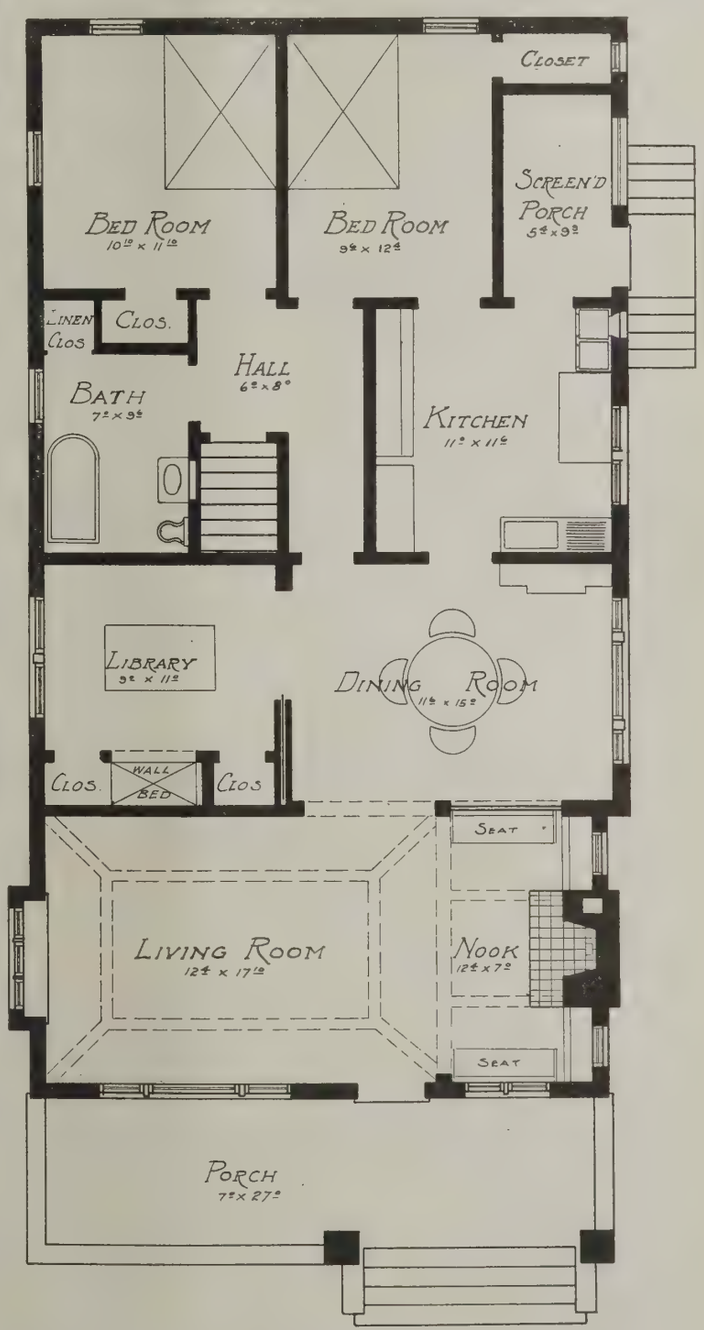


F. Nelson Wilcox, Architect. New York.



E. M. Birchler, Architect. Milwaukee, Wis.





BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

THE CONTRACTORS' SEARC LIGHT: This is a book specially arranged for Carpenters, Contractors and Builders, containing estimate record forms, time book, itemized lists of lumber and hardware, estimating materials, excavation table, nail table, bridging table, capacity of cisterns, area of gables, dimensions of furniture, rafter pitches, rafter tables, table of weights and capacities, etc. Compiled by M. M. Ferguson. Published by The Searchlight Publishing Company, Des Moines, Iowa. Paper cover, 92 pages, on good paper, nicely printed and the whole gotten up in a handy form for use as a pocket book. Price, postpaid, one dollar. Can be obtained at the office of publication, or from the office of the NATIONAL BUILDER.

The main features of this book may be given as follows: First, printed estimate forms for making estimates, each form having an itemized list so arranged that no material or sub-bids need be omitted when making an estimate. Second, itemized lists of lumber and hardware, to prevent omission of material necessary for the whole building when listing from a plan.

There can be no question on the usefulness of the book, and every man who takes a contract—large or small—would save many times its cost, if he only makes proper use of its pages.

THE CONTRACTORS' AND BUILDERS' HANDBOOK. By William Arthur, author of "The New Building Estimator," 370 pages, 3x5 inches. New York, David Williams Company, Publishers. Price, $2.00.

This is a well gotten up book—in every particular—the paper, binding and press work being considerably above the average, like unto most of the books published by the well known firm of David Williams Company. The contents, for a technical work, are somewhat unique and lead out of the old and beaten paths as first laid out by Halfpenny, Moxen, Paine, Peter Nicholson, Riddell, and a hundred lesser lights. Mr. Arthur brightens up his work with flashes of quaint humor and amusing satire, and occasionally a pleasing joke, always suited to the condition in hand.

The real value of the book to the contractor, however, consists partly in the way he places before his readers the advice, hints, and methods of procedure in contracting, estimating and prosecuting the work.

The book is divided into three parts or chapters, each part being a sort of treatise unto itself, and complete, so far as it is intended to be so, and may be studied with profit, even if the other parts are not in the curriculum; though it will be much more to the interests of the contractor, if he reads the book as a whole—and digests the whole oyster.

Part 1 deals with the business side of contracting, showing what ought to be done when arranging with architects, owners, material men, insurance men, sub-contractors and others.

Part 2 gives hints, and exhibits proper methods of arriving at the exact cost of labor and materials in given blocks of work, and removing that terrible nightmare—guess work, from the contractors' dreams.

Part 3 is written in a vein of satire, and gives some sharp finger raps, to some of those foolish braggarts who are continually claiming for themselves, and their friends, all the biggest things that ever were, or ever can be built, also all the most beautiful, the most dazzling and most useful, in architecture and in their own persons, can only be found in—let us say—Timbuctoo. This part is very interesting, and those whose thinking spheres are too large for their hats might learn something that may prove of value to them when discussing the greatest and best things of this little world.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,004,208. Window-lifting mechanism. H. H. Schroyer, assor. General Railway Supply Co., Chicago.

1,004,477. Sash-lock. Jos. F.; M. J.; and L. D. Schwer, Pittsburg, Pa.

1,004,100. Wall with metallic lathing. P. Stolte, assor. ½ S. Katbenstein, Charlottenburg, Germany.

1,004,844. Composition for coating molds for concrete. Wm. W. Bennett and C. S. Pilkington, Westerville, Ohio.

1,004,873. Pivoted sliding window. M. Haberle, Brooklyn, N. Y.

1,005,114. Sound-proof door. I. Hamlin, Chicago, Ill.

1,004,672. Window construction. F. L. Molby, Detroit, Mich.

1,004,938. Skylight construction. J. D. Thompson, Washington, D. C.

1,005,611. H. L. J. Crochet, assor. Societe Anonyme des Manufacturers de Glaces et Produits Chimiques de Saint Gobain, Chauny et Circy, Paris, France. Glass paving block for the construction of luminous floors of reinforced concrete.

1,005,249. Fireproof window construction. E. H. Lunken, Cincinnati, Ohio., assor. The Lunkenheimer Co.

1,005,344. Reversible window. A. C. Soule, assor. Soule Reversible Window Co., San Francisco, Cal.

1,006,423. Concrete floor construction. C. B. Asher, Washington, D. C.

1,005,818. Concrete and stucco paint oil. C. Ellis, Montclair, N. J., assor. Ellis-Foster Co.

1,006,119. Ventilating device. F. J. Nies, East Orange, N. J.

1,006,946. Sliding door construction. John A. Hussey, Indianapolis, Ind.

1,006,668. Ventilator. Wm. McDermott, assor. one-third L. P. Grant, Boston, Mass.

BUILDING TRADES INTERESTS IN THE COURTS.

Where the time fixed for the completion of a building contract is extended, the owner may cancel the contract for the contractor's failure to complete within the extended time.—Fraenkel v. Friedman, 92 N. E. (N. Y.) 666.

Where a building contract provides that materials shall be furnished and labor performed for a gross sum, and the contract completed by a specified day, the owner may insist on a strict performance, and put an end to the contract for failure to perform by the day fixed.—Fraenkel v. Friedman, 92 N. E. (N. Y.) 666.

Where on a building contractor's failure to perform within the time fixed, as extended, the owner did not cancel the contract, but notified the contractor that his employment was terminated, and that the owner would enter and complete the work included in the contract himself, the contractor was entitled on completion of the work to recover the contract price less the cost to the owner of completing the work.—Fraenkel v. Friedman, 92 N. E. (N. Y.) 666.

Where a building contract provided that on the contractor's default the owner might terminate the contract and enter and complete the work at the contractor's expense, such provision did not preclude the owner from canceling the contract for a substantial failure of the contractor to perform.—Fraenkel v. Friedman, 92 N. E. (N. Y.) 666.

Where payments of the contract price to a contractor erecting a building were made with the knowledge and consent of a materialman who directed the owner to pay the contractor, the materialman may not enforce a lien for the materials furnished.—Capital Lumber & Mfg. Co. v. Crutcher, 131 S. W. (Ky.) 176.

Under Rev. St. Me. c. 93, section 29, giving a mechanic's lien for labor or materials furnished in erecting, altering, or repairing a house, building, or appurtenance by virtue of a contract with or by consent of the owner, as contrued by the Supreme Judicial Court of the State, the lien relates back and becomes effective as of the date of the contract under which the labor or materials are furnished—Central Trust Co. v. New York v. Bodwell Water Power Co., 181 F. (U. S.) 735.

The surety for a contractor on a building contract cannot maintain an action for the foreclosure of a lien for materials furnished in the carrying out of the contract and erection of the building, where it appears that the full contract price has been paid to the contractor, or on his order, prior to any claim being made by the surety or notice being given to the owner of the building.—Sanders v. Keller, 111 P. (Idaho) 350.

Where a building contract was indefinite or uncertain in certain particulars, and the principal obligor placed his own construction and interpretation on the contract, and erected the building in accordance therewith, and there does not appear to have been any fraud or collusion between the contractor and the owner of the building, **held** that the surety will be bound by the construction placed on the contract by his principal.—Sanders v. Keller, 111 P. (Idaho) 350.

The lien upon buildings or other improvements and upon the land upon which they are situated, created by section 2869, Ind. T. Ann. St. 1899 (section 4402, Mansf. Dig. St. Ark.), in favor of any person who performs any work or furnishes any material for the erection of such buildings or improvements, does not attach to the buildings or improvements separate and apart from any interest of the owner of the improvements in the land on which the same are located—Keel v. Ingersoll, 111 P. 214.

Where a contractor, putting up several buildings for different persons, bought the material therefor from one man and made payments on the price thereof from time to time, without any application of the payments to any particular purchase, the seller could apply the payments to the debts as he chose, and enforce the materialmen's lien against one of the buildings for which he had supplied lumber, though the owner of such building had paid the contractor in full.—Thacker v. Bullock Lumber Co., 131 S. W. (Ky.) 271.

Where a building contract provided for payment only on an architect's certificate, which was refused, and the builder sued, alleging that the certificate had been fraudulently withheld, an instruction authorizing a recovery on the contract in case the jury found from all the evidence that the architect ought reasonably and fairly to have been satisfied with the work and approved it, and issued his final certificate, was erroneous, as substituting the judgment of the jury for that of the architect.—Cope v. Beaumont, 181 F. (U. S.) 756.

Decedent was struck by a stone dropped by defendant's superintendent from a staging. It was customary to lower large stones by a derrick, at the foot of which decedent was working, and to drop smaller ones after warning. The superintendent, being about to drop the stone that struck decedent, gave two warnings, both of which were heard by decedent, who, after the second warning, left a place of safety and ran out from under the staging just as the stone was dropped, and was struck. **Held** that the mere fact that the stone was dropped, instead of being lowered, was not in itself evidence of negligence.—Wicklund v. Howard, 92 N. E. (Mass.) 705.

Where plaintiff contracted to make certain alterations and additions to a building under the directions and to the satisfaction of an architect, acting as agent for the owner, who agreed to make final payment within thirty days after the contract was finished, provided the architect should certify in writing that all the work, on the performance of which payment was to become due, was done to his satisfaction, and, after the contractor had completed performance, the architect refused a final certificate, plaintiff could recover on the contract, provided he could prove substantial performance, and that the architect's certificate had been fraudulently withheld, and if the contract had not been substantially performed, but the work done was accepted by the owner, then plaintiff could recover the reasonable value thereof on quantum meruit under the common counts.—Cope v. Beaumont, 181 F. (U. S.) 756.

Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Omaha, Neb. Corrected by I P. Hicks.	Los Angeles, California, by Courtesy of B & C.
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM S 2 S	M ft BM R G
2"x4" to 8" up to 16', No. 1	yp $20.00	yp $27.00	op $22.00 to 24.00
2"x4" to 8" up to 16', No. 2	16.00	25.00	21.00
2"x4" to 8" 18 & 20', No. 1	21.00	28.00	23.00
2"x10" up to 16', No. 1	21.00	29.00	24.00
2"x12" up to 16', No. 1	22.00	31.00	24.00
2"x14" up to 16', No. 1	24.00	*	25.00
Each 2 ft. over 20 ft., add per M	1.00	1.00	1.00
Select stock as above, add per M	5.00	*	10.00
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
1"x3" to 1"x8", No. 1	yp $35.00	yp $46.00	rw $35.00
1"x10", No. 1	35.00	44.00	36.00
1"x12", No. 1	40.00	48.00	37.00
1¼"x3" to 1¼"x12", No. 1	42.00	50.00	50.00
1½" and 2" same as above	42.00	50.00	52.00
1" drop siding, No. 1	25.00	32.00	26.00 to 30.00
½" lap siding, No. 1	18.00	30.00	18.00 to 20.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft BM S 1 S	M ft. BM D 2 S
1"x4" to 1"x8", No. 1	yp $18.00	yp $25.00	op $25.00 to 30.00
1 x8" to 1"x10" No. 1	18.00	24.00	25 00 to 30.00
1"x10", No. 1	18.00	24.00	30 00 to 35.00
1"x10", No. 2	15.00	22.00	25.00 to 30.00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.
⅝", T. & G. Flooring No. 1	yp $30.00	yp $40.00	op $40 00
⅝", T. & G. Flooring No. 2	25.00	36.00	35 00
Add for ceiling per M	1.00	2.00	1.50
Add for partition per M	2.00	2.00	2.50
¾"x4", Ceiling No. 1	25.00	30.00	27.50
	100 ft. run	100 ft run	100 ft run
4¼" Moulded Casing	yp $1.85	yp $2.00	rw or op $3.00
4¾" Moulded Casing	2.10	2.50	3.50
7¼" Moulded Base	3.25	3.50	6.00
⅛"x9¼" Moulded Base	3.75	4.00	8.00
1⅛"x4½" Moulded Window Stool	3.00	4.00	7.50
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	rw $3.50	$4.25	rw $2.75
Shingles, No. 2	3.00	3.75	1.75
Shingles, fancy	5.00	4.50	rw 3.75
Lath, 4 ft., No. 1	yp 3.60	F 5.50	4.50
Lath, 4 ft., No. 2	2.75	5.00	3.50
Pickets, 1"x3"x4' 6", dressed	40.00	30.00	25.00
Pickets, 1 x3"x4' 6", rough	*	*	20.00
	Piece.	Piece	Piece.
6"x8' Post split	Cdr $0.13	Cdr $0.30	re $0.30
8"x8' Post split	.20	.35	.40
8"x8' Post whole	.44	.40	.50
6"x8' Post whole	.25	.35	.40
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3.50	$3.00	$3.00
Nails, cut, common	4.00	*	3.10
Nails, wire, fine finishing	1.60	3.50	3.50
Sash Weights, cast iron	1.50	1.50	1.60
Tarred Felt Paper, best 2-ply	Roll, *	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply	*	1.25	*
Red Rosin, Atlas brand	.90	.90	*
Red Rosin, durable brand	.75	.75	*
Black Neponset		*	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	$9.00
Brick, blue, at kilns, No. 1	*	*	6.50
Brick, blue, at kilns, No. 2	7.50	*	6.00
Brick, white, delivered, face	7.00	7.50	*
Brick, red, delivered, backing	7.00	*	*
Brick, delivered, dry pressed	18.00	18.00	*
Brick, vitrified, dry pressed	*	24.00	*
Lime, best gray	bbl. $1.30	bbl. $1.25	bbl. $1.80
Lime, best white	1 40	.25	2.00
Cement, Portland	0.95	1.85	2.15
Plaster, calcined	2 40	1.80	2.25
Hair, 8 lb. per bush	.25	.25	0.48

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

FIREPROOF CONSTRUCTION

By WARFIELD WEBB

THERE are two factors that stand foremost today in the matter of construction, one of which, at least in the past, has been considered in a kind of vague or desultory way by the majority of builders. This refers to protection against fire. It was but natural, to a great degree, that such should be true. It was not altogether carelessness or ignorance, grossly speaking, but came of a lack of knowledge of the proper materials that would resist the flames to a greater degree.

Beauty is the other factor that comes in for a more general consideration now. If we are to combine beauty in with fire-resisting attributes in the matter of building construction, shall we not have the highest ideals that are possible? If a building is beautiful and still lacks in ability to resist the all-devouring element of fire, there is little use to expend money in rearing it. The element of constant danger is far too great to repay one for the outlay.

It is beginning to become more universally recognized as a fact that this is so. Men are now combining these two important details into one, and the result must be the highest possible ideal in house construction. There are several reasons for this change. One is due to the increased losses from fires annually in this country. These have grown with bounds almost unprecedented in the world's history. Then there has been the steady rise in fire insurance rates, made possible by the disregard for the risk in erecting our buildings of materials that will prove a bulwark against fire. It was noted that the most elaborate structures were sometimes destroyed within a short time on account of laxity in protection.

These were sufficient at least to awaken in the minds of the building public a desire for a greater caution, and the outcome is now seen in the care that is being made in the matter of constructing many of our buildings. Some of us, and it may be added that this includes a large number, have had to learn these things from actual experience. We might have deplored the loss that was sustained by others, but it has taken an actual loss to ourselves, in a number of cases, to prove the real necessity of more and greater protection.

It must not be supposed that this protection can be had simply by making the walls of the structure fire resisting. The beams, girders, joists, studding, floors, partitions, windows, roof, all these must combine to reduce the risk that is encumbent upon every structure. The more congested our cities become the greater danger from fire, unless we all unite in building to prevent the spread of flames. If one owner will erect a fireproof building and another a semi-fireproof structure, there will be at least some danger to some property. What is desired is the entire erection of buildings that will withstand the ravages of the flames, and in this way save us many thousands of dollars losses annually.

The old fear and the old story of first cost has stood in the way of progress along this line for years. That the average builder cannot afford to erect a building that is proof against the flames is no longer an argument against the erection of such buildings. Can he afford to take the risk, and can he afford to pay the increased insurance rate in order to save a few dollars in the first cost? If he cannot afford to build in a sane way far better had been that he build not at all.

Along with the demand for better buildings, and more pleasing forms of architecture, there must come a greater revision of our building laws. Without this assistance there shall continue to be a large number of buildings erected that will serve only as inviting fires, and of endangering lives and other property with a greater or less amount of loss.

Our laws should be as iron clad as our regulations against the spread of disease. In protecting the lives by our health departments we should seek to protect them from the awful results of fires. There have been instances in the past few years appalling in their consequences, as statistics will prove, that could and should have been prevented.

It must be stated that there are many buildings today that pass muster as fireproof, that will not withstand the flames an hour. These are still being erected under the guise of fireproof buildings. The fault lies for the most part in our laws. They are weak in some respects, and the only way to make them perfect is through Government action. Make them universal, as far as certain points are concerned, and in this way secure the lives and the property of many who now are satisfied to risk so much for the sake of saving a few dollars.

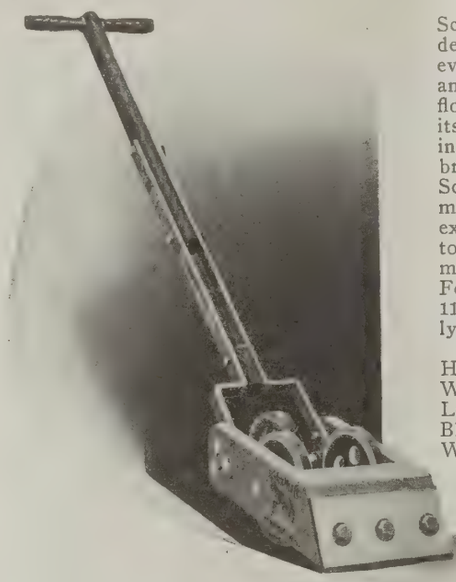
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FLOOR SCRAPING.

However good material is furnished for flooring, there are many opportunities for producing an inferior floor. The material may be damaged by careless handling or exposure to the weather. Plasterers, masons, etc., may work over it and grind the sand and lime deep into the grain. Inferior workmanship may jamb the sharp corners, producing unsightly bruises, or the painter may save a few cents or a few minutes' time and so ruin the appearance.

But probably the greatest possibility for good and evil lies in the scraping. A dull or loose knife chatters across the floor and leaves a succession of ridges; a high corner on the knife leaves a sharp cut groove wherever it travels. Various makes of machines have more or less good points in construction, but the main idea is to produce a perfectly smooth floor with the least possible labor.



The Fox Floor Scraping Machine was designed to produce an even, smooth surface on any kind of hard wood floor. The simplicity of its construction not only insures a minimum of breakage, but places a Scraping Machine on the market at a price that is exceedingly interesting to the contractor. The manufacturers are the Fox Supply Company of 115-123 King St., Brooklyn, Wis.

	Inches.
Height of frame.....	4
Width of frame.....	9
Length of frame....	14
Blade 3x9	
Weight, pounds.....	80

The machine is so perfectly balanced that the weight is exactly where it should be at all times. When in operation, 85 per cent of its weight is resting on the blade, exactly where the weight is required, making the work of the machine purely automatic and requiring no skill on the part of the operator. When not in operation the weight is so perfectly balanced on the wheels that it automatically raises the blade clear of the floor, eliminating all danger of marring or scratching the floor through carelessness.

The frame of this machine is carried on three rubber-tired wheels, two working independently on a roller bearing, the third wheel acting as a rest on the back stroke. A brush upon the forward stroke throws the shaving away from the knife, and also enables the operator to easily turn the machine in any direction and do perfect work in any position.

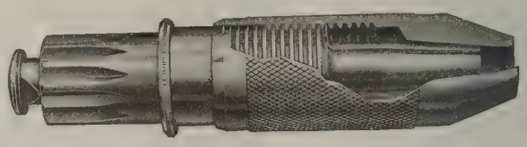
After this machine had been placed on the market it was improved to its present state of perfection and is now fully guaranteed by the manufacturers to do rapid and perfect work under all ordinary conditions. One of the marked improvements is the addition of a rubber pad, 3x9 inches, placed over the knife, which consumes all the jars, protects the knife and insures a floor free from all waves and chatter.

The Fox Supply Company is making a specialty of Scraper Knives. They have established a reputation for the tempering of their blades and their facilities insure prompt deliveries.

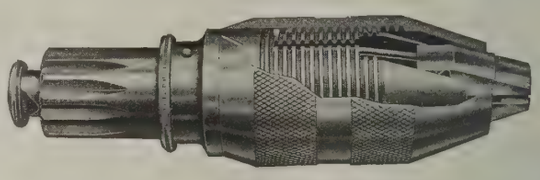
NEW AUGER BITS AND BRACES.

The first-class mechanic appreciates quality in tools of every description, whether it is a saw, a plane, a hatchet or a bit. Not alone must the temper of the cutting edge be just right, but the very form, action and balance of the tool must be suited to the work. In the manufacture of auger bits and braces, the workmanship must be such that accurate and rapid work is possible, and this calls for a high grade of workmanship as well as material.

The methods of finishing the shank of bits and the chucks of

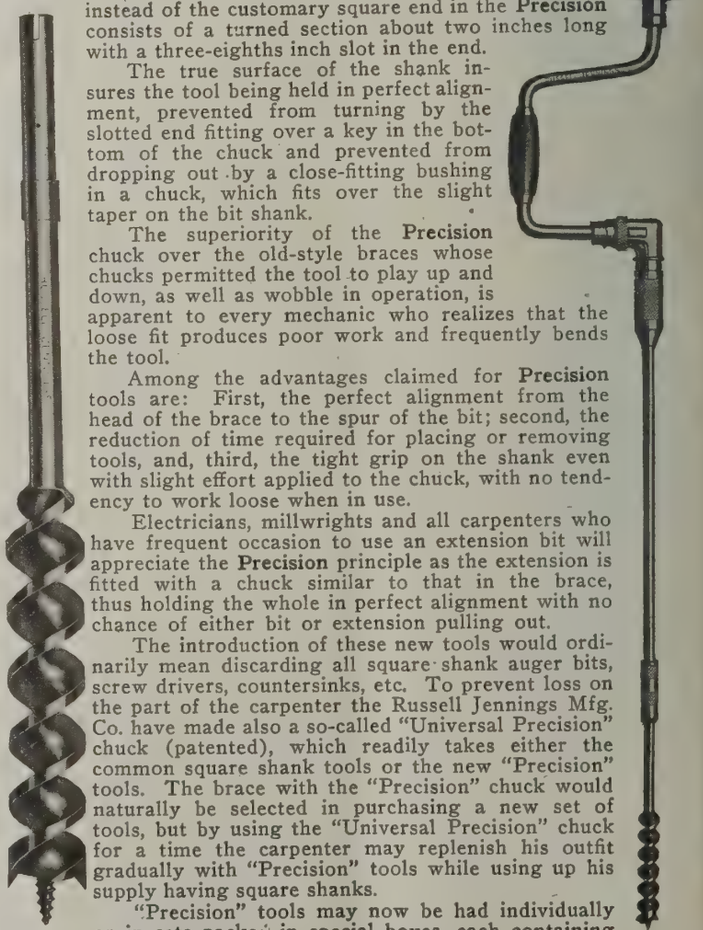


braces has been more or less unsatisfactory for many years. There has been too much opportunity for slipping, bending the shank, boring a hole not exactly in line with the brace, etc. Various manufac-



turers have endeavored to overcome these troubles, and we show in this article the method devised by the Russell-Jennings Co.

Because of the accurate results obtained by these tools, the makers have applied the name "Precision" to them. The new features apply principally to the shank, which instead of the customary square end in the **Precision** consists of a turned section about two inches long with a three-eighths inch slot in the end.



The true surface of the shank insures the tool being held in perfect alignment, prevented from turning by the slotted end fitting over a key in the bottom of the chuck and prevented from dropping out by a close-fitting bushing in a chuck, which fits over the slight taper on the bit shank.

The superiority of the **Precision** chuck over the old-style braces whose chucks permitted the tool to play up and down, as well as wobble in operation, is apparent to every mechanic who realizes that the loose fit produces poor work and frequently bends the tool.

Among the advantages claimed for **Precision** tools are: First, the perfect alignment from the head of the brace to the spur of the bit; second, the reduction of time required for placing or removing tools, and, third, the tight grip on the shank even with slight effort applied to the chuck, with no tendency to work loose when in use.

Electricians, millwrights and all carpenters who have frequent occasion to use an extension bit will appreciate the **Precision** principle as the extension is fitted with a chuck similar to that in the brace, thus holding the whole in perfect alignment with no chance of either bit or extension pulling out.

The introduction of these new tools would ordinarily mean discarding all square shank auger bits, screw drivers, countersinks, etc. To prevent loss on the part of the carpenter the Russell Jennings Mfg. Co. have made also a so-called "Universal Precision" chuck (patented), which readily takes either the common square shank tools or the new "Precision" tools. The brace with the "Precision" chuck would naturally be selected in purchasing a new set of tools, but by using the "Universal Precision" chuck for a time the carpenter may replenish his outfit gradually with "Precision" tools while using up his supply having square shanks.

"Precision" tools may now be had individually or in sets packed in special boxes, each containing one brace fitted with either the "Precision" chuck or the "Universal Precision" chuck, one bit exten-

The NORTHWESTERN TERRA COTTA COMPANY

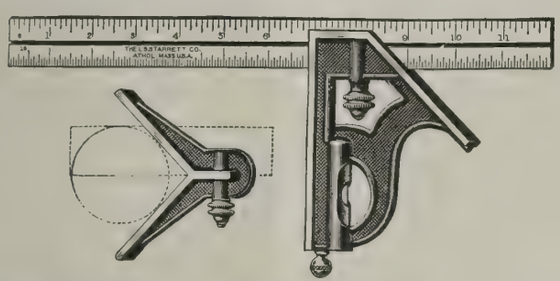
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And You will Then be Able to Close Many a Contract that Would Otherwise be Lost

The demand for Architectural Perspective is increasing yearly because those who build are demanding, in addition to the plans, perspective drawings of their buildings. A well made perspective drawing, properly shaded and set off by a little landscape and secondary detail, pleases the eye, and is a valuable adjunct to the regular plans and elevations. Our correspondence course in ARCHITECTURAL PERSPECTIVE and DRAWING of BUILDINGS is complete, practical, and can be learned at home at odd times. Instruction likewise given in twelve separate, complete Art Courses, for pecuniary profit, or pleasure only, as desired. Year Book sent upon request.

SCHOOL OF APPLIED ART
Battle Creek, Mich. U.S.A.
677 APPLIED ART BUILDING



¶ That's what one Carpenter said when writing about his experience with Simonds Hand Saws.

¶ It would be entirely too broad a claim to say that none of them ever did come back, but we believe that dealers have to give "money back" on fewer Simonds Saws than any other brand of Hand Saws.

¶ Here's what one dealer in a large city in Pennsylvania writes: "The Saws I return you by express are the only ones to my knowledge returned for exchange in all the years I have bought your line. We have less exchanges on Simonds Saws than on any other brand and sell twice as many of them."

¶ A Carpenter in Cairo, N. Y., writes: "Five years ago I bought two Simonds Hand Saws, one Rip and one Cut-off. They are certainly the nicest running saws I have ever used. The Dealer said if they were not better than any other make I ever used to bring them back. I never took them back."

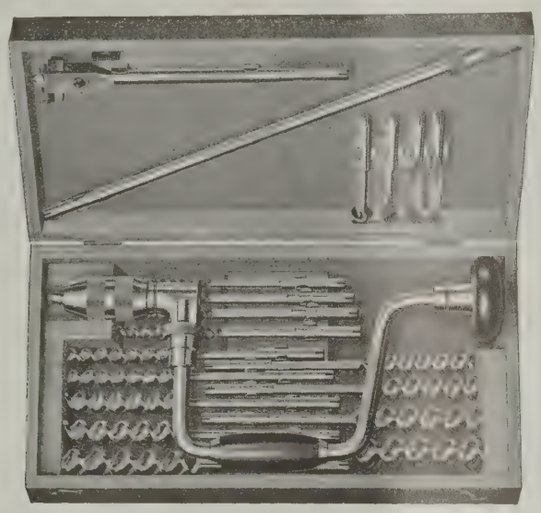
¶ Ask your Hardware Dealer for Simonds Hand Saws or write us about the kind of a Saw you are wanting.

Simonds Manufacturing Company

Fitchburg, Mass.
Chicago, Ill.
New York City
New Orleans
San Francisco
Portland, Ore.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

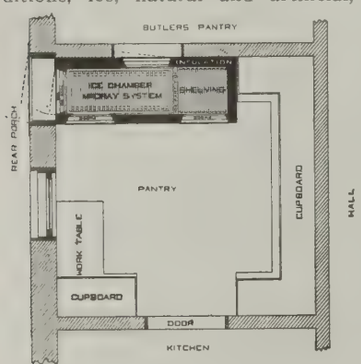
sion having small "Precision" chuck, one expansive bit with large and small cutter, and a set of bits from ¼ inch to 1 inch by sixteenths (32½ quarters), two screw drivers, and one countersink for metal and one for wood. This complete set of finely finished tools is made of



selected tool steel and with the fine workmanship that characterizes all Russell Jennings bits. All these tools bear the name "Russell Jennings" on the "Precision" shank, which name is the sign of boring tool perfection.

REFRIGERATORS.

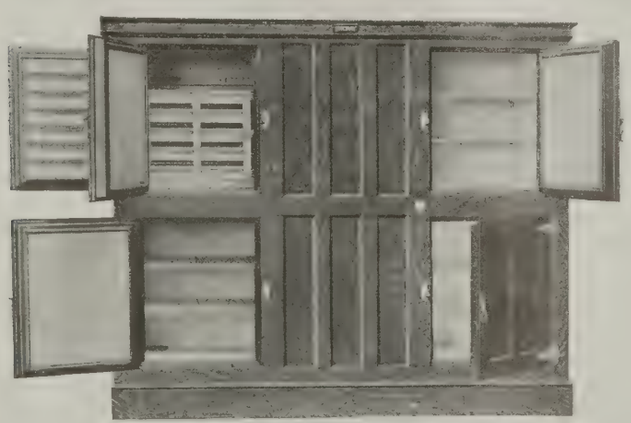
Nature has been lavish in the supply of raw materials, coal, wood, minerals, etc., and the ingenuity of man has found many ways to use the materials and modify conditions to his own uses. Until a few years ago the use of ice, except in favored places where it could be stored in winter, was unheard of. Now, through modern conditions, ice, natural and artificial, is considered a necessity, not only in the temperate zone, but in the tropics and the demand is met by artificial ice made on the spot or by natural ice shipped from the large storehouses on the Northern Lakes.



One of the features of the modern house to which more attention is being paid than formerly, not only by the owner, but by the builder, is the refrigerator. This may either be built to order or be a stock size box with rear or side icing door, adapted to the space where it is intended to go.

The McCray Refrigerator Company of Kendallville, Ind., has paid special attention to built-in refrigerators and co-operates with owner, architect and builder in planning and building the style best suited to the needs. It maintains a special drafting department for the sole purpose of preparing plans for prospective purchasers.

There are many ways in which a refrigerator can be located so as to combine convenience with economy in space. The illustrations



show a very desirable arrangement. The refrigerator, which is lined with Opal glass, is 84 inches wide by 30 inches deep by 72 inches high. It is placed in the corner of the pantry and has an ice door in the left end opening onto the rear porch. It has three storage doors, that to the center compartment opening into the butler's pantry.

"McCray Refrigerators in American Homes" is an illustrated book published by the McCray Refrigerator Company and in it are illustrated and described every conceivable arrangement for both built-to-order and stock refrigerators. One of these booklets may be had by mentioning THE NATIONAL BUILDER.

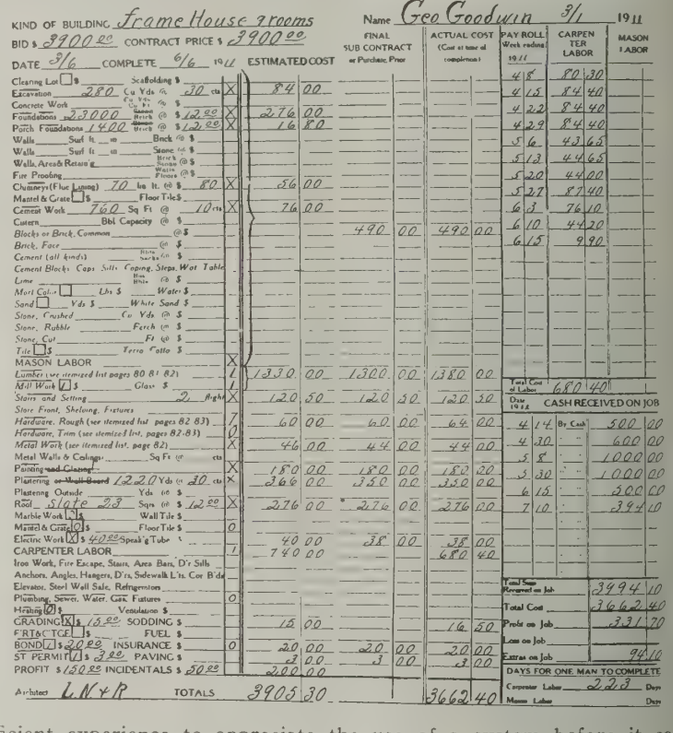
THE CONTRACTOR'S SEARCHLIGHT.

Whatever light can be thrown on the subject of estimating is of great value to the contractor. Nearly every contractor is enough of a mechanic to direct his work and see that it is finished properly and on time, but how many can readily take off a set of quantities for even a simple job and be sure they are correct and complete?

Specializing may be carried to the extreme in this branch of the work and in our larger cities are many men who do nothing but estimate one job after another. To such the routine gets them into a system such that the tendency to omit anything is reduced to a minimum, but can the same be said of the small contractor, who must not only estimate, but construct, worry about payments and payrolls, and see that material is on hand? The opportunities for mistakes increase rapidly with the cost of the building, a frame barn contains little besides foundation, lumber, hardware and paint, but how often we see a shortage of material in even these small jobs. A shortage, as a rule, means a mistake in estimating either in quantity or omitting an item entirely.

For more elaborate buildings there are further items which might easily be forgotten when one has many things on the mind. Such items as hardware, glass, anchors, hangers, metal work, plumbing, gas fitting, etc., each have subdivisions which must be watched carefully to make sure everything is included.

When one has a system for making estimates the chance of forgetting something is considerably reduced. One must have sufficient experience to appreciate the use of a system before it can be of much value, so the simpler it is the better.


KIND OF BUILDING Frame House 7 rooms Name Geo Goodwin 3/1 1911
BID $ 3900.00 CONTRACT PRICE $ 3900.00
DATE 3/6 COMPLETE 6/6 1911

		ESTIMATED COST	FINAL SUB CONTRACT	ACTUAL COST (Cost at time of completion)	PAY ROLL Week ending 1911	CARPENTER LABOR	MASON LABOR
Clearing Lot					4 8	80 30	
Excavation 280 Cu Yds @ 30 cts	X	84 00			4 15	84 40	
Concrete Work					4 22	84 40	
Foundations 23000 Brick @ $12.00	X	276 00			4 29	84 40	
Porch Foundations 1400 Brick @ $12.00	X	16 80			5 6	43 65	
Walls Surf ft on Brick @ $					5 13	44 65	
Walls Surf ft on Stone @ $					5 20	44 00	
Walls, Arch & Return'g Brick Stone Waste Piers @ $					5 27	87 40	
Fire Proofing					6 3	76 10	
Chimneys (Flue Lining) 70 lin ft @ $.80	X	56 00			6 10	44 20	
Mantel & Grate $ Floor Tile $					6 15	9 90	
Cement Work 760 Sq Ft @ 10 cts	X	76 00					
Cistern Bbl Capacity @ $							
Blocks or Brick, Common @ $		490 00	490 00				
Brick, Face @ $							
Cement (all kinds) Rosendale Portland @ $							
Cement Blocks, Caps, Sills, Coping, Steps, Wat Table							
Lime Gray White @ $							
Mort Colors Lbs $ Water $							
Sand Yds $ White Sand $							
Stone, Crushed Cu Yds @ $							
Stone, Rubble Perch @ $							
Stone, Cut Ft @ $							
Tile $ Terra Cotta $							
MASON LABOR	X						
Lumber (see itemized list pages 80 & 82)	/	1330 00	1300 00	1380 00			
Mill Work $ Glass $	/				Total Cost of Labor	680 40	
Stairs and Setting 21 Risers	X	120 50	120 50	120 50	Date 1911	CASH RECEIVED ON JOB	
Store Front, Shelving, Fixtures							
Hardware, Rough (see itemized list pages 82 83)	/	60 00	60 00	64 00	4 14	By Cash 500	00
Hardware, Trim (see itemized list, pages 82-83)	0				4 30	600	00
Metal Work (see itemized list, page 82)	X	46 00	44 00	44 00	5 8	1000	00
Metal Walls & Ceilings Sq Ft @ cts					5 30	1000	00
Painting and Glazing	X	180 00	180 00	180 20	6 15	300	00
Plastering on Wall Board 1220 Yds @ 20 cts	X	360 00	350 00	350 00	7 10	394	10
Plastering Outside Yds @ $							
Roof Slate 23 Sqs @ $12.00	X	276 00	276 00	276 00			
Marble Work $ Wall Tile $							
Mantel & Grate $ Floor Tile $	0						
Electric Work $ 40.00 Speak'g Tube		40 00	38 00	38 00			
CARPENTER LABOR	/	740 00		680 40			
Iron Work, Fire Escape, Stairs, Area Bars, D'r Sills							
Anchors, Angles, Hangers, D'rs, Sidewalk L'ts, Cor B'ds							
Elevator, Steel Wall Safe, Refrigerators					Total Sum Received on Job	3494	10
Plumbing, Sewer, Water, Gas Fixtures	0				Total Cost	3662	40
Heating $ Ventilation $					Profit on Job	231	70
GRADING $ 15.00 SODDING $		15 00		14 50	Loss on Job		
FRTGE $ FUEL $					Extras on Job	94	10
BOND $ 20.00 INSURANCE $	0	20 00	20 00	20 00	DAYS FOR ONE MAN TO COMPLETE		
ST PERMITS $ 3.00 PAVING $		3 00	3 00	3 00	Carpenter Labor	22.3	Days
PROFIT $ 150.00 INCIDENTALS $ 50.00		200 00			Mason Labor		Days
Architect L N & R TOTALS		3905 30		3662 40			

Under the name "The Contractor's Searchlight" the publishers, the Searchlight Publishing Company, Des Moines, Iowa, have prepared an excellent outline for the use of the contractor. This form, a reduced page of which we show, serves as a guide for lining up the work when making up the estimate and checking the estimate up when the building is finished.

Another part of the searchlight is ruled off to serve as a weekly or two-weekly time book. This is an always handy section, for too many contractors take a chance on remembering that it rained last Tuesday and the men quit at 3 o'clock.

For the benefit of those who do not care to make many extensions the Searchlight gives excavation tables showing the yardage for foundations of various sizes from 16x20 feet to 40x42 feet and in depth to 7 feet, another table gives the feet of lumber for the commonly used sizes and will aid materially in checking lumber bills, while one can also find the number of nails required for various purposes. A large amount of valuable matter is collected into a comparatively few pages ready for immediate references.

One of the ever present questions is how to cut a rafter, and this subject is given careful attention.

The Searchlight Publishing Company, who are placing this book on the market are confident that every contractor who sees the Searchlight will appreciate its value, and as they offer to refund the price if the contractor is not satisfied, it shows their confidences in it. They have an advertisement on another page of the NATIONAL BUILDER which the reader will no doubt see.

Douglas Fir—"A block-head like you don't need a hair-cut."
Red Cedar—"Oh, I don't know; I can get shingled."

"Mamma," asked a little girl of her mother one day. "Do men ever go to heaven?"

"Certainly," said her mother, "why do you ask?"

"Well, then, why don't angels ever have whiskers?"

"Because," said her mother "they get there by a close shave."
—National Monthly.

Glidden

to the Better Builders

THE BETTER BUILDERS know that in the art and science of building there are no details unworthy of their most exacting and minute attention—no paltry things of little value or of little importance—but that, "from turret to foundation stone," ***all*** is of importance. Wherefore, in their most exacting avocation an aptitude and capacity for taking infinite pains is, of necessity, the rule, where in other fields of endeavor it is too often the exception.

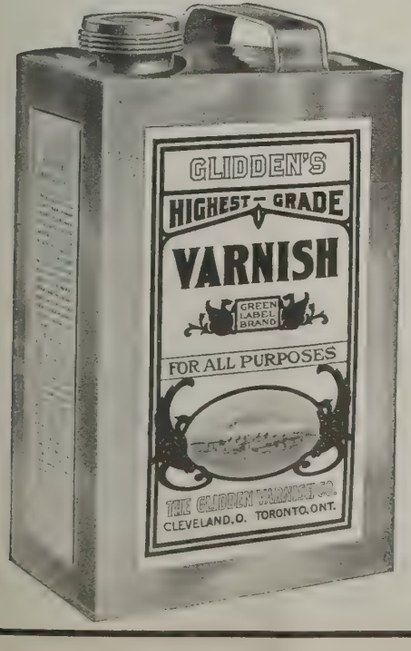
Knowing this, we have prepared for the use of the better builders, Glidden's Green Label Varnishes, Endurance Wood Stains and Specialties. They are being specified by architects and the better builders for the finishing of the finest interior trim in private residences, banks, office buildings, etc.

IF you sublet the varnishing on your jobs, see that the painters use M. P. Durable Interior (the best varnish for interior trim), M. P. Durable Floor (the strongest floor varnish made), Glidden's Velvet White Enamel (the ideal egg shell finish), and Glidden's Superior White Enamel (the perfect gloss white).

When you have to guarantee work make sure that the best material is used.

We will gladly send you, free of charge, a beautiful panel frame showing our Endurance Wood Stains in fourteen different color effects, and the same stains finished with our best interior varnishes. We maintain a special department devoted exclusively to reproducing any color scheme you may care to suggest, and you are welcome to avail yourself of the services of this department ***without cost.***

Glidden's Endurance Wood Stains are the finest in the World—the ultimate wood stains—the stains you will always specify and always use, once you know them. Those who have used them declare that they are so far superior to any other stains that there is no comparison. They enhance the natural beauty of all woods. They penetrate ***without raising the grain,*** and all the colors are permanent.



Write us for free panel frames and literature. Use the attached coupon.

The Glidden Varnish Company

FACTORIES:
Cleveland, U. S. A. Toronto, Canada

BRANCH WAREHOUSES:
New York Chicago London, England

The Glidden Varnish Co., Cleveland, Ohio

Gentlemen: Send me your free panel frame showing Endurance Stains Finished with M. P. Durable Interior Finish (Green Label Brand), and your literature regarding same.

Name .....

Address .....

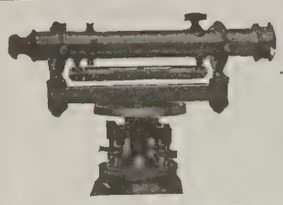
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



THE New Gun Metal Finish

Makes the "STERLING" Builders' Levels by far the most Durable Instrument in existence—1912 Models now on sale. Write today for Catalogue and special prices.

ISZARD-WARREN CO., Inc.
Makers
136 No. 12th St., Philadelphia, U. S. A.

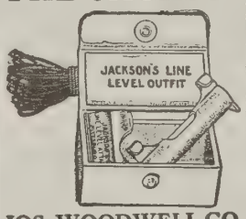


WHITE'S IMPROVED LEVEL

combines Simplicity with Accuracy and Durability. Three features to be found only in the White's Level. We will ship this regular $45 Improved Level for the next 30 days at $40 prepaid to any address. Examine it upon receipt and if found other than we represent it return it to us and your money will be refunded.

DAVID WHITE COMPANY, 421 E. Water St., Milwaukee, Wis.
Write for Catalogue and complete price list.

THE JACKSON ALUMINUM LINE LEVEL



Is designed particularly to meet the requirements of all Mechanics in building construction, especially Bricklayers, Masons, Carpenters, Millwrights, Architects, and Cement Workers.

By using the Aluminum Line Level you can take Levels in one-half the time required by the old method of the Straight Edge.

This is possible because the Aluminum Line Level weighs only one-fourth ounce and is easily and quickly attached to a line. Levels thus taken are guaranteed to be accurate on a stretched line from one to forty feet. Besides, from its construction, it can be used as a Pocket Level.

This cut shows the Aluminum Line Level, including Attachment and 40-ft. line. Complete in Leatherette Case.

PRICE $1.00, POSTAGE PREPAID

It is especially adapted for laying out foundations for buildings. It will do the work no other level will do. For sale at hardware dealers, or

JOS. WOODWELL CO., Sole Agents, 201 Wood St., PITTSBURG, PA.

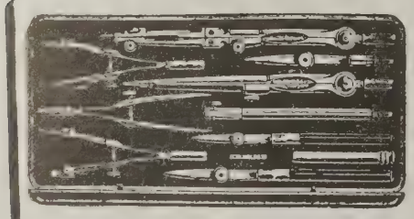
Drawing Materials Surveying Instruments

Drawing and Blue Print Papers, Architects' and Builders' Levels, Drawing Instruments, T Squares, Triangles, Scales, Inks, etc. Steel and Metallic Tapes, Builders' Levels. Repairing promptly executed.

Catalogue on Application

127 Fulton Street New York — KEUFFEL & ESSER CO. — General Offices and Factories Hoboken, N. J.

CHICAGO 111 East Madison St. | ST. LOUIS 813 Locust St. | SAN FRANCISCO 48-50 Second St.



ALOE THE STANDARD FOR 60 YEARS

FREE! FREE! FREE!

Our new catalogue of Civil Engineers' and Surveyors' Instruments, Architects' and Draughtmen's Material, Draughting Room Furniture, Blue and Black Print Papers, is now ready for distribution, and will be mailed on receipt of request.

A. S. ALOE CO., : 511 OLIVE STREET, : ST. LOUIS, MO.

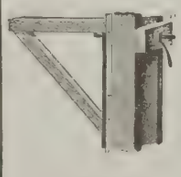
$15 SAVED ON EVERY FRAME HOUSE YOU BUILD WITH

Wheeler Safety Scaffolds

No lumber or nails used—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

Write today for our trial offer

AMERICAN STEEL SCAFFOLD CO., 60 McGraw Bldg., Detroit, Mich.



Rockford Bolt Co. — Strap & T Anchors, Truss-Rods
100 Ruby Street, Rockford, Ills.

BARS FOR CONCRETE WORK
Bolts, Lag Screws and Forgings to Order

Scaffold-Bolts Plates Stirrups Turn-Buckles



WASHERS Cast Wrought Malleable

THE PANAMA CANAL.

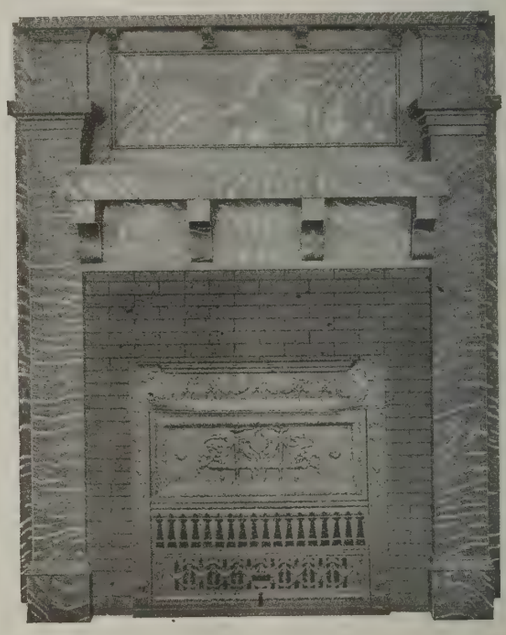
This gigantic enterprise is attracting a great deal of attention on the press as well as among engineering societies, and its completion at an early date should be reason enough to compel every NATIONAL BUILDER reader to be posted on its many peculiar characteristics. For many years we have had the price hurled at us by those who could say millions without using their imagination, the vast quantities of material glibly rattled off exactly as the boulders as big as a house are tossed about by the steam shovels.

But the canal will soon be a reality. It is expected that the first boat will go through the locks January 1, 1913, little more than a year away. It is rumored that the warship "Oregon" will have the honor of first passing through and it is fitting that she should. Probably many NATIONAL BUILDER readers will pass that way, so everyone should look up, read up, and be posted.

Possibly no better map of the Canal Zone has been published than that being distributed by the Tidewater Cement Co. It is printed in colors, the hills, locks and prominent features being highly embossed. A close inspection will show that at this point the ship must go east to get from the Atlantic to the Pacific, and the sun rises out of the Pacific on the Pacific end of the canal and sets in the Atlantic on the Atlantic end. We understand that this map can be obtained by mentioning the NATIONAL BUILDER to the Tidewater Portland Cement Co., Keyser Building, Baltimore, Maryland.

MODERN MANTELS.

The Huber Builders Material Company, 3943 Vine street, Cincinnati, call attention to the illustration of wood mantel which they are featuring and offering at what they state is an unusually low price for such a fine mantel. It is described in their catalogue as being eight feet one inch in height, four feet ten inches wide, wall plates five feet and pilasters six and one-half inches, tile opening 42x42 inches, profile 5 inches. The

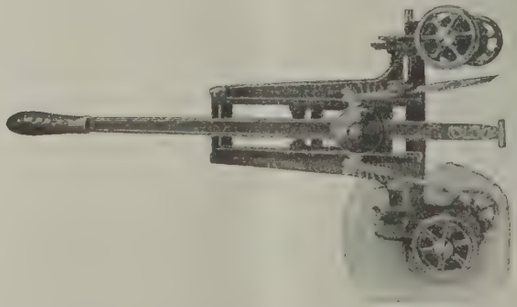


wide panel shown in the illustration aids in making this a very attractive piece of furniture. A fine French beveled plate mirror can be had in place of the panel when desired.

Many other views of mantels are shown in a special booklet issued by the Huber Builders' Material Company. They also issue a catalogue on sash doors, frames, flooring, wallboard, builders' hardware, etc. Both of these will be sent on request.

THE A. W. MILLER MFG. CO.

This company call attention to their lock mortiser, which has been improved until it is now recognized as one of the greatest time and labor saving mortisers on the market. It is no exaggeration or misstatement when the claim is made that this mortiser will cut an opening in any kind of wood complete in three minutes and any carpenter can do it in that time. Many builders who are using the Miller lock mortiser repeatedly



state that they can do the complete job of mortising in two minutes. Of course results always come from the manner in which a tool is handled, whether it is an ax or an up-to-date device. If the builder will have one man bore the two holes and another follow up with the cutter, the job can be done in one minute. There is no other mortiser operated by hand that can beat this time. The A. W. Miller Manufacturing Company have

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

made a study of mortisers for years. All kinds of methods and devices have been carefully tried out, and the cumulative good results embodied in the present form. The mortiser is as handy in the shop as on the job, as it frequently happens that the door is fitted and hangs on the frame before going to the building. This greatly lessens the time spent on the job and allows other mechanics to start their work sooner.

Contractors generally are enthusiastic over the results of the Miller Mortiser and the manufacturers are daily receiving letters from pleased customers.

Mr. D. H. Minton of Panama City, Fla., under date of January 30, 1910, writes as follows: "I have thoroughly tested your lock motiser and find it is one of the greatest time savers I have ever seen. It is a complete piece of machinery and it does the work perfect in every respect. I fully recommend it to any man who wants to put his money in something to get it back at once. It is just everything you claim for it. With thanks for the trial and having notified the agent to forward your money, I remain."

When a contractor talks this way there must be something to the Miller Lock Mortiser. Circulars and price can be had by writing A. W. Miller Manufacturing Company, Nevada Building, Cincinnati. Ohio.

PHENIX REVERSIBLE WINDOWS.

Many of the so-called improvements in building construction are not always an unmixed blessing. As the size and height of buildings increased, the danger from accidents also increased, the loss from fire was much greater on account of the concentration of material.

Among the places where improvement over the accepted forms of construction is noticed is in the windows. To keep the old style



windows clean required getting out on the sill and either sitting on the sill or being held in place by a belt and straps. So dangerous are these windows in the high buildings that many cities require that all sash must be so constructed as to permit being cleaned from the inside. This ruling has brought out several devices for accomplishing this purpose; in some the sash is pivoted, other hinged. In the Phenix Reversible Window the entire frame swings into the room, so that there is no occasion whatsoever for going outside. The



method of doing this is shown in the accompanying cuts. The manufacturers of these windows, The Phenix Manufacturing Co., 0.28 Center St., Milwaukee, Wis., will be very glad to hear from anyone interested in this life and trouble saving device.

EDWARDS PRESSED STEEL CEILINGS AND WALLS FOR THE AMEER OF AFGHANISTAN'S PALACE AT KABUL.

Snobbishness is a characteristic of money laden people whose brains have not been developed. You very often hear people tell—with much pride and gusto—of how they were entertained at some prominent man's house—or of the great time they had at a banquet given in honor of some lord or duke.

These things we know and hear. But to associate and do business with princes and rulers is beyond the dreams of even the most snobbish. However, the Edwards Manufacturing Company, "The Sheet



Look for the "Big Chuck" when you buy a brace

THEN look for "The MARK of the MAKER" and you can be sure it's a

P.S.&W. "SAMSON"

YOU can't mistake the Samson Ball-bearing Chuck. It fits the hand comfortably and the weakest wrist can release it instantly, or get a tighter grip than you can get with any other brace by using a vise.

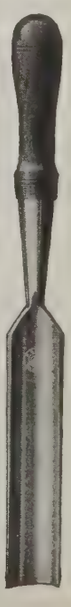
The Samson is the top notcher in the most complete brace line on the market.



Don't forget to look for the trade-mark. It stands for 92 years of experience, ability and progress in tool-making and is put on every item in our line of Guaranteed Tools for Carpenters.

P. S. & W. Guaranteed Chisels

THIS is another of our guaranteed lines that you ought to know. It leads in the big things—variety, completeness, quality, design, workmanship; and it leads in every little detail—finish, temper, perfect fit of handle and shank, blade ground to a sharp edge, etc.



Write today for our Free "Mechanics' Handy List," a 170-page book containing 35 pages of valuable information and a complete catalog of over 200 tools for Carpenters, Machinists, Electricians and Tinsmiths.

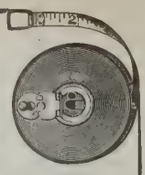
THE PECK, STOW & WILCOX COMPANY

MANUFR'S of the Largest Line of Mechanics' Hand-tools Offered by Any Maker

Established 1819 — Address correspondence to 32 Murray St. NEW YORK CITY — Five Large Factories

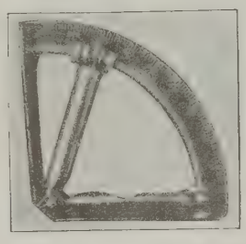
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN
Steel Measuring Tapes

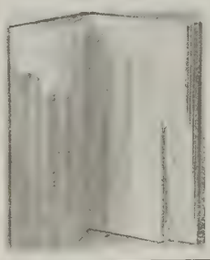


With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor

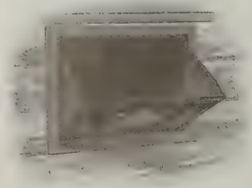


CARPENTERS
One-third of your time saved by the use of a Weaver Adjustable Level
Pays for itself on one job
PRICE $1.00 By Mail
Guaranteed—Money returned if not satisfactory
J. D. WEAVER
JACKSONVILLE ILLINOIS



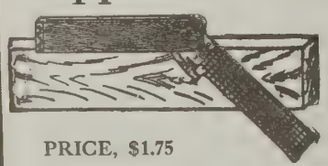
THE PERRY RECKONER
is a tabulation of all the commercial sizes of lumber and shows the number of feet, board measures, in any number o pieces from one to a hundred.
The book is so indexed that you can instantly find the proper table and as surely know you are right.
One mistake in figuring the old way costs you many times the price of this book.
Price, postpaid $1.00
Benjamin L. Jenks, Sole Publisher
906 Williamson Bldg. Cleveland, Ohio

ELEVATORS
Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.
MECHANICALLY PERFECT
State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.
SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO



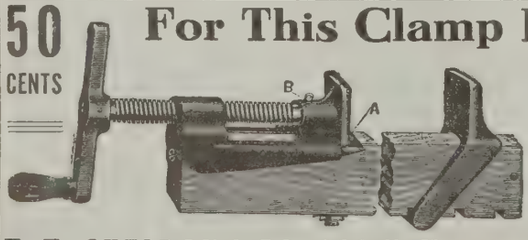
The Window Chute
FOR BUILDERS OF MODERN HOMES
Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.
HOLLAND FURNACE CO.
HOLLAND, MICH.

Topp's Framing Tool
A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.
IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.
PRICE, $1.75
G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.

50 CENTS
For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES
Write for Catalog of Sheldon's Clamps and Vises
E. H. SHELDON & CO., 321 N. May St., CHICAGO

Metal Folks," Cincinnati, Ohio, whose products enjoy a world-wide reputation, had the honor of having their metal ceilings and walls specified by one of the most aristocratic and exclusive rulers in the world.

Yet, if you step into their place of business you can detect no aloofness, no exclusion, no snobbishness, although their various products are known over the entire civilized globe. Instead of trying to climb the ladder of success by looking well in a dress suit, they put their entire energies into the manufacturing of products that would be the best on the market.

This rule they claim to be responsible for the success of their business. Their latest achievement was the securing of an order from



the Ameer of Afghanistan for pressed steel ceilings and walls for his entire palace at Kabul, an order amounting to a goodly sum.

It would take an artful imagination to trace a relationship between Afghanistan and Cincinnati, but the matter is very simple. The present Ameer, Habibullah, ascended the throne in 1901, at the death of his father. Since his ascendancy the kingdom has undergone a complete change—the Ameer is progressive—he is introducing American people and American customs into his country.

He has lifted Afghanistan from a sleepy, monotonous life into the realms of science and better things. So when the time came to remodel his palace he wanted the best and from the metal ceilings and walls brought from the markets of the world he chose the the product of the Edwards Manufacturing Company, as the most artistic and up-to-date in design, finish and material.

BURMITE.

Whether exposed to the burning glare of the mid summer sun, or the chilling blast of the Northern blizzard, the roof is expected to fulfil its primary purpose of protecting the interior from damage by the elements. In many locations there are local conditions which greatly modify the qualities of good roofing. In some cities the gases from manufacturers render some materials short lived, in other places, the danger from fire, from the exposure hazard is a prominent factor.

The model roofing is a rare combination to meet the diversified requirements, but quality will tell and the good reputation of a material on one building leads to its use on one of another character, and thus the line is extended from sheds to factories, from factories to loft buildings, to office buildings, to cottages and residences. Bermingham & Seaman Company, 1208-26 Tribune building, Chicago, are securing the specifi-



ELLIOT HOTEL, LES CHENAUX ISLANDS, MICH.

cations of their red slate surfaced and green slate surfaced Burmite roofing for fine residences and buildings. The samples of this roofing show a very fine material, not only in looks but in wearing qualities. The illustration shown here of the Elliot Hotel, Les Cheneaux Islands, Michigan, gives an idea of what this roofing is used for. The roofing of the hotels and summer cottages in the Les Cheneaux Islands, which lay far up at the head of Lake Huron and close to the Michigan shore, where forest fires in the dry season are a constant danger, should be fire proof as well as water proof. In placing Burmite roofing on the Elliot Hotel, not only is this feature considered but also the fact that there can be no leaking of the roof when the heavy snows arrive early in October and remain until late in the spring.

The Bermingham & Seaman Company show in their advertisement in this number a very artistic little cottage with Burmite used as a roofing material and also Burmite siding on the sides. It will be seen by the manner of clap-boarding that a very nice effect is obtained and at the same time the owner has a water and fireproof roofing and siding.

Many people when looking at this cottage are under the impression

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

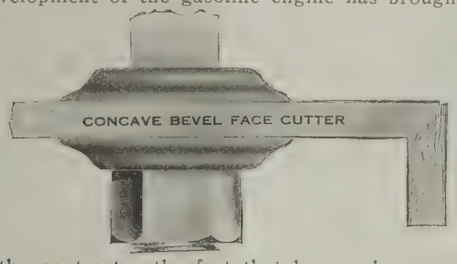
that the sides are rough cast cement or plaster. The difference in cost between plastering or cementing the sides of this cottage and Burmiting is is considerable and takes an entirely different class of labor. Most anyone can put Burmite on either as roofiing or siding with satisfactory results, while it takes an unusually good workman to cement or plaster a building properly. Circulars are being mailed on Burmite and can be had by writing the Bermingham & Seaman Company, 1208-26 Tribune building, Chicago.

WOODWORKING SPECIALTIES.

Mechanical work has to a large extent superseded the expensive and slow hand work of fifty years ago. Then the larger part of a building was made by hand; the sash, doors, blinds, etc., were made one at a time. The work was generally good, depending on the skill of the individual workman and the sharpness and variety of his tools as much as on the quality of the material.

The advent of planing mills to a large extent did away with this form of hand work. The doors, sash, blinds, trim, etc., all came to the job ready to nail in place. In some cases, even the doors were hung in the frames, the locks fitted, etc., and the painting and varnishing practically complete.

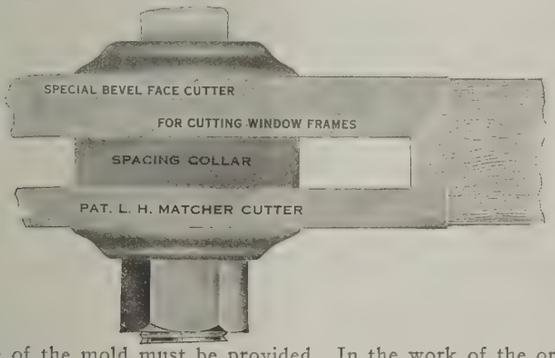
The development of the gasoline engine has brought to the at-



tention of the contractor the fact that he can be more or less independent of the planing mill, especially on rush and repair work. Where only a few pieces of an odd size are to be gotten out, there is usually a long delay at the mill. By the use of the portable saw rigs and similar shop machines, all this work is easily gotten out in a hurry.

The saws and tools used for the various classes of work on these machines vary greatly. In the cut herewith we show the shape of some of the saws as made by the Huther Bros. Saw Mfg. Co., 500 University Ave., Rochester, N. Y. The tooth best fitted for each kind of work is carefully designed to produce the greatest and fastest result with the least power.

For special work on moldings, sash, etc., a cutting face with the



reverse of the mold must be provided. In the work of the ordinary small shop these are comparatively few, and elaborate moldings may be cut with a combination of simple saws or knives. In the illustrations herewith we show combinations for sticking sash, cutting convex and concave bevels, etc.

Knives of this character are easily applied to any of the numerous "saw rigs" now on the market. A full list of available knives is, of course, impossible, as each shop might require a few special patterns. The Huther Bros. Saw Manufacturing Company, 500 University avenue, Rochester, N. Y., are well known as manufacturers of saws and knives for this class of work and will be glad to send their catalogues on request. The general information is valuable to anyone using or contemplating the use of a saw rig or similar machinery.

THE PERRY LUMBER RECKONER.

Mathematics have ever been a stumbling block to most mechanics. The schooling necessary to make a fine scholar has too often been denied the men who have worked up from the ranks. This lack of the knowledge of the tricks of rapid calculation of quantities frequently handicaps them in securing work, as from uncertainty they are apt to "figure high" or, if the truth were known, "guess" when they should be accurate.

No one book is large enough to provide all the tables and calculations required about the building. For this reason, The Perry Lumber Reckoner contains little besides lumber, but it has lumber down to a fine point. Beginning with 1x1-t foot long the tables run up to 12x14-34 ft. long and in quantities from one to a hundred.

A unique table shows how many pieces of various timbers are required to make 1,000 feet. From this table the contractor can easily check the quantities as delivered, and should too many be delivered, call the attention of the lumberman to the error.

Under the head of remarks, a number of other items of information are given, which will well repay close study. Rules are given for estimating lath and shingles required, and even the simple rules of interest.

The Reckoner is provided with a cut index for readily finding the various timbers and is sold exclusively by Benjamin L. Jenks, 906 Williamson Building, Cleveland, Ohio.



Asbestos "Century" Shingle Roof—Residence Dr. Robt. Damerell, Red Cloud, Neb. Architect, C. M. Way & Co., Hastings, Nebr. Contractors, S. Beckwith, Red Cloud, Nebr.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

PEOPLE often write us to know if we can supply Asbestos "Century" Shingles for some special style or kind of building.

Our answer to that is that we can fit out any building with an Asbestos "Century" Shingle roof.

Our assortment of shapes is universal.

It has to be.

Asbestos "Century" Shingles are in use today on practically every kind of building occupied by civilized man.

You will find them on residences of all types—from the cottage and bungalow up to the most costly mansions of America and Europe.

You will find them on office buildings, public buildings, museums, factories, railroad stations and workshops.

You will find them in the temperate zone, in the tropics, near the Arctic Circle—impervious to every climatic condition and immune from fire risk.

Write us for information about the shapes of Asbestos "Century" Shingles—the sizes—and the three colors: Newport Gray (silver gray), Slate (blue black) and Indian red. We will send you quotations and our booklet "K. & M., 1911."

THE KEASBEY & MATTISON COMPANY, Factors

AMBLER, PENNSYLVANIA

Branch Offices in Principal Cities of the United States.



YOU can do what others do!

You *can*—if you really want to. You can fit yourself to earn *more* than the other fellows. For they are not naturally any smarter than you. They haven't any more brains or ambition than you. They don't work any harder than you. They are simply *trained men*—that's the difference. They have *special knowledge* that you don't possess—*special knowledge* and *training* that makes them *worth more* to their employer than you can possibly be until *you* equip *yourself* with special knowledge and training.

The American School is training *hundreds* of men to become draftsmen, engineers and architects. It is training hundreds to fill executive positions, to earn *good* salaries, to play a man's part in the business game. *And what the American School of Correspondence is doing for others it can do for you.*

Mark the Coupon

and send back to us *on the next mail.* That's the first step towards getting your name higher up on the payroll—the first step towards getting the kind of position *you'd like to have,* the kind of a salary *you ought to have.*

American School of Correspondence
Chicago, U. S. A.

OPPORTUNITY COUPON

American School of Correspondence, Chicago, U. S. A.

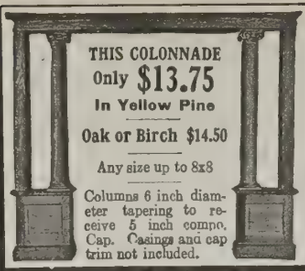
Please send me your Bulletin and advise me how I can qualify for the position marked "X." Nat'l Bldr., 11-11.

....Aviator	....Lawyer
....Draftsman	....Fire Ins. Engineer
....Architect	....Telephone Expert
....Building Contractor	....Moving Picture Op'r
....Structural Engineer	....Bookkeeper
....Civil Engineer	....Stenographer
....Electrical Engineer	....Accountant
....Elec. Light & Power Supt.	....Cost Accountant
....Master Mechanic	....Certified Public Acc'nt
....Automobile Operator	....Auditor
....Steam Engineer	....Business Manager
....Reclamation Engineer	....College Preparatory

NAME.....

ADDRESS.....

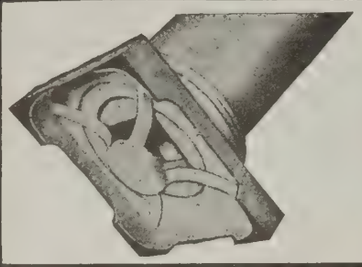
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



THIS is positively the best Colonnade for the price in the market today. We want every Contractor and Builder to take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

Our Catalogue No. 35 shows many new designs. Write for it.

Bertelsen Adjustable Grille Co.
615-617 So. Clinton St., - Chicago

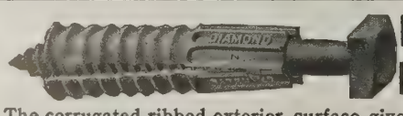


NO SINKING INTO THE FLOOR WITH THE
ZIMMERMAN IRON BASE
It has a center bearing that the sun cannot heat. Have done with this rot nuisance and have your architect specify the ZIMZIMMERMAN BASE. It separates the column from the floor and also ventilates the column shaft, preventing columns from checking and opening.
Write for Circular J
SYRACUSE CORNER BLOCK FACTORY,
SYRACUSE, NEW YORK

The New
PARKHILL PITCH GAUGE
on a square gives the easiest method ever devised to mark roof framing—and by far the quickest. Complete framing for **any** roof pitch—of hundreds—marked on the timbers inside of 5 minutes. Any hip in a few seconds (7). And in 17 seconds all the following:—Side bevel for jack; miter bevels for roof sheathing, facia, plancher, purline, and a hopper; also length and cuts for an irregular hip. Other cuts, etc., with equal ease and speed.
The PARKHILL PITCH GAUGE has no equal AS A STAIR and BRACE GAUGE
See illustration in National Builder for September. If these statements strike you as strong, it costs nothing to verify them, as a Gauge Set with directions will be sent you prepaid for $1.50, with the privilege of returning it inside of 30 days and get your money back.
JOHN PARKHILL, Reference—First Nat'l Bank **ROCHESTER, MINN.**



CALDWELL SASH BALANCE
Does away with weights and cords and VASTLY more durable.
Makes sashes work perfectly.
Permits greater window space in new work, as box frames are not necessary.
May be applied to old windows without altering sashes or frames.
Write for circular to the
Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.



Diamond "N" Expansion Shields
The corrugated ribbed exterior surface gives increased holding power. The longitudinal ribs at the outer end of the shield prevent the shield from turning when the screw is inserted.
THEY HOLD AS LONG AS THE WALL LASTS
DIAMOND EXPANSION BOLT CO.
90 WEST STREET, NEW YORK.

Improved Quick and Easy Rising Steam
Electric and Hand Power Safety
ELEVATORS
and Dumb Waiters, Automatic Hatch Gates
SEND FOR CIRCULARS
KIMBALL BROS. CO., Council Bluffs, Iowa



BLUE PRINTS.

For many years the reproduction of original drawings in the form of blue prints, black, brown and Van Dyke prints has been quite a problem to the majority of manufacturing, railroad construction, engineering and architectural firms using them. The original drawings are of considerable value, and must therefore be kept as permanent records. While not allowed outside of the drafting room or office of the firm owning them, the necessity for numerous exact reproductions for use in the operating end of the plant, mailing and advertising purposes arises.

This has been accomplished in the past by Solar printing, using many unwieldly sun print frames for exposing the tracing and sensitized paper. The objectionable features of this method, such as the impracticability of making these frames large enough, unfavorable weather conditions, complications arising—among these the demand for prints by the night working force, large quantities at reduced cost, uniformly clear and distinct prints at all times. These conditions opened a field for an electric blue printing machine, substituting electric for sunlight, thus working independently of weather conditions and increasing the output by its convenience.



The first machines built involved such a high cost and heavy operating expense, because of the many lamps used and electric motors for power, that the sale was limited. It was apparent that a medium priced, highly efficient machine operating at low cost would meet with popular favor.

The Buckeye Engine Company, themselves large users of blue prints, undertook to design a printing machine which would overcome many of the serious objections to the machines then in use. The result was the Buckeye Electric Blue Printing Machine, which, with a single lamp, vertical cylinder and other distinctive features of construction, proved not only most efficient but of the utmost simplicity in operation.

As will be seen from the illustration herewith, the machine consists of two vertical half cylinders of glass, with a lamp traveling up and down between them. The tracing is placed on the outside of the glass, covered with the sensitized paper, and a curtain drawn over them to hold the whole in place. By suitable mechanism the lamp travels slowly down between the plates of glass, and the print is made. The machine typically illustrates the necessity for speed under all circumstances. The operator can make prints at any time, independent of time or weather, in size up to 42x72, or can make a number of small prints at once. To make a print of this size with a Solar frame would require a space of at least 40 square feet inside the building and an extension outside with tracks, etc., half again as much, while the Buckeye requires about 3½ feet square on the floor.

So general are these machines in use that we believe the manufacturers, the Buckeye Engine Works, Salem, Ohio, can direct one to a machine in their neighborhood. We are sure that mention of the NATIONAL BUILDER will bring a prompt reply to any questions regarding their operation, maintenance, etc.

WATERPROOFING AND FINISHING SPECIFICATIONS.

Possibly no one item gives the architect or engineer more trouble than protection against water. Not only the roof must form a protection from the rain and snow falling on it, but it must be proof against all the tricks of the weather, piling up snow and ice, expansion, etc.

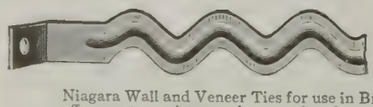
The sides of the building must be tight against not only actual openings, through which the weather may enter, but also proof against moisture and dampness workng through the composite materials of the wall.

But however much trouble the roofer or the mason may have above ground, their troubles are simple compared to the problems confronting the man working below the ground. Until the last few years it was generally considered that basement walls must be damp and that water would always stand on the cellar floor. It has remained for the engineers who designed buildings several stories below the street and natural water level to provide dry walls and floors for those places. How well they succeeded is shown by the fact that basements are being built where it was considered impossible a few years ago and the masonry walls, both below and above ground, are kept dry.

While there are a number of methods for securing these results, there has always been the thought that complicated and expensive work was required, so that only the largest and most expensive buildings were benefited by the processes. Such is not the case at present. The requirements of the large buildings produced the systems in use which are now as applicable to the one-story cottage as to the skyscraper, and just as necessary. Health demands dry walls as much as expensive machinery does.

Various engineering magazines, as well as the NATIONAL BUILDER,

NIAGARA HARDWARE SPECIALTIES FOR CONTRACTORS AND BUILDERS



Good Metal Ties are the Stiff Backbone of any wall :: :: ::



Niagara Wall and Veneer Ties for use in Brick and Brick Veneer Walls offer greater resistance than any bond on the market. They are galvanized as a protection against rust. Folder 57B on request.
Niagara Wall Plugs. 12 in. Wall Ties for Stone, Brick and Concrete Block Walls. Niagara Sash Pulleys and Sash Fixtures. Premax Sash Chain. Embossed Sheet Metal Letters and Figures.

Manufactured Exclusively by
NIAGARA FALLS METAL STAMPING WORKS
NIAGARA FALLS, NEW YORK, U. S. A. 2M

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WHEN YOU GET TO **SASH CORD** USE
SILVER LAKE

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but **one coat of paint.**
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

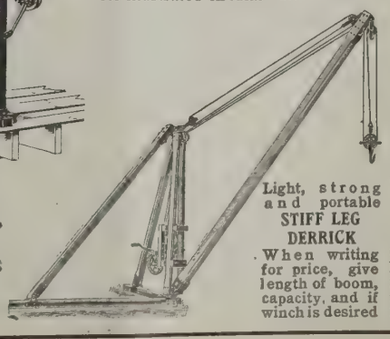
GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instructions for laying
BAYONNE or GULF STREAM
JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years

The Light weight Champion
$36
Complete, ready for use, with 110 ft. cable, block boom and load brakes.



Machines shipped on trial to reliable contractors.
OUR MOTTO IS
SATISFACTION OR NO SALE
Prompt Shipment guaranteed. Write for illustrated circular "N."





Sasgen Bros.
2053 Racine Ave.
CHICAGO, - ILLINOIS
New York Office:
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Light, strong and portable **STIFF LEG DERRICK**. When writing for price, give length of boom, capacity, and if winch is desired

Light, strong, **T. P. SETTER DERRICK** Capacity 1½ ton Equipped with Steel Gears and fittings. Price, 18 ft..... $33.00



Be the Man Who Superintends
Be the Man Who GIVES Orders

The man who superintends now was once the man who was given orders. Special training has raised him in salary and position.

You who hold minor positions now have the same opportunity for quick advancement that thousands of our graduates have had.

The "hard-working, oldest employees" advance very slowly nowadays. It is the man with individual training who jumps over their heads.

That is the reason why you see men of 25 and 30 years superintending men of 40 and 50 years.

Our special training in

Architectural and Mechanical Drafting

Estimating, Plan Reading
BY MAIL

will increase your salary

You know the advantages of being able to read plans and estimates, and the opportunities for promotion and prosperity that come to those with that ability. We can positively teach you, with our simply written, practical lessons. Hundreds of plans of buildings, in course of construction in Chicago, are studied from.

As a practical man you can see the advantage of studying blue print plans, specifications, and estimates for buildings *now being built* or recently completed. You do not receive a lot of books to read *about* some building which exists only on a printed page, as your problem. To *learn* a thing you must *do* it—reading about it is not sufficient.

If you are a bricklayer, mason, carpenter or builder, you need this course—it will bring you higher wages.

If you are a foreman or superintendent, you need this course—it will enable you to become a successful contractor.

If you are a contractor you need this course—it will help you to figure closer. It will eliminate mistakes—increase your profits.

The lessons are approved by well-known Chicago architects and engineers. We have partial courses to fit your individual need, if you have had previous experience.

Start now on your journey to success. Don't say you can't do it—you can; don't say you haven't time—take it; don't say you haven't the money—earn it as you study.

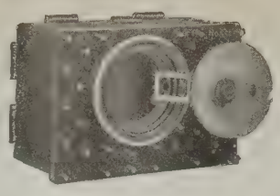
Determine now whether you will advance in salary and position or let other men go ahead of you.
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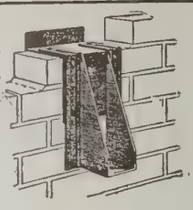
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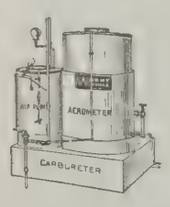
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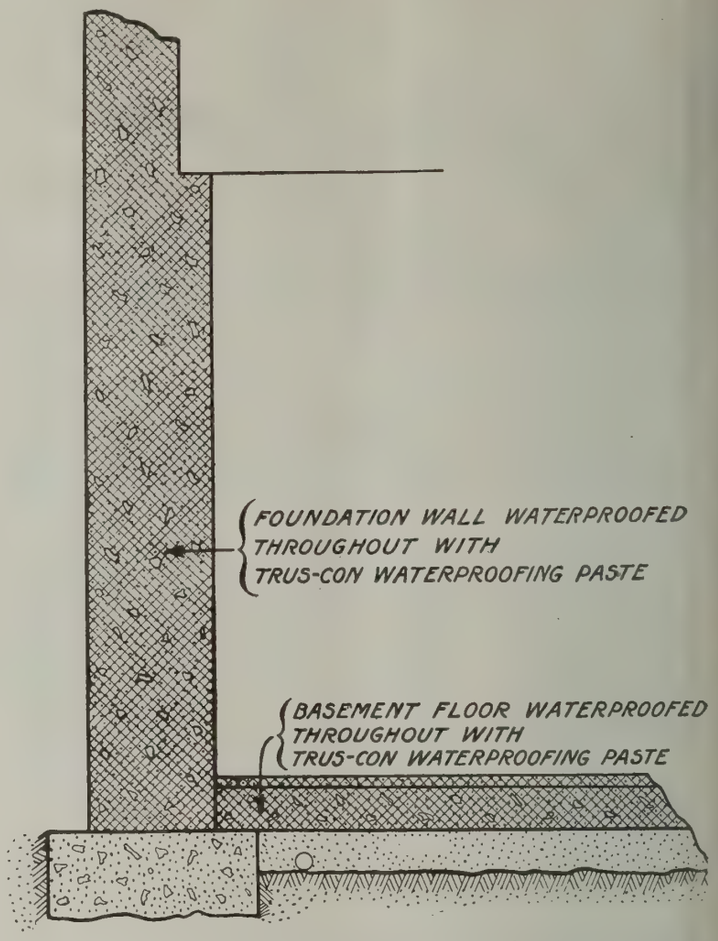
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Workers in Art Glass and Mosaics.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

have from time to time described the various methods of waterproofing. Manufacturers of preparations have advertised their wares and made their names familiar. One of the latest to prepare explicit specifications and directions for waterproofing under various conditions is the Trussed Concrete Steel Co., 384 Trussed Concrete Building, Detroit, Michigan. Under the above heading they have prepared



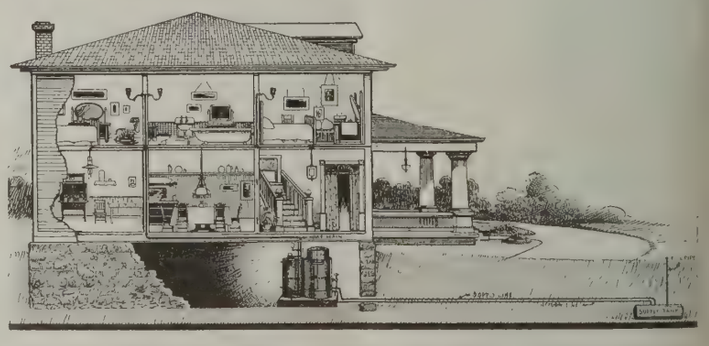
an excellent description of their products with directions for use in the shape most desired by intelligent mechanics. The specifications are illustrated by diagrams showing the proper construction to give the best results and the booklet provides an excellent guide to the architect, engineer, contractor, mechanic and owner.

We understand that anyone interested in this subject is entitled to a copy of this excellent work.

GAS FOR HEAT AND LIGHT.

One by one the advantages of the city life are being carried to the suburbs and country. Few small cities and towns are without adequate water supply, telephone systems, gas and electricity. Suburban towns where any of these are lacking soon find themselves regarded as behind the times.

But the introduction of all of these into country places, farms, etc., has required more time. The cost of long runs of pipe and wire for a few customers made the service expensive and frequently unsatisfactory, and has led to the introduction of systems in which the individual owner was practically independent of a central source of



"Economy" System in a Country Home.

supply. This has been adapted to particularly water supply and gas. The former is frequently surprisingly easy to install, a hillside spring often having sufficient head to pipe directly to house and barns.

In the manufacture of gas systems operating in enormous quantities are in use in the larger cities, and it is frequently overlooked that there are systems adaptable to small villages, county estates or single farm units.

The Economy Gas Machine Company, 437 E. Main St., Rochester, New York, have for some twelve years been making a gas plant adaptable to places of this character. In general, the system consists

Build Artistic Stairways From Gordon-Van Tine Stock!

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A Flight of Stairs Complete for $23.93

Our Stair Department Will Save You Big Money

Through our ceaseless efforts of selling reliable stairwork at cost plus one small profit, we have been able to produce and sell stairwork at prices which leave a handsome profit for the contractor. In our Grand Free Millwork Catalog we itemize individually, each and every article required for the stairs, and explain fully just how this material comes to you and attach net prices. With this information at your command, an infinite variety of arrangements of stairs can be figured within a few moments, and you know the exact cost without entrusting your interest to any outsider.

The fact that part of this material is already machined ready to go right into the stairs, reduces the erecting cost very materially. We use only thoroughly kiln-dried material in making up the different parts of this stair stock, and only the most skilled and expert mechanics are employed in the production of the finished article. By using kiln-dried lumber you avoid any of the annoying effects of shrinking or coming apart of the stairs after they are put in the building. The itemized list for a flight of stairs which is given on this page, shows you at a glance how reasonable the material for a complete stairs can be purchased.

The fact that you have had no previous experience in the stair building line should not deter you one moment from learning its simplicity now. If there are any points which are not practically clear to you regarding the proposed stair for which you are in the market, write us, and we will give you the advice of an expert stairbuilder.

Vast Assortment of Oak and Yellow Pine Stair Material

Our stock designs of Stair Newels, Rails, Balusters, Steps, Risers, Face and Wall Stringers and miscellaneous materials in Oak and Yellow Pine is very complete. A line which is at once adapted to the swell and modest cottage or most elaborate home.

Correct in Every Detail

We call particular attention to the style of construction, for instance, of our posts; the correct size of all mouldings, in order that the assembled effect may be harmonious and complete. Likewise, the turning of the balusters and shape of rails are especially adaptable for these specific purposes.

With the styles illustrated, an infinite variety of arrangements of stairs is permissible, and it is a very rare exception when special work will be required for any particular purpose. Our designs are modern and up-to-date. All Newels are hand smoothed and made from thoroughly kiln-dried stock. All carvings are handmade and not composition ornaments. Every Newel from one-inch lumber, with glued lock joint. Height of all starting Newels 4 feet, with 8x8 base and 6x6 shaft, suitable for open or closed stringboard. Base of post, 20 inches long, allowing one or two risers. Every Newel wrapped in paper and carefully packed. The stock is all thoroughly machined, well kiln-dried and can be shipped promptly.

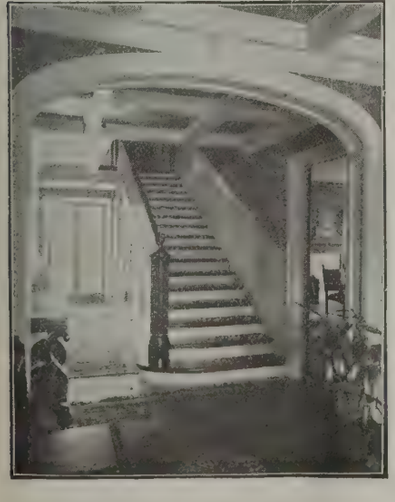
List of Material Required for Stairs Shown Above

E349	14 feet Face Stringer	Yellow Pine @	$0.06½	$0.91
E731	10 feet Wall Stringer	" "	.05	.95
E8421	7 feet Base	" "	2.80	.20
E725	18 ft. Wall Stringer, Extension	" "	.01½	.27
E8420	26 feet Base Moulding	" "	.82	.21
E347	13 Steps	" "	.40	5.20
E961	2 Landing Steps	" "	.15	.30
E726	1 Round End Step	" "	2.90	2.90
E727	14 feet Return Nosing	" "	.02	.28
E348	15 Risers	" "	.20	3.00
E8060	75 feet Scotia	" "	.30	.23
E336	1 Newel	" "	2.57	2.57
E341	2 Angle Newels	" "	1.60	3.20
E343	14 feet Rail	" "	.11	1.54
E962	12 feet Fillet	" "	1.00	.12
E345	11 Balusters, 28-inch	" "	.08½	.94
E345	13 Balusters, 32-inch	" "	.08½	1.11
	Total Cost			$23.93
	Dealers' Prices			90.00
	Saving to You			$66.07

This Saving of $66.07 Should Appeal to You

You get a high standard of workmanship, superior qualities of lumber, choice designs, prompt shipments and ***guaranteed safe delivery***. You get low freight rates and quick delivery. These are facts, and should appeal to you at once. Send us your order for Stairs today.

YOU WILL BE SATISFIED AND SAVE $66.00 OR MORE



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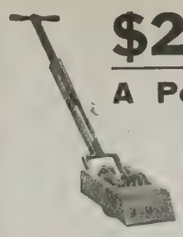
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$25 THE FOX $25

A Perfect Floor Scraping Machine

WHY PAY MORE?

AN UNEQUALIFIED GUARANTEE WITH EVERY MACHINE
6000 SATISFIED USERS.

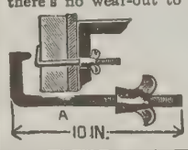
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ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



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CONCRETE MACHINERY

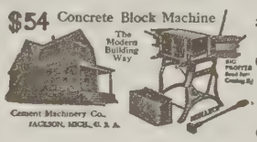
The greatest mixer made. All kinds of styles of the latest cement block and brick machines and molders from $5 and up; in fact WE MAKE EVERYTHING IN CONCRETE MACHINERY (low prices but high grade) GET CATALOG N. FREE.

SYSTEMATIC CONCRETE MIXER
28 ADVANTAGES



CEMENT MACHINERY COMPANY
Jackson, Michigan, U. S. A.

$54 Concrete Block Machine



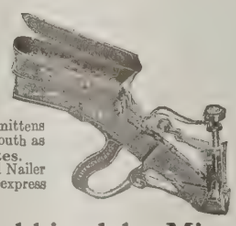
CEMENT IS CHEAP—BIG PROFITS

making concrete products and building sidewalks. Get a mixer. Get started. Prospects brighter than ever; things are going to boom in the cement industry. Get free Catalog "N."

CEMENT MACHINERY CO., Jackson, Michigan

COLD WEATHER TROUBLES IN SHINGLING
OVERCOME BY

Pearson's Nailer



for it works as well in one season as another. Wear your gloves or mittens and (with it) drive more nails than you ever did. Quit using your mouth as a nail pouch. **PEARSON NAILERS are made in two sizes.** The Blue Nailer is for common 3d No. 14 wire nails, and the Red Nailer is for the galvanized 3d, No. 13, 1¼-in. wire nails. **$5.00** each, express prepaid. Money cheerfully returned if Nailer is not as represented.

Write for Circular "N."

PEARSON MFG. CO. : Robbinsdale, Minn.

Carpenters -- Builders -- Architects -- Owners

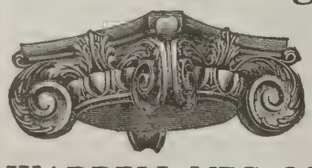
Sea Green or Purple Roofing Slate is the **only** known roofing whose first cost is the only cost—no painting, repairing or recoating as long as the building stands up. It's **solid rock**—split into thin sheets of standard sizes—nothing to rust, rot, warp or wear.

SEA GREEN or PURPLE SLATE ROOFS
Never Wear Out

Write to us for full information. Write today.

AMERICAN SEA GREEN SLATE CO.
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Wood Carvings for Interior Finish



SEND 15c for catalogue showing 1,000 designs on Ramps, Easements, Newel Posts, Mouldings and Balusters.

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WADDELL MFG. CO. 67 Colbrook Street **Grand Rapids, Mich.**



Consoles, Columns and Grilles

add to the fine appearance and value of any building. Especially if they are made by us. In quality and price our work is not surpassed.

SEND FOR CATALOG No. 16

It contains many beautiful designs of Consoles, Columns and Grilles.

NORTHWESTERN GRILLE WORKS
Office and Showroom, 1824 Milwaukee Ave., CHICAGO

of a tank buried in the ground some distance from the building, to hold the required supply of gasoline, and a machine to mix air and gasoline vapor in the proper proportion to form a perfect illuminant. It will be noted that only a few ounces of gasoline are in the house at any time and the gas is generated only as used. The smiplicity of the system may be judged from the fact that no attention is required except to fill the supply tank, the gas machine being entirely automatic in its action. The tanks shown in the illustration contain only air, and as the supply tank should be lower than the basement floor, no gasoline can flow into the house except when gas is being used.

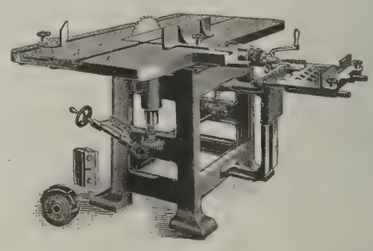
As the working parts are all metal there is nothing to require lubrication and there being no friction between the metal parts, there can be no wear.

Contractors and builders will find the installation of these machines very simple, and their use so economical and satisfactory that no country place should be built without one. The prospective builder should investigate this machine when planning his house and the contractor should be posted on it in good season. We are sure the Economy Gas Machine Co., 487 E. Main St., Rochester, N. Y., who manufacture this machine, will be glad to have you ask for further information.

NEW HOME OF THE CHICAGO MACHINERY EXCHANGE

Even at this time in many cities any old kind of a building is good enough for a machinery business, but the progressive men manufacturing and selling machinery now have as finely constructed buildings and as attractive show rooms and offices as manufacturers of other lines.

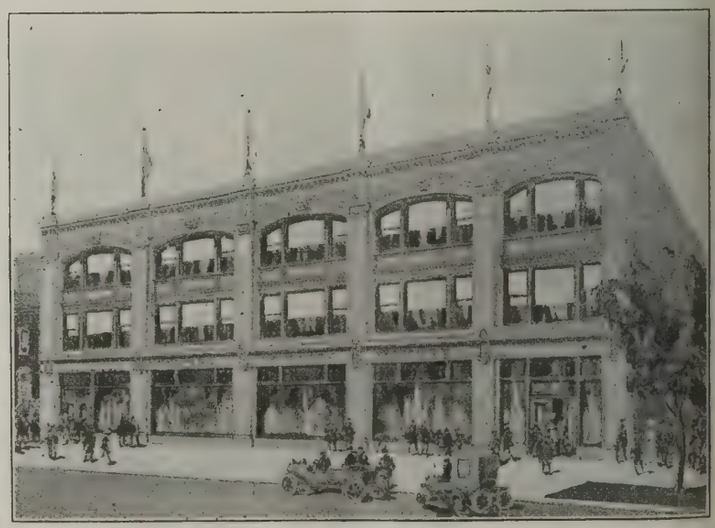
Among the larger companies owning their own building and having everything right up-to-date in it for a display of fine woodworking machinery, is the Chicago Machinery Exchange, 1217-25 Washington boulevard, Chicago. This new home of the Chicago Machinery Exchange contains sixty thousand square feet of floor space. It is well lighted and arranged to display every machine so that the buyers can see exactly what he is getting. Among the many different woodworking machines carried in stock by them is their number one and a half Universal Saw and Dado Machine. For the contractor and builder who is obliged to save floor space, this machine is one of the most popular. It can do a large range



of work and is used either in planing mills, furniture factories, jobbing shops, carriage and wagon factories and pattern shops. It is a rip saw, cross cut saw, mitre saw, bevel saw, jointer, dadoing machine and boring machine all combined in one.

The number one and a half machine is furnished complete with all attachments or with parts of the attachments omitted as required. It is sold at a very low price and is furnished with one fourteen-inch cross cut saw and one-fourteen-inch rip saw, one dado head for making any size grooves. The jointing head is six inches long and is furnished with two straight knives. One boring attachment is also furnished with five boring bits.

It will be seen from the accompanying illustration that this machine is built for service on each equipment. To get full information and description it will be better to write the Chicago Machinery Exchange



for their circulars about it. For a contractor and builder who has plenty of floor space in his shop, attention is called to the Chicago Machinery Exchange's advertisement in another part of this issue where two separate machines are offered for the price of one.

The Chicago Machinery Exchange has been doing business continually for many years in Chicago and is well and favorably known to many of our older subscribers. They will be glad to renew old acquaintances and make new friends if given the opportunity.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Try FREE Samples

Johnson's FLAT WOOD FINISH



Johnson's Flat Wood Finish

A LIQUID—an easy spreading preparation made especially for finishing interior woodwork of all new buildings, equally valuable for refinishing old surfaces.

When applied with a brush, produces the soft, velvety effect of the hand rubbed finish at

One-Third the Cost of Labor

It dries in an hour without the slightest suggestion of a gloss. One coat *thoroughly brushed* in is sufficient.

By use of Johnson's *Flat Wood Finish* you can make estimates on those artistic and expensive hand-rubbed effects and get away with the contract every time. What's more, you can guarantee perfect satisfaction, and besides

Make a Good Substantial Profit for Yourself

A single gallon covers 500 square feet—the price, $3.00 per gallon, places this extraordinary wood finish within reach of everyone.

S. C. Johnson & Son - Racine, Wis.

"The Wood Finishing Authorities"

Painters, Decorators, Architects, Contractors,

Fill out this coupon for free sample of Flat Wood Finish, Wood Dye Shade —and our free booklet edition N. B. 11. We will also send you panels of wood, beautifully finished, if you wish them and so indicate on this coupon.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SAVING A MONTH IN BUILDING.

SPEED is demanded in Twentieth Century building. More durable building and more sanitary building are engaging agricultural science as never before—and wonderful progress is being made along these lines. But durability and sanitation must be worked out in rapid construction methods.



BISHOPRIC WALL BOARD.
Lath Is Necessary in Wall Board as in Plaster, to Keep from Warping.

Every owner likes to be able to say that his cottage or his skyscraper is better than his neighbor's. But from the moment he decides to build his main desire is to "get into" the building.

In the old days—not so very old either—the most exasperating delay was due to the drying of the plastering. There was no way to avoid it—except hastening the drying by putting on more artificial heat. Every one in the building professions and trades can tell of losses and even disasters resulting from that plaster freezes. Therefore, plastering in the winter was commonly out of the question.

NEED BROUGHT FORTH THE BISHOPRIC WALL BOARD.

There are many other objections to plaster. It absorbs moisture. It cracks. It crumbles. It lets out the heat and lets in the cold, wind and rain. It also lets in vermin. It does not deaden sound.

So it is a great need that brought forth Bishopric Wall Board to take the place of the old combination of lath and mortar.

It does away with all the old plaster troubles—is actually less expensive—and saves a month in the building of residence factory or business block. It comes in sheets all ready to be nailed at once to the studding.

Any man who can drive nails can put on Bishopric Wall Board. It can be applied in half the time required for lath and plaster. This means a saving of fifty per cent in labor. An ordinary lather can finish a wall with it in less time than he can put on laths for plastering.

As soon as it is on, the wall or ceiling is ready for immediate decoration. There is no waiting until it sets or drys. There is no delay until artisans are available for the work. The finishing goes right on. Time is saved. Labor is saved. Expense is saved.

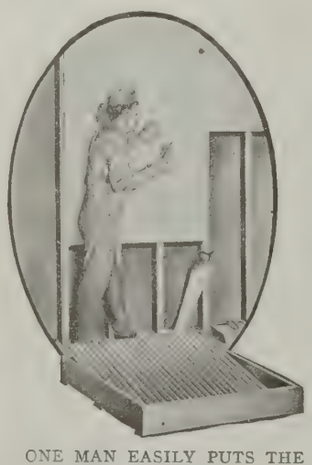
KILN DRIED LATHS IMBEDDED IN ASPHALT MASTIC.

Bishopric Wall Board is made of kiln dried, dressed laths, imbedded in hot Asphalt Mastic (99%) pure at a pressure of 500 pounds to the square inch. It is surfaced with heavy, sized cardboard and cut at the factory into sheets (laths and Asphalt Mastic combined), 4x4 feet in size, and three-eighths of an inch thick—all of uniform size and thickness.

It is shipped in crates of 16 sheets. Each sheet is 4 feet square and three eighths of an inch thick. One crate of Bishopric Wall Board therefore will cover 256 square feet of wall surface. One crate weighs 250 pounds.

ASPHALT MASTIC IS TOUGHENED ASPHALT.

To produce it, Carbonate of Lime is combined with pure asphalt, producing a hemogeneous mixture.



ONE MAN EASILY PUTS THE WALL BOARD ON.

It is a patented discovery. Asphalt Mastic withstands all climatic and weather conditions. It will not soften under the hottest summer sun nor crack in zero weather. It stands a pressure of 500 pounds to the square inch, which is a guarantee against breaks or cracks. Asphalt Mastic is proof against moisture, heat, cold, wind or air, sound, vermin, acid and fire. No paint or other coating is required for protection for the reason that the mastic process so toughens the asphalt that it withstands the hardest tests of wear to which it can be subjected in a building.

The laths which are inseparably imbedded in Asphalt Mastic make the best kind of a binder. With the laths thus imbedded, there is no danger of Wall Board warping or getting twisted out of shape. Furthermore, the laths make it possible to nail the Wall Board securely to the studding.

ASPHALT MASTIC DOES NOT BURN, PROTECTS LATHS FROM FIRE.

Oils mixed with asphalt for tempering purposes burns. But Asphalt Mastic being a homogeneous mixture of special process lime and asphalt does not burn.

Laths imbedded in Asphalt Mastic therefore do not burn so readily as laths in plaster.

As a matter of fact, Bishopric Wall Board under fire sticks to the studding longer than laths and plaster, because Asphalt Mastic adheres to the laths much longer than plaster. Under fire and water plaster soon crumbles, exposing the laths. By sticking to the laths, the non-burning Asphalt Mastic protects the laths. This enormous advantage, has saved many buildings finished with Bishopric Wall Board.

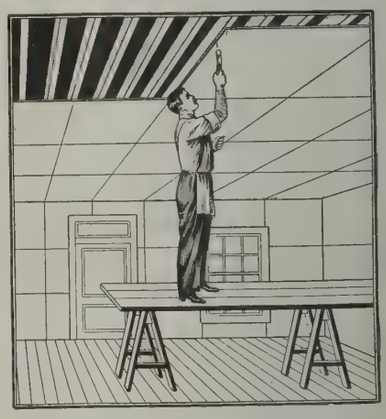
A special reason for using Bishopric Wall Board was found in California. It was found to withstand the tremors of the earth which plays such havoc with plaster. A San Francisco builder writes that it ought to have a good market in California for this reason alone.

USED IN EVERY KIND OF BUILDING, SMALLEST AND LARGEST.

Bishopric Wall Board is suitable to every building. It is now in use in the most expensive residences, cottages, bungalows, flats, pleasure and health resort buildings, schools, colleges and churches, office and factory building and garages. New partitions in old buildings are made of it. Attics have been turned into ideal billiard rooms, playrooms, and even bed chambers with this wall board. Cellars are ceiled with it. Back porches and laundries are finished with it. In fact it goes anywhere that a smooth weather-proof interior is desired.

TAKES PAPER, PAINT OR ANY OTHER DECORATION.

Bishopric Wall Board sheets are cut square. Therefore, in fitting, neat, close, snug unions are produced. In sawing sheets for fitting around doors, window and wall projections, it is only necessary that the sheets be cut true. When, through imperfect fitting, the pieces are not closely joined the seams may be covered with cheap muslin, manila paper, or cheese cloth. It is a common practice, when an exceptionally fine job is desired, to cover all seams with narrow strips of cheese cloth or manila paper.



Comes in Sheets 4x4 All Ready to be Applied. May be Painted, Papered, Covered with Burlap of Any Other Wall and Ceiling Decoration.

By applying a lining paper (cheap grade of wall paper or manila), over the entire wall surface, the result is a spirit level wall surface.

Oil or water colors may be used in painting Bishopric Wall Board. The surface is first covered with muslin or canvas.

Any of the artistic systems of paneling may be used. Strips of decorative wood, beading or timber is applied over the seams. For mission panel ceilings Bishropric Wall Board is ideal.

It insures the utmost in smoothness, and adhesion to any wall paper, as the wall board is sized before leaving the factory.

Bishopric Sheathing is made of precisely the same materials as Bishopric Wall Board but finished surface is not necessarily so smooth. It is less expensive than lumber sheathing; is applied in less time, does away with building paper and makes a more solid and wind proof job.

It is nailed to outside of studs with lath side of Sheathing exposed. Over the Sheathing, weatherboards are nailed or cement or stucco applied. When weatherboards are applied, dead air space is left between the laths, furnishing excellent insulation. The same spaces between the paralleled laths form an excellent key where a cement or stucco exterior is desired.

Bishopric Roofing is made of woolen felt covered on both sides with Asphalt Mastic and surfaced with flaked mica producing a handsome as well as most durable roof.

A national demand has been created for Bishopric building materials. They now are extensively sold in every state in the Union, as well as in Alaska, Canada, the West Indies, South America, Africa, Asia and Australia.

Bishopric Wall Board Sheathing, and Roofing are manufactured by The Mastic Wall Board and Roofing Manufacturing Company of Cincinnati, Ohio. On request they will send free samples of the Wall Board, Sheathing or Roofing, and a booklet fully explaining these products and all their uses. Dealers are especially requested to write for their special proposition.

A national advertising campaign is being carried on in leading publications. Prospective builders everywhere have become acquainted with these products and are inquiring about it. The company is desirous of placing the business through local representatives in all parts of the country. The growing demand surely means profits for all who begin handling these products now.

Amatite ROOFING

Why the Buyer of Amatite Never Complains

WHEN a man buys ordinary ready roofing he usually neglects to paint it and after three or four years he comes back to the dealer with a protest. It is human nature to neglect painting roofs.

When a man buys Amatite Roofing he lays it on his building and in three or four years it is still as good as new and does not need any paint. He forgets he has such a roof but no harm is done by that.

There is nothing to neglect in the case of Amatite. Amatite has a peculiar surface—a sort of plastic concrete made of pitch and mineral matter.

This surface is plastic enough so that the material can be rolled up into handy rolls in the usual manner and handled just like any other ready roofing. When unrolled on the roof and nailed down it presents to the weather a continuous surface of mineral matter and pitch. On this surface wind, rain, storm, heat and cold have little effect. Year after year it looks up to the sky undisturbed and unaffected. It costs nothing to maintain and relieves the owner from all responsibility.

Dealers can improve their business by selling Amatite and buyers make a good bargain when they buy it. The price of Amatite is less than that of most painted roofings of less weight and durability.

Sample and further information on request.
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Everjet Elastic Paint

A lustrous carbon black paint, very cheap, very durable—for protecting all kinds of metal and wood work.

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Reduces Roofing Cost

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We sell retail lumber dealers only, but yours will get these good shingles for you.

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Pacific Coast Lumber and Timber Lands — MENZ TIMBER GOLD BONDS — Buckeye Brand Red Cedar Shingles

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THE MODERN WALL LINING

Better than Lath and Plaster in Every Way

Compo-Board will outlast lath and plaster several times over—in fact it will outlast the building itself.

Makes absolutely dry, warm, moisture proof walls and ceiling. Cannot crack, crumble or chip off like plaster. Keeps the rooms warm in winter and cool in summer.

Compo-Board can be used in any climate. It is quickly and cheaply put on in any kind of weather—no muss or dirt or waste of time waiting for plaster to dry.

Not only is Compo-Board a superior wall lining, but it has a multitude of uses in the home, around the yard, and in the office and factory.

Made of thoroughly seasoned kiln dried strips of lumber covered with a thick coat of cement and heavy durable paper put on under intense heat and pressure.

You can buy it in strips four feet wide and one to 18 feet long, any length you want in even feet.

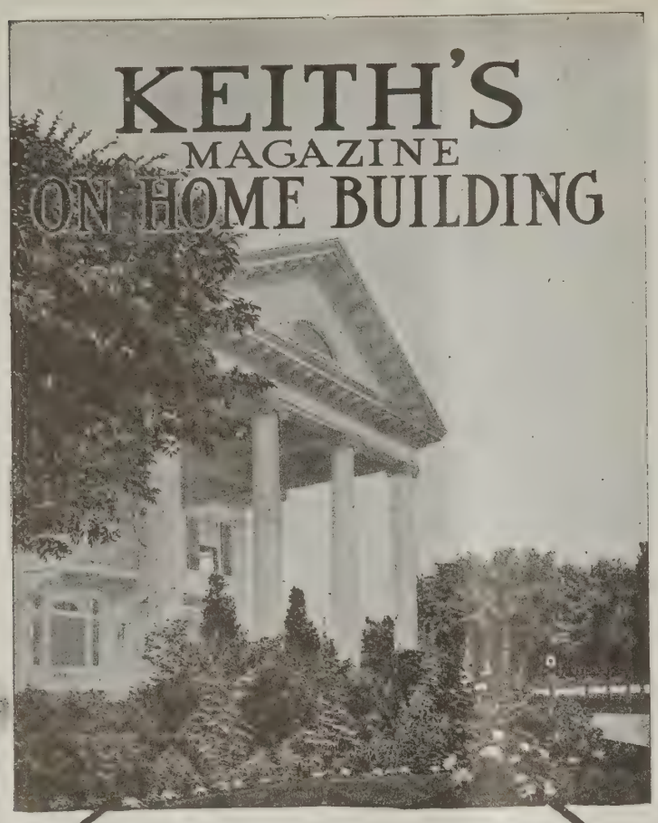
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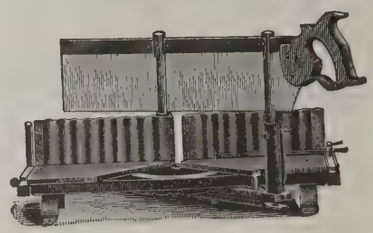
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As the leaders in Architectural Beauty and Quality.

When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.

We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, that's why we are selling more columns today than ever before. Ask for Catalogue "T"—it's worth having for any Home Builder. Send for catalogue T 27 of pergolas, sun dials and garden furniture or T 40 of wood columns.

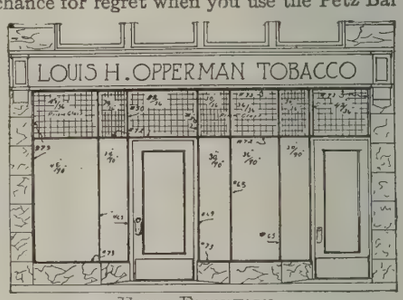
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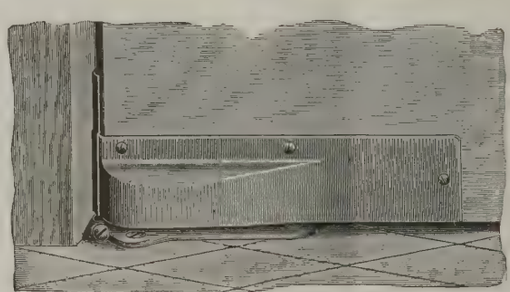


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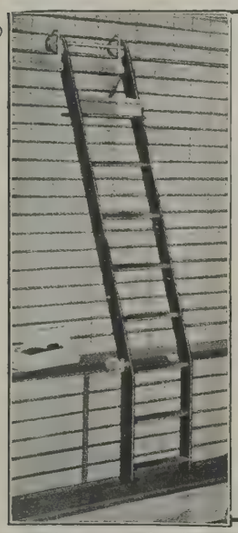
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Write for full particulars.

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Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

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Our screens are made from kiln dried lumber and have waterproof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

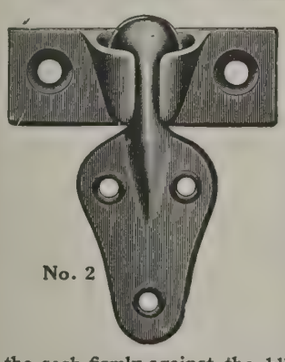
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28 Years Experience. 3½ Acres of Floors



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Storm Sash and Screen Hanger No. 1 and 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.

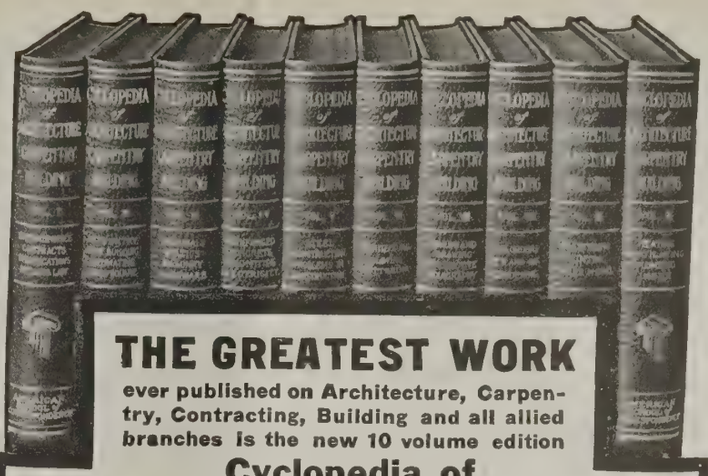


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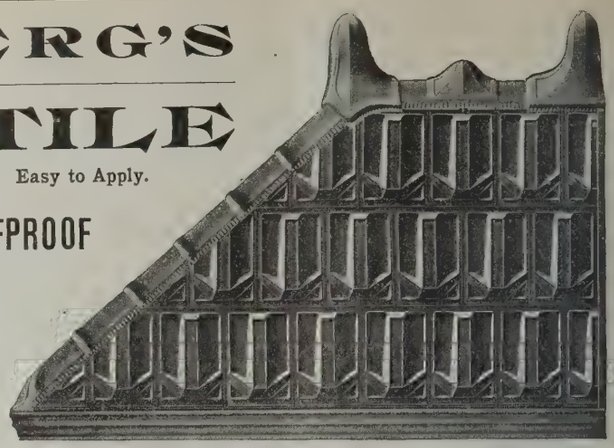
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List price: Smoother $3.25, Jack $3.50, Fore $3.75, Jointer $4.50.

Do not think the price too high until you try it, then if the Plane is not worth to you twice its cost, return it at our expense and the TRIAL WILL COST YOU NOTHING.

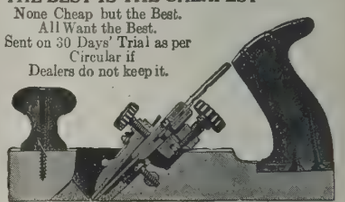
Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

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If only names and a dome are sent, you will get 2 carpenter pencils.

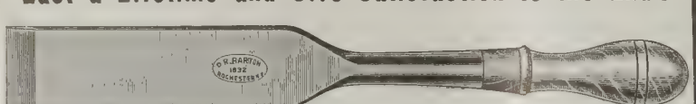
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Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

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SAVES 50 PER CENT OF COST; 40 PER CENT OF FUEL



Most Durable, Most Economical Furnace Sold

Has a Perfect Ventilating System for Every Part of the Building

RESIDENCE HEATING PLANT

Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 20-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

Special Price, $65

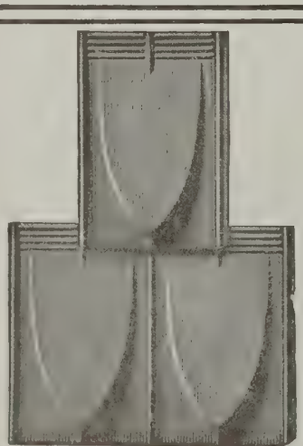
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One large hot air, two cold air registers, 54-in. Furnace, 32-in. Fire Pot, 40-in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

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Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

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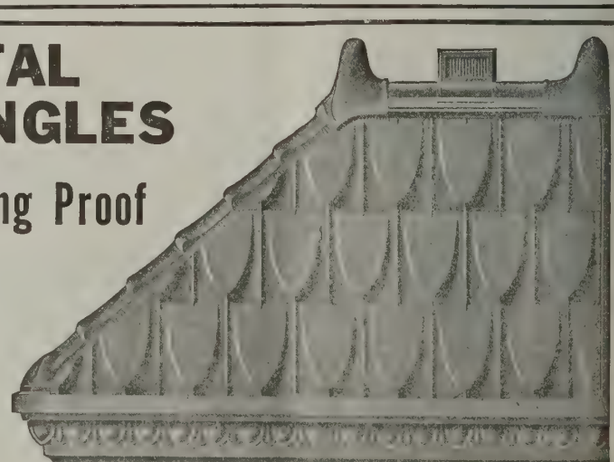
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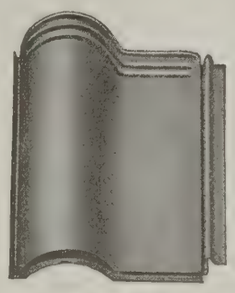


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We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing Others have made big profits simply devoting part of their time to selling and laying our Metal Spanish Tile.

Edwards Metal Spanish Tile





Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "slip" painted or heavily galvanized, size 10 x 14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TO-DAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TO-DAY FOR OUR SPECIAL AGENTS' PROPOSITION.



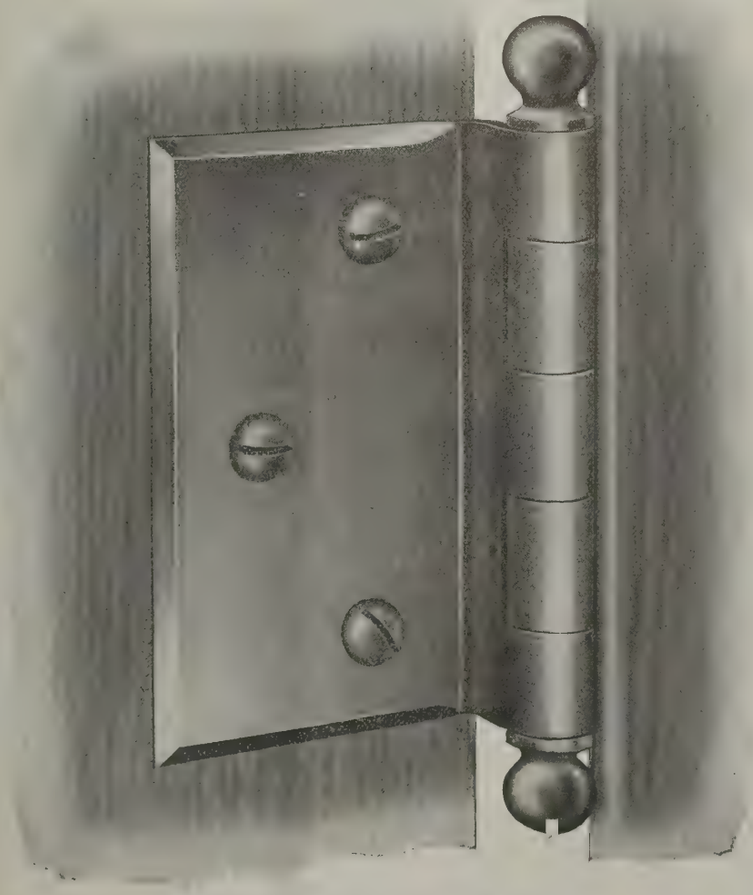
Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

430-450 Eggleston Ave. **CINCINNATI, OHIO**

THE WORLD'S LARGEST METAL ROOFING, METAL SHINGLES AND METAL CEILING MANUFACTURERS.



No. 450. CUT FULL SIZE, 3½ INCH.

WE INITIATE
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A Big Hit

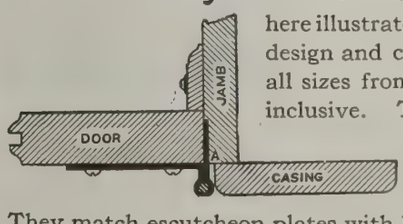
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The TIP is threaded and screws into the Butt in both the Jappanned and Plated finishes.

It is also SLOTTED for A SCREW DRIVER, making it easy to remove the tip and affords ready access to the pin.

The slot also indicates instantly which is the bottom of the butt—a feature greatly appreciated by the carpenter. These are exclusive "NATIONAL" features.

Style No. 450



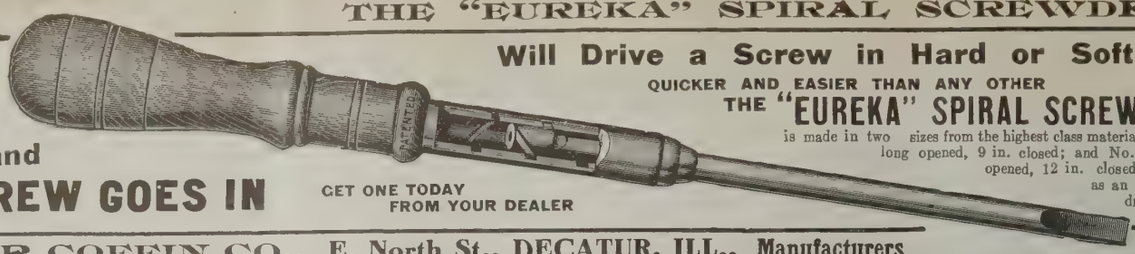
here illustrated is a very popular design and can be furnished in all sizes from 1½ in. to 4 inches inclusive. These butts are highly polished, double plated and have beveled edges. They match escutcheon plates with beveled edges. Ask for "Catalog B" and give dealer's name.

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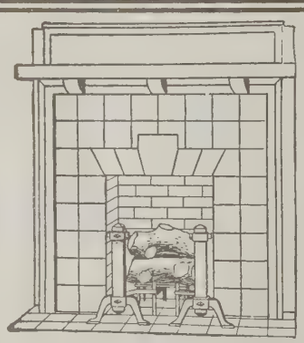
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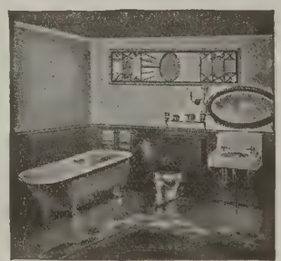
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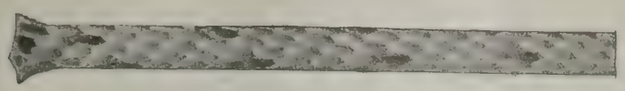
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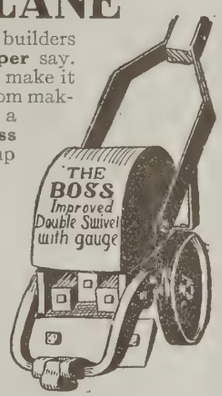
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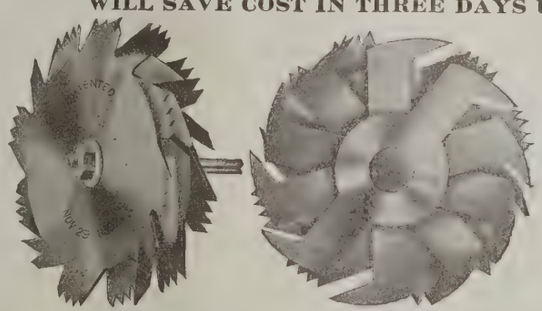
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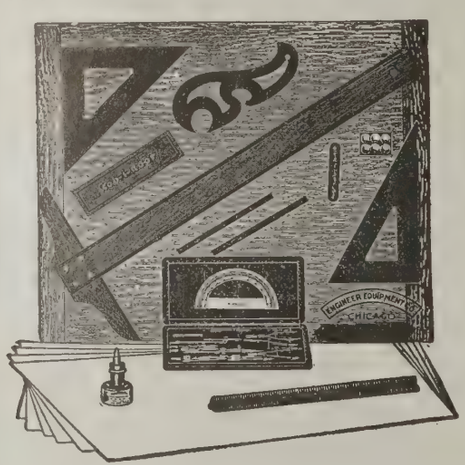
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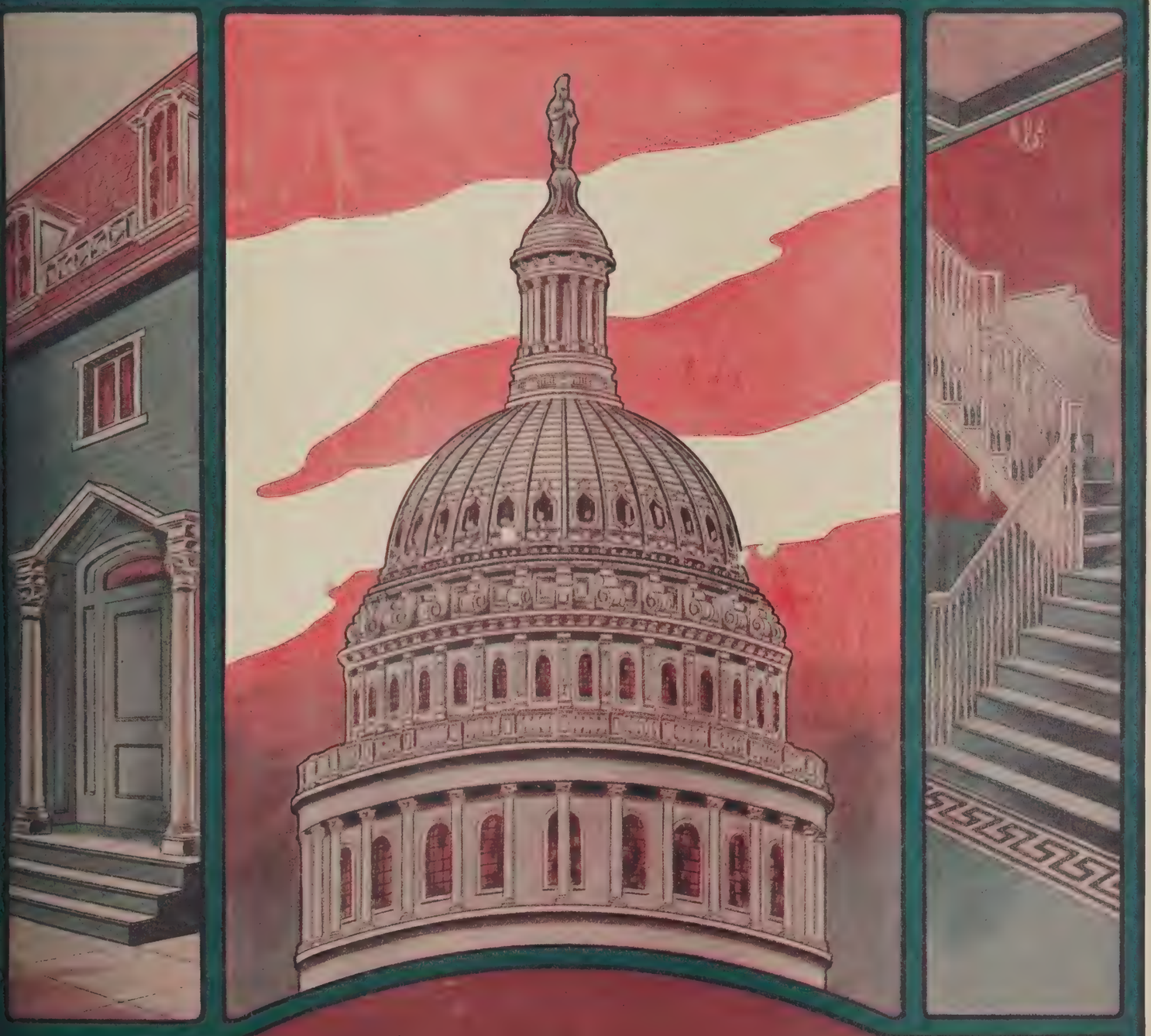
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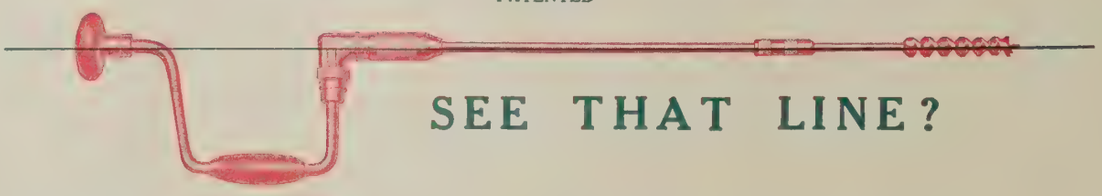
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We also make a Universal Chuck which will take either the Precision shank or the ordinary square shank.



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Fire-Resisting—Air-Tight—Moisture-Proof Rat, Mouse and Cockroach Proof!

Here is the reason: Bishopric Wall Board is made with Asphalt-Mastic. This is asphalt toughened by a patented process and **it won't burn.** In hot Asphalt-Mastic kiln-dried dressed laths are imbedded at a pressure of 500 pounds to the square inch. The other side of the Asphalt-Mastic is surfaced with heavy sized cardboard.

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Bishopric Sheathing is made of precisely the same materials as Bishopric Wall Board, but finished surface is not so smooth. It saves 75 per cent of the cost of lumber sheathing and building paper; is applied in less time; does away with building paper and makes a more solid and windproof job.

It is nailed to outside of studs with lath side of sheathing exposed. Over the sheathing weatherboards are nailed or cement or stucco applied. When weatherboards are applied, dead air space is left between the laths, furnishing excellent insulation. The same spaces between the paralleled laths form an excellent key where a cement or stucco exterior is desired.

Sheathing may be used in place of Wall Board where a fine finish is not necessary.

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Bishopric Wall Board is the only wall board made with laths. Laths are positively necessary to back up a wall board—to make it rigid and substantial—and to keep a perfectly flat surface. Without lath, wall board swells, warps, cracks and pulls away from the joints.

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We have a new proposition for the live contractor and builder in every town.

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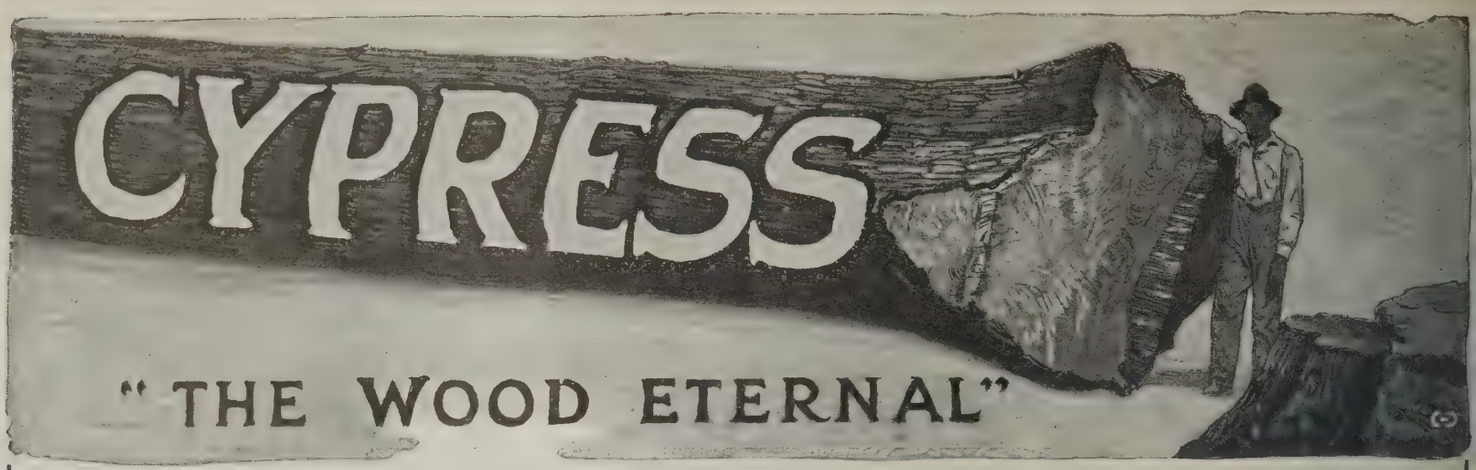
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You Know the Ancient fame of

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But do you know its uses *today*, and their significance to *you*?

CYPRESS is ***the*** wood of Scriptural history, and of romance; CYPRESS was the mystic wood of mythology—and it was the reliance of the sturdy builders of early America; CYPRESS always has been a magnet for those who have wrought sentiment and beauty into useful things—and CYPRESS is ***today*** the ***staple wood*** of the hard-headed calculating buyer who seeks the most ***lasting*** values for his lumber money.

This concerns ***YOU***—if you like to avoid repair bills on anything made of wood.

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To bring the record nearer home—there was Thomas Lyon, who in 1640 built him a house in Greenwich, Connecticut. He put CYPRESS shingles on its roof and sides. With no exterior repairs of consequence, this house is today occupied as a residence.

THIS WAS **AMERICAN** CYPRESS—the kind we own and cut and are selling you.

CYPRESS is in truth "the wood eternal." He who uses Cypress builds but once. If you are putting up a palace or a pasture-fence, and want to build it "for keeps"—USE CYPRESS.

There will continue to be a liberal education (and a wonderful *investment* value for you) in the CYPRESS advertising—and in the DETAILED INFORMATION and RELIABLE COUNSEL to be had promptly, *WITHOUT COST,* if you will *WRITE US YOUR OWN NEEDS* (big or little), and *ASK YOUR OWN QUESTIONS* of the **"Builders' Department"** of the

Southern Cypress Manufacturers' Association

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

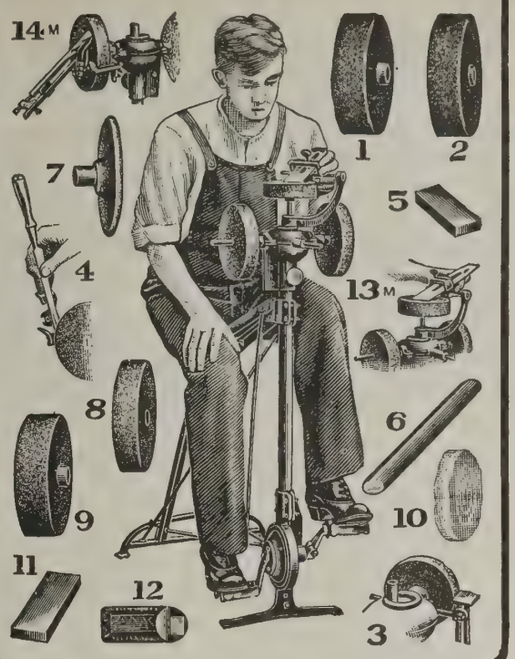


Probably your lumberman sells CYPRESS; if not, *WRITE US,* and we will tell you the dealer handiest to you.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

Sharpen Tools 30 Days FREE

NO PROMISES! NO RED TAPE! NO MONEY NEEDED!
You can try this all-metal, shaft-drive tool grinder, with its Dimo-Grit (artifical diamond grit) wheels for **30 days absolutely free, and without putting yourself under any obligations.** You can put all your tools in bright, shiny, keen condition, and you will be amazed how quickly and easily you can do it. You can **sharpen your chisels, twist drills, draw knives, hatchets, augers—gum your saws and put a keen edge on every tool—all at no cost.** Use the outfit 30 days—then if you want to part with it, **send it back at my expense.**

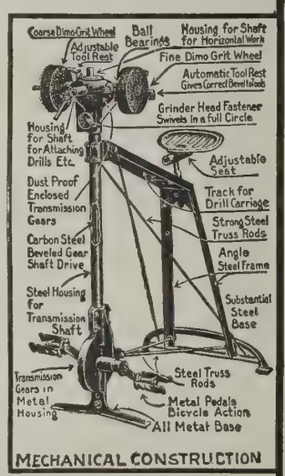


Dimo-Grit Wheels—"the wheels for steel"—25 times faster than grindstone—10 times more efficient than emery—Will not draw temper—no need to cool with water

DIMO-GRIT is the new artificial diamond abrasive, a twin product of carborundum you have heard so much about, but **DIMO-GRIT** is especially adapted to steel, leaving the **keenest, smoothest edge.**

DIMO-GRIT cuts hardest steel as easy as emery does copper. The **DIMO-GRIT** wheels of this grinder, turning **4,000 revolutions per minute,** make the hardest job of grinding but a few minutes easy work. **Prove it by trying this outfit on your own tools 30 days free.**

DIMO-GRIT crystals are really artificial diamonds as hard as real diamonds, made of the same elements as real diamonds and fused in the marvelously hot electrical furnaces at Niagara Falls, in which fire brick and metal melt like bees-wax and is vaporized like water in a kettle. Genuine South African diamonds could cut steel no quicker than **DIMO-GRIT.** Carborundum wheels furnished if wanted.

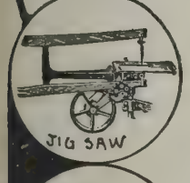


MECHANICAL CONSTRUCTION

Luther Hummer Tool Grinders

Mechanic's outfit consists of machine and 14 attachments—16 other attachments from which you can select what you want.

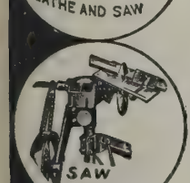
No machine ever built is like the "Hummer"—**it is all steel and iron—nothing to wear out**—steel shaft drive like automobile—ball bearing, dust-proof bearings. **Costs no more than cheap chain-drive grinders.** Runs as easy by foot as a sewing machine—engine power can be applied. The 14 mechanic's attachments **equip you for all kinds of sharpening, buffing and polishing.** From the other attachments, such as jig-saw, rip saw, lathe, drill, etc., you can select what you want. No other machine so moderate in price saves money so many different ways. **You can prove it by 30 days free trial. 5 years guarantee. Over half a million Luther Grinders now in use.**



Choose what you want



Besides the sharpening attachments which are included in the sharpening outfits, there are 16 other attachments from which you can select what you want. In this way you can secure a turning lathe, drill, circle saws, jig saws, metal polisher, etc.—16 in all—simply by getting these attachments to go on your "Hummer" Grinder.



If you were to purchase machines to do the same work that these attachments will do, it would cost a good deal, but by getting these attachments for your grinder you can completely equip your workshop at amazingly small cost. Our Free Book describes all attachments.



DIMO-GRIT
Sharpening Stones
Ask your dealer for **Dimo-Grit** sharpening stones, the fastest and smoothest cutting sharpening stones in the market—look for the name "Dimo-Grit" on the stone.

Big illustrated 40 page book FREE

Contains the story of artificial diamond sharpening substances, and of the marvelous electrical furnaces at Niagara Falls, exactly as printed in McClure's Magazine. It fully describes the Luther "Hummer" Tool Grinder and attachments and gives pointers on tool sharpening. You will find it valuable to you in many ways. This book is free. Return the coupon and get it, along with our 30 days FREE TRIAL OFFER.

The Wonderful Ways This Grinder Saves Time and Money

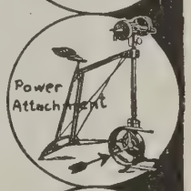
Day by day, year after year the work you do depends on tools. The amount of work you get done, and the ease with which you do it, depends on how sharp your tools are. This grinder, because it makes tool sharpening so easy, enables you to keep your tools always in perfect edge, making all your work go twenty percent faster and easier.

These patent tool rests enable an apprentice boy to do most difficult sharpening, such as sharpening twist drills, gumming saws, etc., and do it exactly as well as a high priced mechanic.

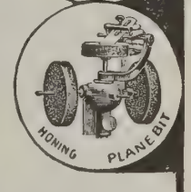
It saves tools—ninety percent of tools come to an early old age because of grinding on grindstones and emery wheels. **Dimo-Grit** wheels do not draw temper—make your tools last twenty-five percent longer. The saving in tools alone will pay for the grinder outfit over and over. This mechanic's outfit equips you to do all grinding, polishing, buffing, etc., for carpenters, mechanics, contractors, shops, etc.











WHAT OTHERS SAY:

Most Practical Grinder Made

I received the grinder the 18th of April. I am highly satisfied with it. I consider it the best and most practical all-purpose machine so far manufactured.
ALLEN STOODLEY, Goldfield, Nev.

The Best Grinder

I wish to write you with regard to my grinder. I am well pleased with it. It is the best grinder we have around here.
E. N. EARLES, Bealsville, Ohio.

Better Than Expected

The grinder arrived here some time ago, and have found after testing same it works very good indeed, better than expected. I shall let everybody know about it that comes within my hearing.
THOMAS HEMLER,
Thetis Island, B. C. Canada.

What Neighbors Say

I received your grinder a few days ago, and it more than comes up to expectations. I am pleased with it. It does everything you claim for it and more, too. I have shown it to my neighbors, and they say it is one of the finest things they ever saw.
LEW KNUSTON, Leland, Ill.

Just as Represented

I have just received the grinder and find it is just as represented. I am very well pleased with it
C. H. THOMPSON, Cheyenne, Wyo.

Obtains Keen Cutting Edge

Your machine reached me in due time, in good shape and as represented. I am a template maker by trade and I have a great many tools that require a very sharp edge, which I can obtain through using one of your machines. I enjoy good tools and have as many of them about me as possible.
E. R. WEESNER, New Castle, Ind.

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For Free Trial Offer and Free Book.

Send the coupon for full particulars about this money making machine—then decide if you would like to have us send it for 30 days free trial, **absolutely without the slightest risk or obligation on your part.** Please remember that the coupon places you under **no obligation whatever**—it is just a request for information. Send for our Free Trial Offer today and get a **quick answer.** With the Free Trial offer we will send the 40 page book.

LUTHER GRINDER MFG. CO.
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COUPON

Luther Grinder Mfg. Co.,
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Please send without cost or obligation, your 30 days Free Trial Offer and large free book.

My name is .....

My address is.....

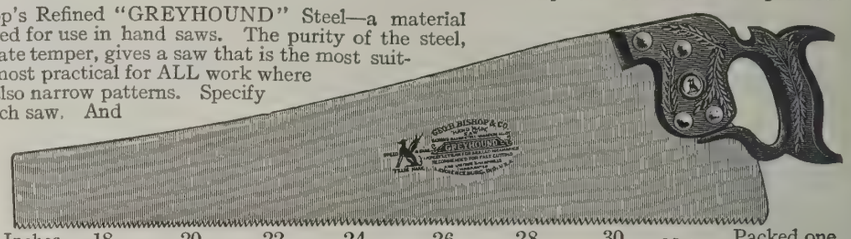
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GREYHOUND HAND SAWS

SPEED & EASE
TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the **best** for your use, you get your money back.

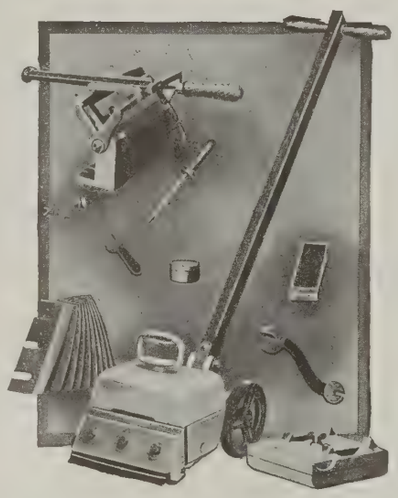


Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers
Lawrenceburg, Indiana

The Acme Floor Scraper



Is an equipment that has revolutionized the work of floor scraping.

It is a time and money saver and is guaranteed to do perfect work.

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Price Complete
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HARDWARE CO.

ESTABLISHED 1872

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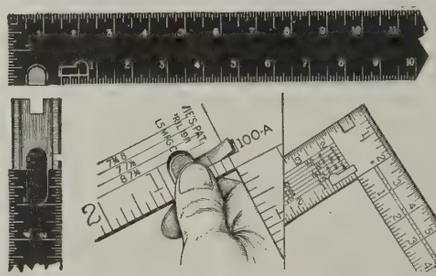


Where in "the Sam-Hill is that Key?"

NONE OF THESE TROUBLES WHEN YOU HAVE A

NICHOLLS TAKE-DOWN SQUARE

It has a Thumb Lock. No Key to Lose.



GUARANTEED TO REMAIN TRUE

Beveled Bearings take up wear in taking square apart and putting it together, therefore it will remain true. Rust-proof canvas case with each square.
If your dealer does not handle ourgoods and will not order them for you, write us. We have a special inducement to those who order first square in every town. We prepay express.

THE No. 100A HAS THE OCTAGON FRAMING RULE ON BACK

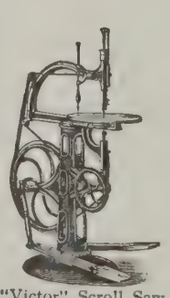
	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

Add ten cents to the price of the No. 100R and 100A if 1¾ inch tongue is desired.

NICHOLLS MFG. CO., - Ottumwa, Iowa

FOOT, HAND AND LIGHT POWER

WOOD-WORKING MACHINES



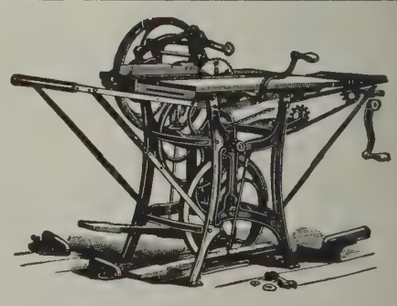
"Victor" Scroll Saw.



"Diamond" Mortiser

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor-saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.

Send for catalog "A" describing our complete line

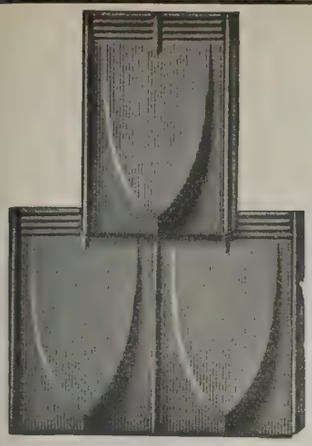


No. 5 "Union" Self Feed Rip and Cross-Cut Saw

THE SENECA FALLS MFG. CO.

629 Water Street SENECA FALLS, N. Y., U. S. A. (249)

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STYLE B.
Showing Method of Laying

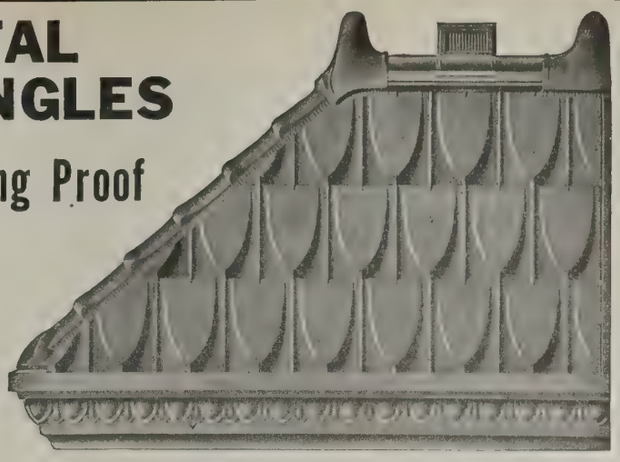
"TITELOCK" TRADE MARK METAL SHINGLES

Fire, Water and Lightning Proof

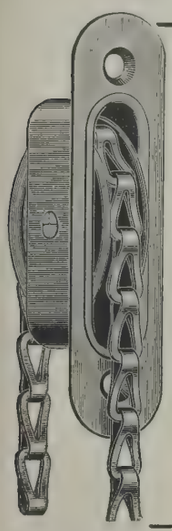
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Milwaukee Corrugating Co.

MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.



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NIAGARA

All Steel Sash Pulleys and Sash Fixtures

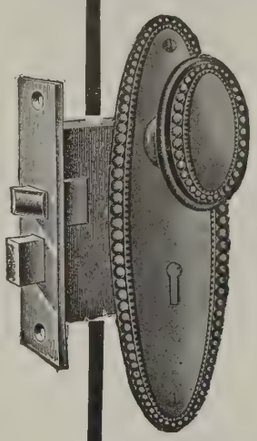
should be specified if reliability and durability are required. It is to the Building Contractor's interest to have our Samples and Prices. **Write for Folder 57-B.**

Premax Sash Chain made in three weights of link, in bright steel or in electroplate of copper, brass or nickel.

Niagara Falls Metal Stamping Works

Manufacturers of Hardware Specialties Niagara Falls, N. Y., U. S. A.

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37 CENTS Per Set All Complete for THIS STEEL ANTIQUE Copper Finished

INSIDE LOCK SET

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FREE Our illustrated catalogue and net price list to contractors and builders. It's full of big bargains on fine builders' hardware, tools, etc.

Prompt Shipments and Satisfaction Guaranteed

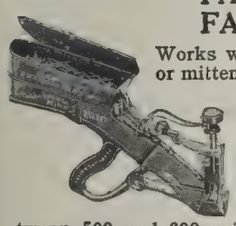
We do not sell to Contractors in Cook County.

REHM HARDWARE CO.

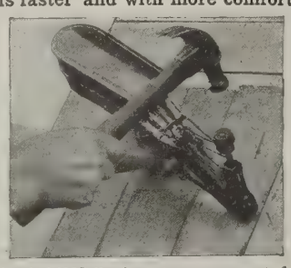
1503 Blue Island Avenue CHICAGO, ILL.

PEARSON'S AUTOMATIC SHINGLE NAILER

PAYS FOR ITSELF ON ONE FAIR-SIZED SHINGLING JOB



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.



PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼-in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented.

Write for Circular "N."

PEARSON MFG. CO., ROBBINSDALE, MINN.

Taylor Portable Steel Derrick



Tested at factory, hoisted and swung complete circle 1900 lbs. Shipped ready to operate. No wrench or tools required to set derrick on job. Made in two sections. Beam section connects post by tipping in a vertical position and projects at such an angle to clear side wall of building and has sufficient height to hoist wheel-barrows, window frames and timbers. One man can climb a ladder with either section. Consider the durability of a derrick constructed entirely of malleable Iron and Steel and that of Wood, more compact, more powerful.

Derrick complete with three way block, channel steel brackets, bolts for attaching to building, price $40.00, and four and one-half cents per ft. for crucible steel cable attached. Drum capacity 300 ft.

Special platform and chains for attaching derrick to gondola railroad cars, price $15. Chains for hoisting wheelbarrows, price $2.00.

JOHN L. TAYLOR, Manufacturer

Taylor Portable Steel Derricks

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COMPLETE OUTFIT FOR

Carpenters and Builders

IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Warranted to be well made, will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

Price $15.00



We make Sixty Styles of Knives

SEND FOR NEW CATALOGUE

W. F. & JOHN BARNES CO.

436 Ruby Street, Rockford, Illinois

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HARRIS & COLE BROS.

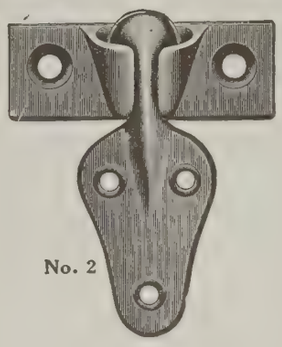
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TRADE MARK

RED GUM & OAK—TRIM AND MOULDINGS
RED GUM & OAK—FINISHING LUMBER

We can furnish Red Gum Finishing Lumber and Oak Finishing Lumber in any width desired and ship QUICK.

HARRIS & COLE BROS. CEDAR FALLS, IOWA



No. 2

Storm Sash and Screen Hanger No. 1 and 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.



No. 1

Manufactured by the

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Send for Catalogue

Carey's Flexible Cement Roofing

WHEN Carey's Roofing is specified and used, roof quality, durability and satisfaction are assured. Its standardized construction is recognized everywhere—proved by twenty-five year tests.

¶ Furnished and applied—under our direct supervision and guarantee—to any class of buildings, flat or steep surface.

Write for full particulars.

THE PHILIP CAREY MFG. COMPANY

50 Branches : : : Est. 1873

59 Wayne Ave., Lockland, Cincinnati, O.

Our Literary Contest

for December struck a live wire all right, and as a number of replies are already in, we are going to keep this contest up for another month at least, and we are again offering

A Prize of Ten Dollars

for the best article on either of the following subjects:

1. What Shop Machinery Do You Find Most Useful?
2. Cost Keeping on Small Contracts.
3. How to Keep Busy in Winter.

More or less shop machinery is necessary in every line of work. Power is so cheap and labor so high nowadays that it is almost a crime to rip up a lot of furring strips by hand, yet we see it done. Why doesn't every contractor have a well equipped shop? Tell us your experience with machinery.

That ast house you built! Did you make money on it? How do you know? If it is necessary for a ten-cent store to have a cash register to keep track of the dimes, why don't you have some accurate system? If you do, tell us. We know lots of our readers who are hungry to hear it.

Possibly you haven't been idle a day all last winter. Were you just lucky or did you figure it out we would have cold weather and snow about December and January? Tell us, so we can tell our readers. Lots of them were out of work, for they told us about it.

Tell us in your own words, make drawings in pencil if you want to, but give us some ideas and get them to us before February 1, 1912. Write from 500 to 1,000 words, and try to

Get the Ten Dollars

The best answer gets the prize, and any others that we can use we will pay for at our regular rates on publication.

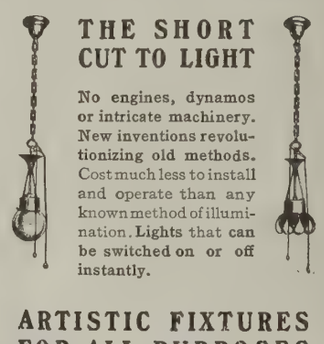
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THE NATIONAL BUILDER
542 SOUTH DEARBORN STREET
CHICAGO

ANYONE CAN INSTALL

THIS SIMPLE LIGHTING SYSTEM

IN TWO HOURS TIME







THE SHORT CUT TO LIGHT

No engines, dynamos or intricate machinery. New inventions revolutionizing old methods. Cost much less to install and operate than any known method of illumination. Lights that can be switched on or off instantly.

ARTISTIC FIXTURES FOR ALL PURPOSES

such as the lighting of stores, homes, churches, halls, streets, etc. Nothing to wear out or get out of order. A positive guarantee for a life-time furnished with each system.

HOW IT IS DONE

From a tank placed anywhere most convenient a small flexible hollow wire no larger in diameter than a match is used to convey the gasoline from the tank to the different lamps, where it is converted into gas and mixed with 94% of air. A few strokes of a small pump once a week is all that is necessary to produce the softest, steadiest and most brilliant light known to science. **Safer** from an insurance standpoint than electricity, gas, gasoline engine, kerosene or acetylene. No unsightly black pipes or insulated wires to be seen. Anyone can install and operate them. **It does not require a mechanic to run this wonderful system.** Five hundred Candle Power two hours a night for a NICKEL A WEEK. Send for our thirty day trial introductory proposition and complete descriptive matter.

RESIDENT AGENTS WANTED. An opportunity of a lifetime is offered to get into a permanent money making business. Every system installed sells others. Every user an enthusiastic booster.

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METAL LUMBER,
METAL CEILINGS,
REINFORCING PLATES,
ETC., ETC., ETC.

Let Us Quote You—Will Save You Money

PRACTICAL *Up-to-Date* PLUMBING

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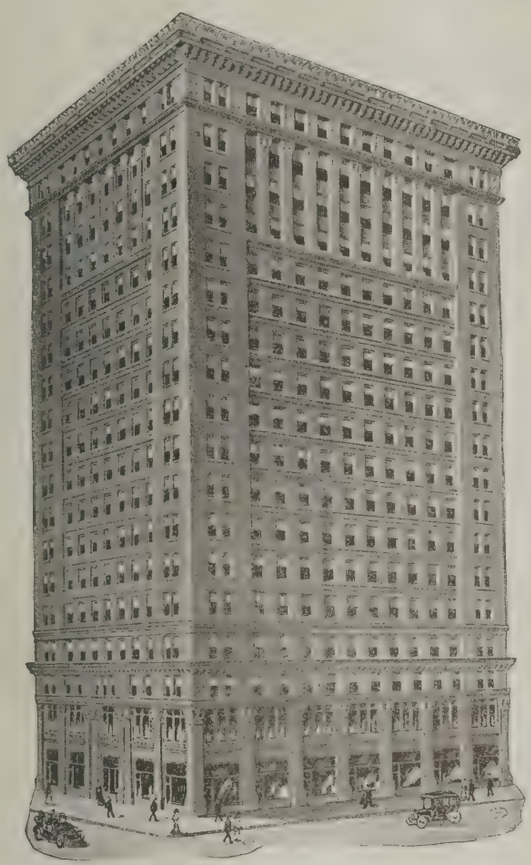
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SAP GUM

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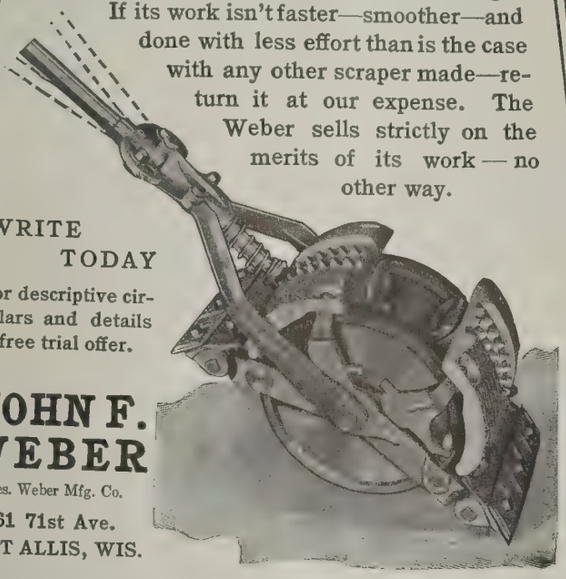
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Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

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WHY SCRAPE FLOORS BY HAND



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when you can do it so much better and in one-fourth the time with the **Acme Floor Scraping Outfit?** If you are still using hand scrapers you are losing 75 per cent on every job of floor scraping that you have to do.

This is a positive fact and can be vouched for by thousands of Carpenters and Contractors who have bought my equipment during the past five years.

Every Acme Outfit I sell is guaranteed to give satisfaction or I do not want any money for it. You can judge the merits of my tools on your own work, for I will ship the machines to you on **One Week's Free Trial** and if they do not meet with your entire approval, just return them to me at my expense and you will owe me nothing. This is my method of doing business. Does it sound reasonable to you? If so, write me now for booklet describing the best floor scraping outfit on the market.

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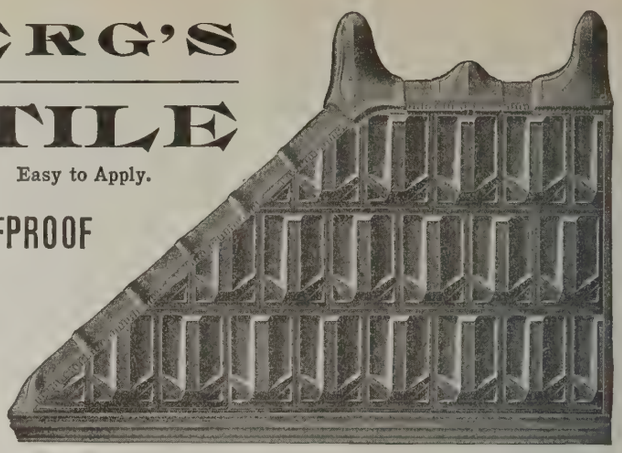
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METAL TILE WITH RIDGE AND HIP FINISH

The Advantages of a Portable Woodworker

Especially the "FAMOUS"

Stop hauling your millwork to the machine-shop—and hauling it back. Bring your machine-shop to your millwork! It's cheaper—and the saving goes into **your** pocket.

The FAMOUS Portable Woodworker is really a movable machine shop. When you've completed your contract on one job, move the machine to the next. Seven useful woodworking machines—practically all that a contractor requires—are combined into one. And a gasoline engine, complete with belting, is included in the outfit.

A Remarkable Machine

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Sidney, Ohio

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The machines embraced in the FAMOUS Portable Woodworker are:

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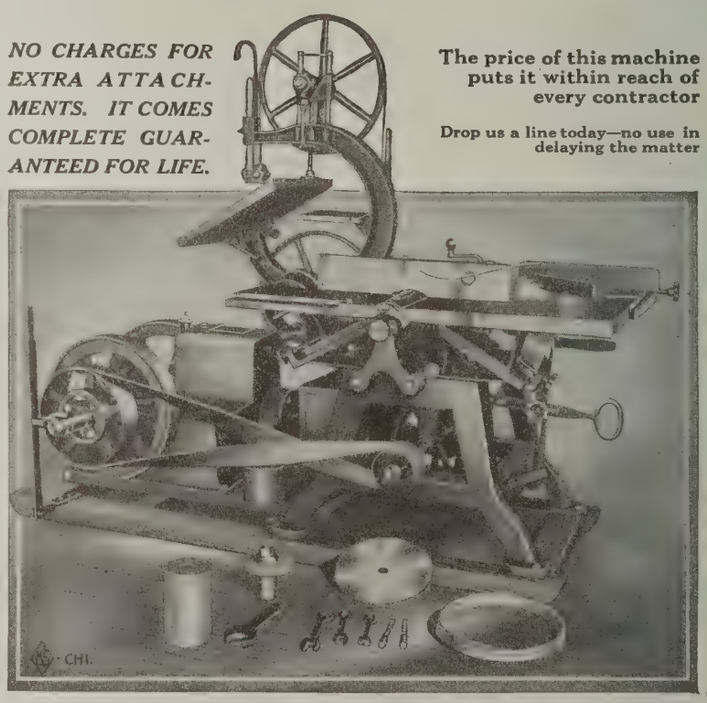
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NO CHARGES FOR EXTRA ATTACHMENTS. IT COMES COMPLETE GUARANTEED FOR LIFE.

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GUARANTEE OF QUALITY STAMPED ON EVERY BUTT

FURNISHED IN ALL STANDARD FINISHES

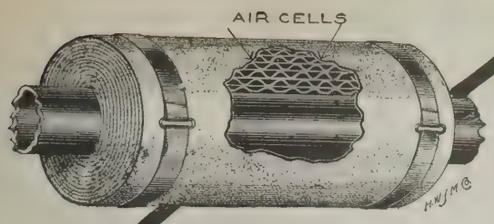
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McKINNEY MFG. COMPANY

WRITE FOR NEW 1911 CATALOGUE

Pittsburgh, Pa.

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Pointers On Pipe Covering

Most people know that insulation is based on the fact that heat cannot pass through dead or *motionless* air; and that the efficiency of a pipe covering is in direct ratio to the volume of dead air it confines. But how many know the difference between *dead* air spaces in a pipe covering and *live* air spaces.

The ordinary air cell coverings used for heating work confine *live* air and *not motionless* air—they have large air spaces running from end to end which allow air to travel back and forth. Therefore, they do not prevent the loss of any great amount of heat any more than you could keep heat from escaping from a pipe or a radiator in a room by closing all the doors, windows and vents.

J-M Asbestocel Pipe Covering

is made on a different principle from all others. The air cells run around the pipe instead of lengthwise. This makes the air spaces so small that there is no place for the air to circulate, and it must be motionless—dead. Consequently ASBESTOCEL confines a much larger volume of dead air than any other low pressure covering.

If you have hot water or low or medium pressure steam pipes to insulate, compare Asbestocel with all others. You can quickly see that it contains the greatest number of dead air spaces.

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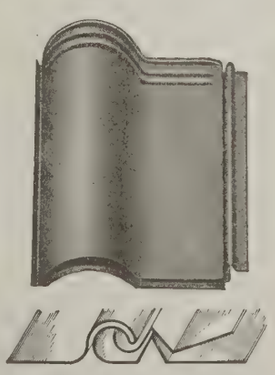


Don't Miss This Opportunity

We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing Others have made big profits simply devoting part of their time to selling and laying our Metal Spanish Tile.

Edwards Metal Spanish Tile

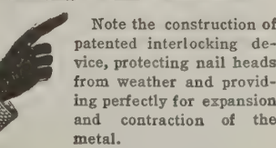


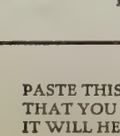
Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10 x 14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

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Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

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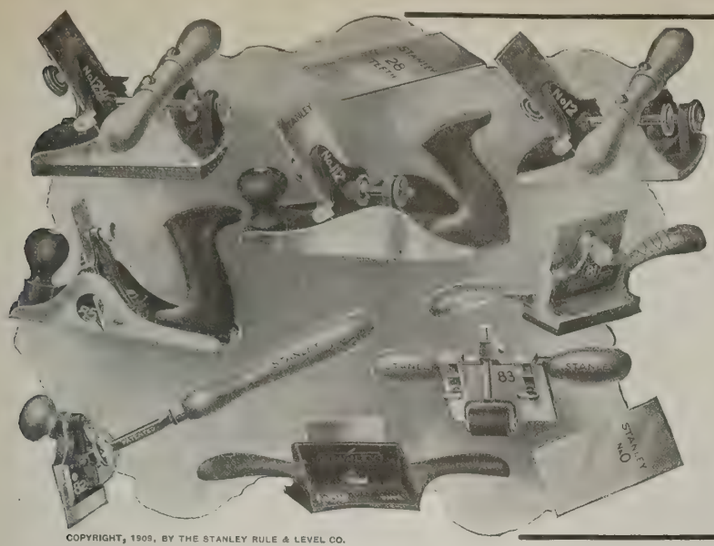
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EVERY TOOL GUARANTEED

BOMMER SPRING HINGES
ARE QUALITY GOODS



This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge



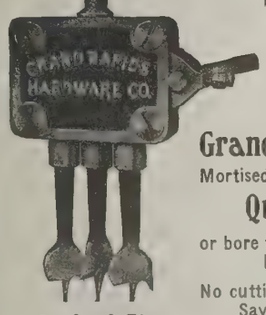
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The Springs Never Go Lame

Spring Hinges lead the strenuous life in Builders's Hardware; no other article in their line endures such wear and tear; therefore don't err in judgment, use BOMMER SPRING HINGES; they stand up to their work.

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HAVE YOU POWER BORING MACHINES?



Quadruple Bit
Price $5.00
Can not be used in a hand brace

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No Sash Pulley Can be Classed with the

Grand Rapids No. 12
Mortised at one Punch with the
Quadruple Bit
or bore four holes with a single bit and it's done

No cutting, fitting nor trimming
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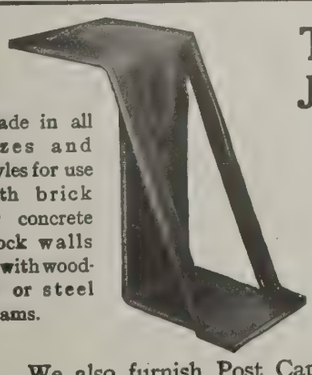


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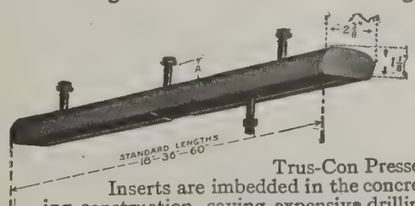
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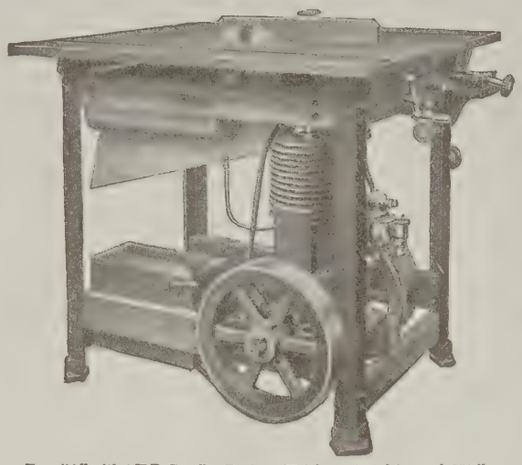
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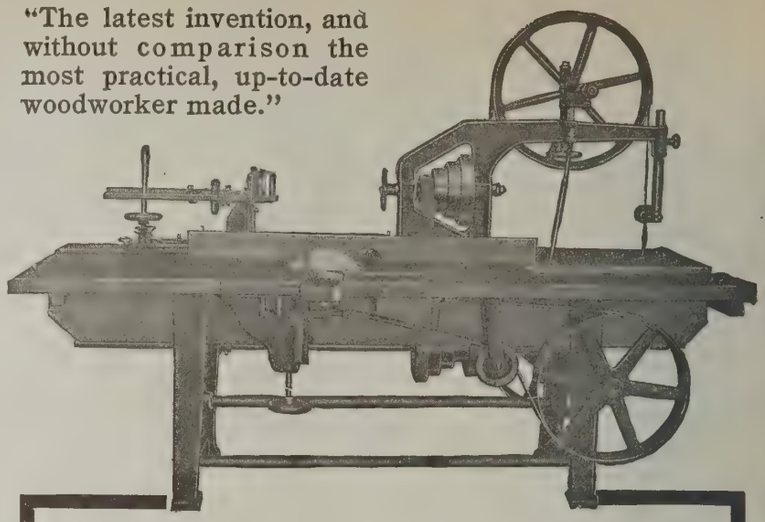
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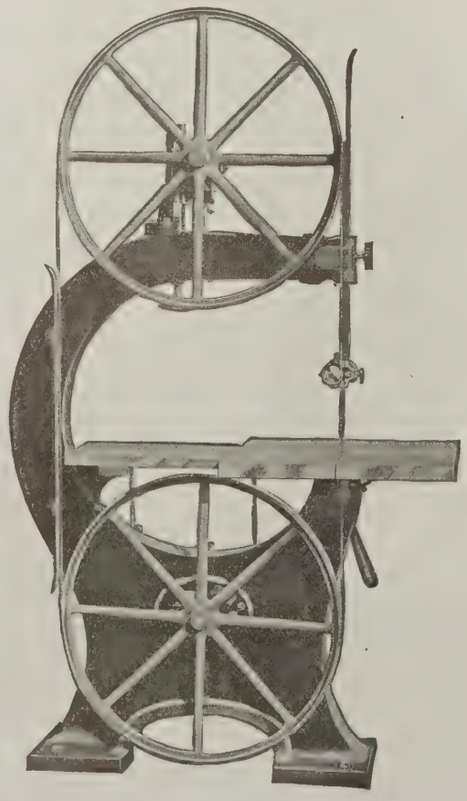


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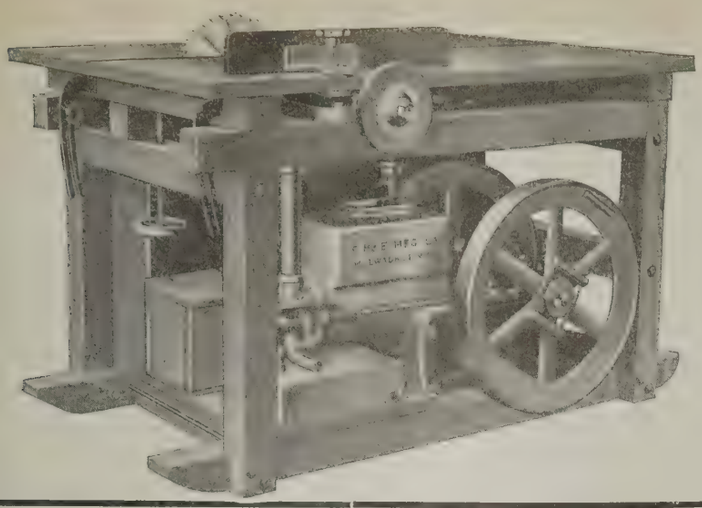
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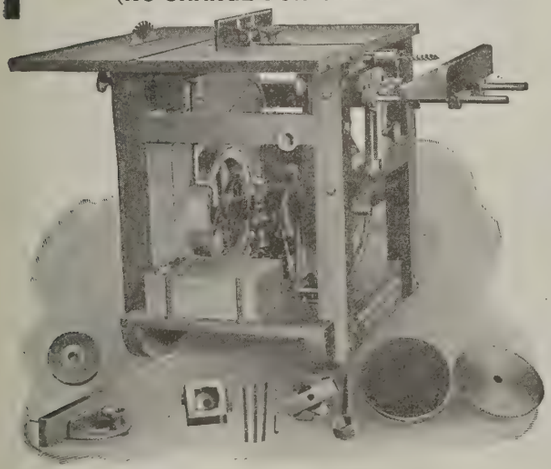
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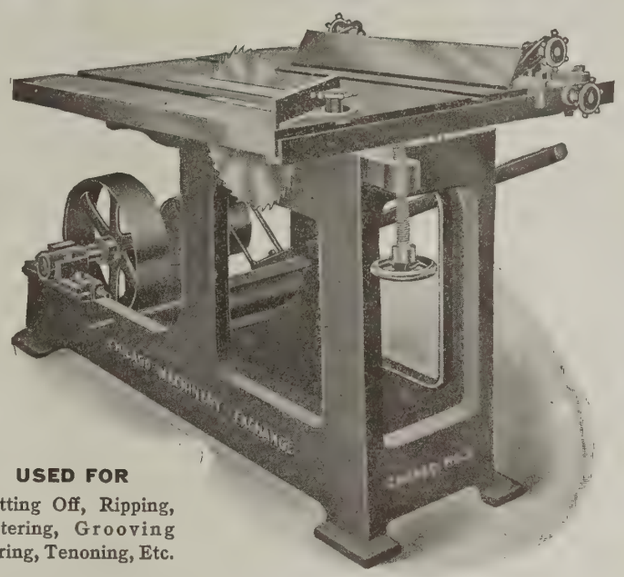
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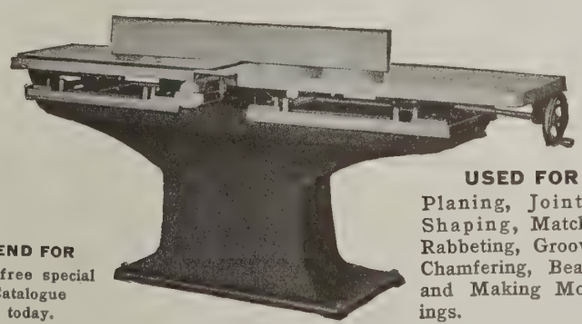
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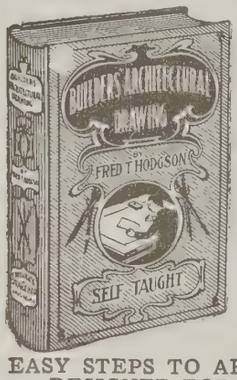
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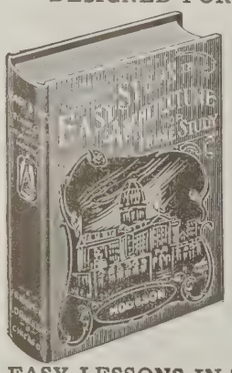
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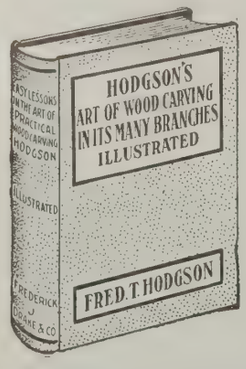
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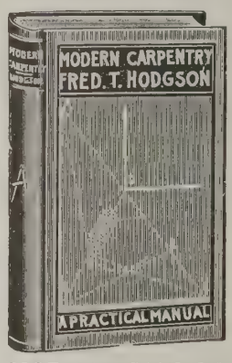
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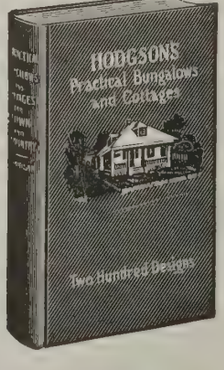
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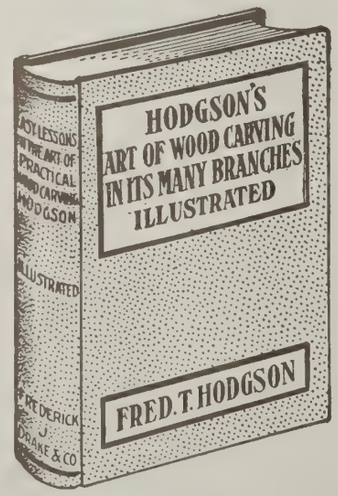
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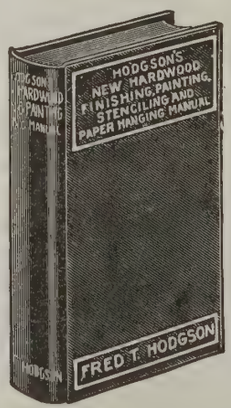
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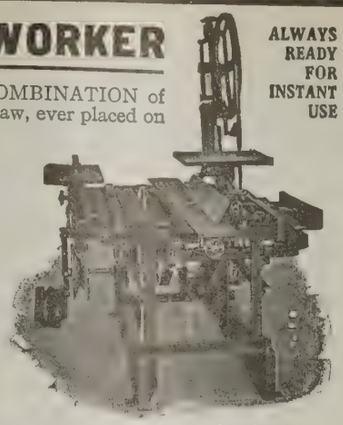
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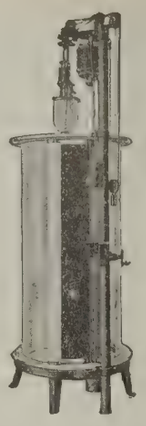
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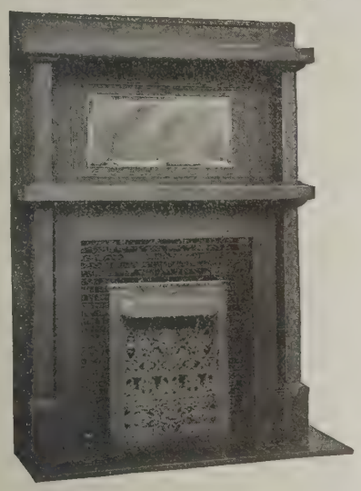


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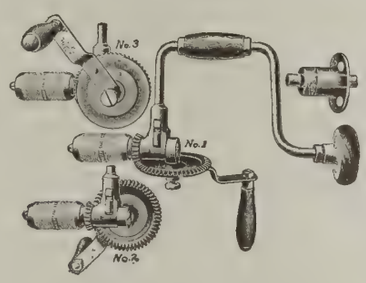
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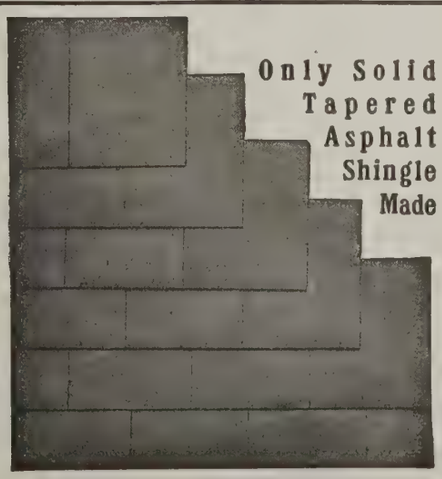
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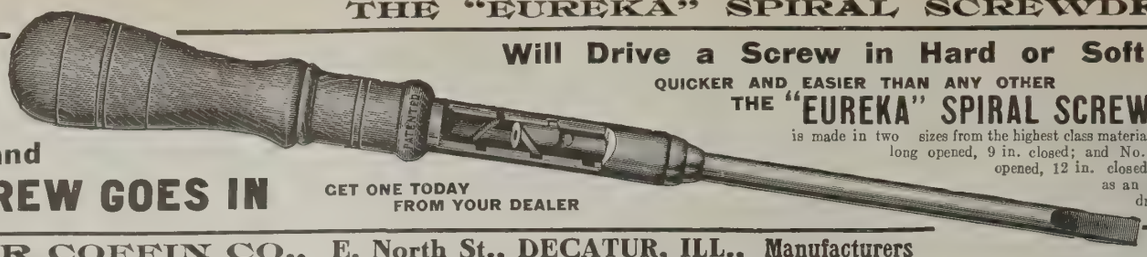
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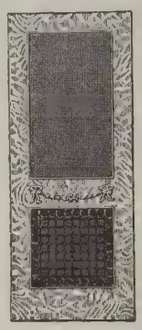
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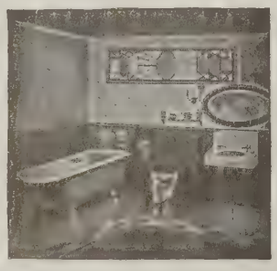
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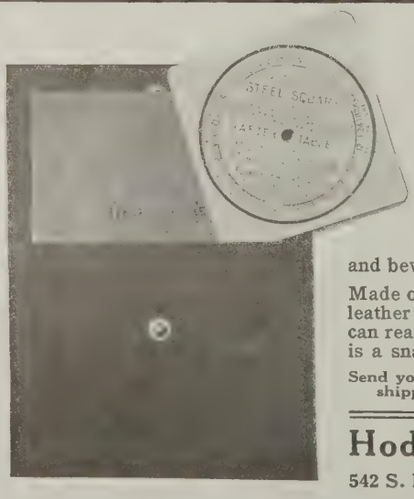
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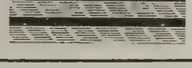
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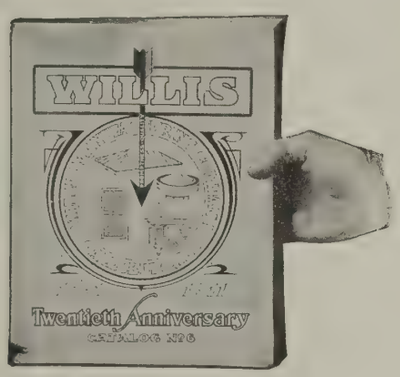
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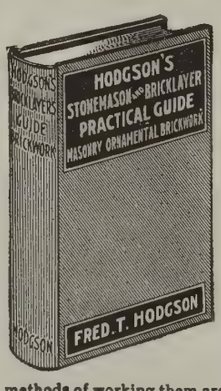
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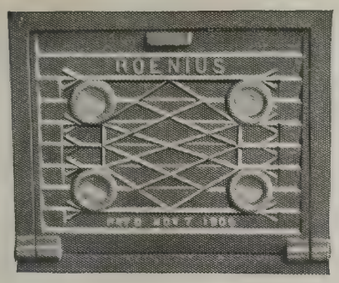
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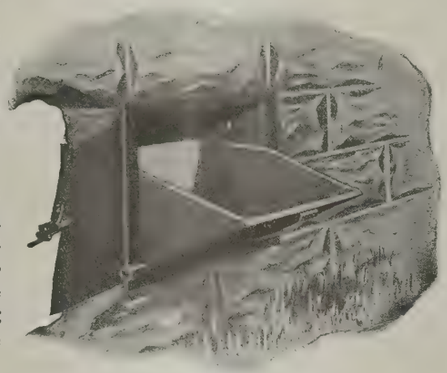
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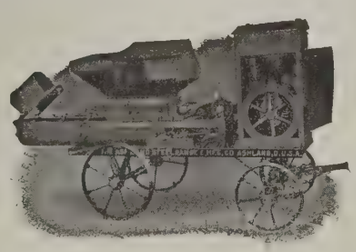
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This Quarter-Sawed Oak Mantel, $27



Called No. 1142. Height, 6 ft. 1 in.; width, 4 ft. 10 in. Wall plates to 5 ft. Pilasters 6½ in. Tile opening, 42x42 in. Profile, 5 in. Stock finish, golden polish, but we can match or give other finish without additional charge, including best coal grate, summer front, ash pan, tile facing and 18in. hearth (you can have enameled or dull finish tile), also hooks and plates for fastening to wall.

Best Gas Grate instead of Coal Grate..... $30.30

Or No. 1143 with French Bevel Plate Mirror, instead of wood panel, **$3.00** additional.

Mail us your order, inserting price, and be surprised at this bargain. **Special booklet displaying similar bargains** mailed **FREE** upon request.

Our MAMMOTH CATALOG of everything needed in the line of Sash, Doors, Mouldings, Columns, Stair Work, Grilles, Roofings, Art Glass, etc., is yours for the asking.

The Huber Builders Material Company
39-43 Vine Street **CINCINNATI, OHIO**



Oak Flooring

Attracts your attention immediately and holds your admiration permanently.

Every **builder, owner** and **investor** should use OAK FLOORING, because its natural beauty combined with its **economical** and **durable** qualities makes it the **King** of **Flooring.** Any truthful landlord or architect will tell you that OAK FLOORING **increases the renting** and **selling values** of any building more than any other kind of flooring.

OAK FLOORING will harmonize with any kind of trim, furniture or color decoration, and is susceptible to any kind of finish. In color, it is **rich** and **cheerful,** and imparts an **air of refinement** and **elegance** to a home.

OAK FLOORING ⅜″ thickness by 1½″ or 2″ faces can be laid over old floors in old homes or over cheap sub-floors in new homes at a very low cost. It is cheaper than carpets or Pine Flooring.

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THE OAK FLOORING BUREAU
858 Hammond Building - - Detroit, Michigan

Sheet Metal Statuary *of* Rare Artistic Worth



WITHIN the last quarter of a century there have been reproduced at the Mullins Factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.

We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

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Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

***The* W. H. Mullins Co.**
210 Franklin St., :: :: SALEM, O.



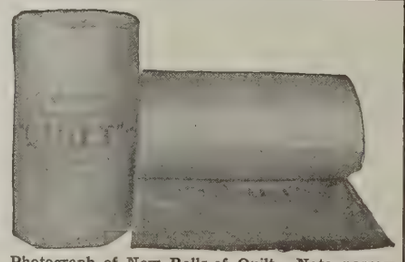
THIS BOOK FREE

It has been compiled by experts and will show you the one best way to get the best results from every kind of a saw. There is nothing of greater importance than a correct knowledge of the proper care and use of tools, among which the saw, to give the best results, demands the most expert attention. You should write for your free copy today. It will give you a better knowledge of the diseases and proper treatment of saws. Send postal for Saw Points Booklet No. 7.

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277 Broadway **NEW YORK**

THE NEW CABOT'S "QUILT"

The Original Scientific Insulator and Deadener
50% Better than Ever Before



Photograph of New Rolls of Quilt. Note narrow space in middle for splitting into 18″ strips.

IMPROVEMENTS

Made in 250 foot rolls.

Wonderfully strong, untearable paper.

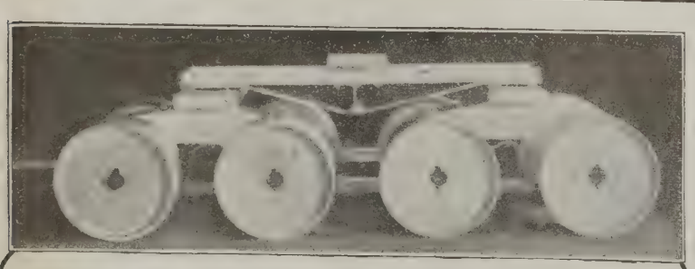
Fastened stitching that cannot rip.

No creases or lumps.

18-inch strips to go between studs.

One layer is warmer than forty layers of common building paper. The only perfect sound-deadener.

SAMUEL CABOT, Inc., Sole Mnfrs., Boston, Mass., U. S. A.
1123 Broadway, New York **350 Dearborn Ave., Chicago**



THE LA PLANT HEAVY HOUSE MOVING TRUCKS

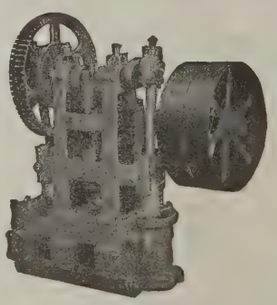
When you get a job with an old building on the lot—move it with the La Plant Trucks to another place—itstead of wrecking it. There is more profit in it for you.

La Plant Heavy House Moving Trucks are made of steel—on scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

Write for Catalogue N and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO. 900 E. Nevada St., MARSHALLTOWN, IOWA

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Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our
Power Pump Catalogue

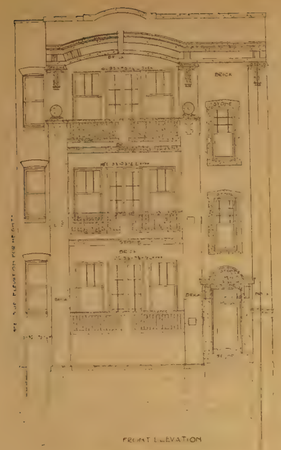
The Deming Co.
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Hand and Power Pumps for All Uses
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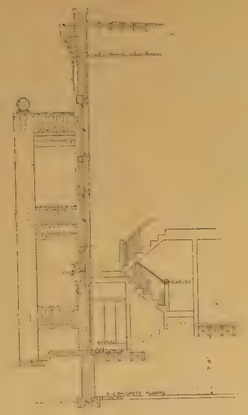
HENION & HUBBELL, CHICAGO
Other Agencies in All Principal Cities

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

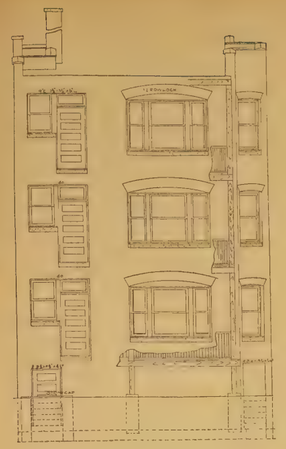
PRESENTED BY PROF. ...
CORNELL UNIVERSITY



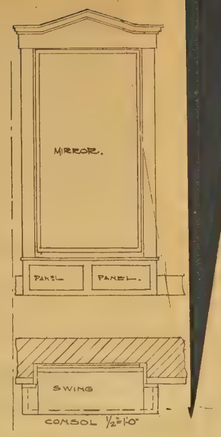
FRONT ELEVATION



SECTION THRU STAIR HALL

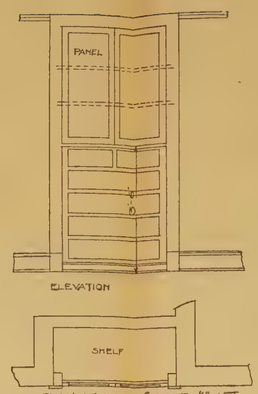


REAR ELEVATION

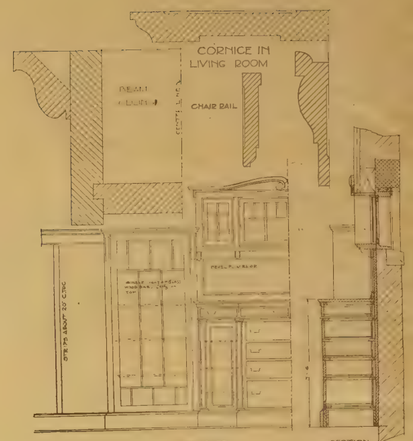




BASE BOARDS.



DETAIL OF LINEN CLOSET



SUPPLEMENT TO

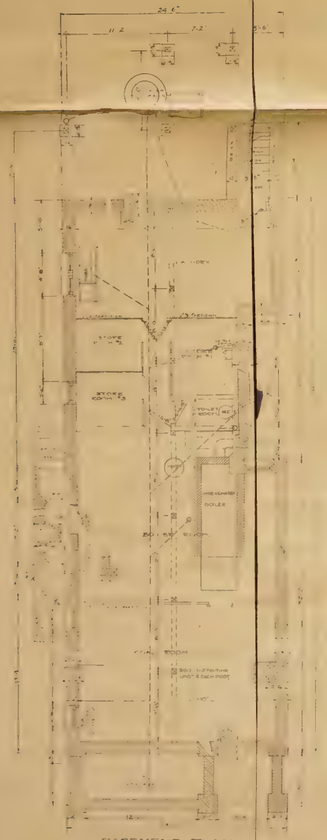
THE NATIONAL BUILDER

DECEMBER, 1911

NATIONAL BUILDER DESIGN No. 348, THE WISCONSIN BIRCH APARTMENTS

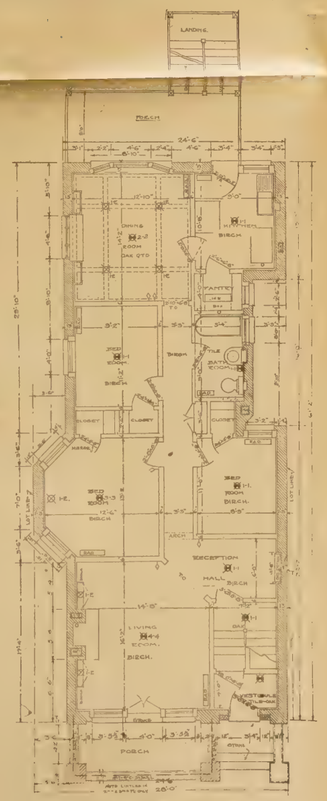
SCALE FOR FLOOR PLANS, SECTION AND ELEVATIONS, ⅛ INCH EQUALS 1 FOOT.
DETAILS, ½ INCH EQUALS 1 FOOT, ½ FULL SIZE AND FULL SIZE.

FOR ESTIMATE, SEE PAGE 29



BASEMENT PLAN

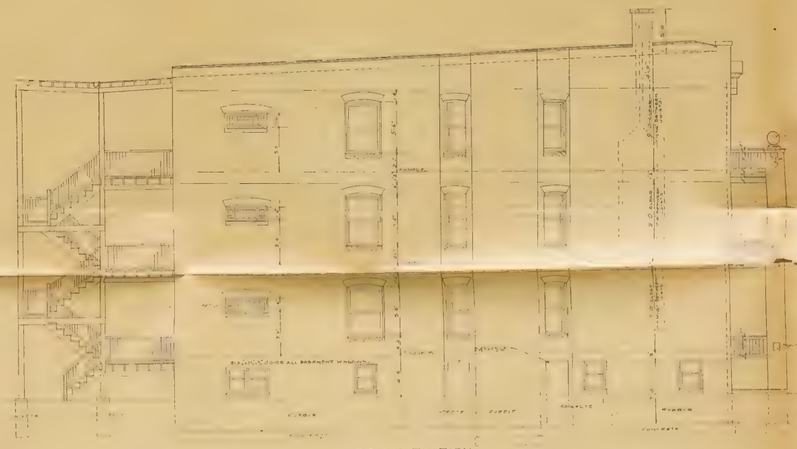
NOTE: THIRD FLOOR PLAN IS SAME AS SECOND, EXCEPT AT STAIRS.



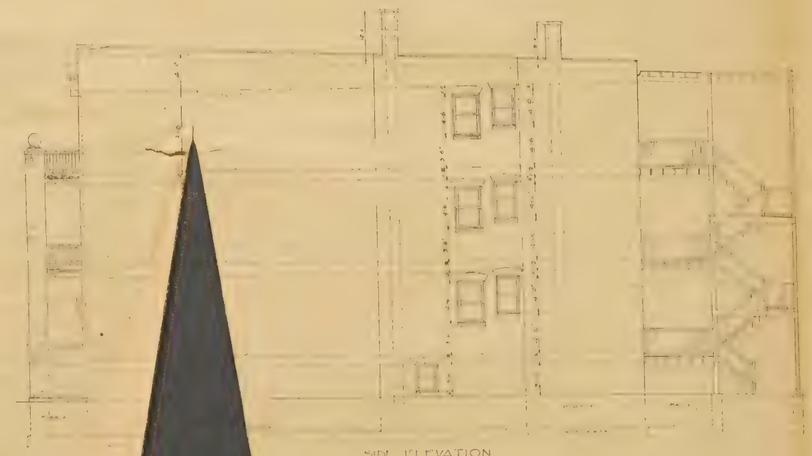
FIRST FLOOR PLAN



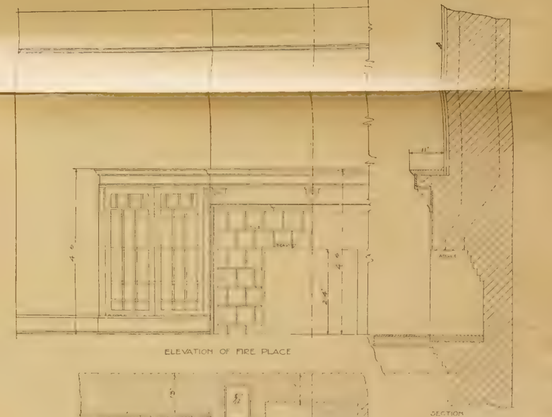
SECOND FLOOR PLAN



SIDE ELEVATION

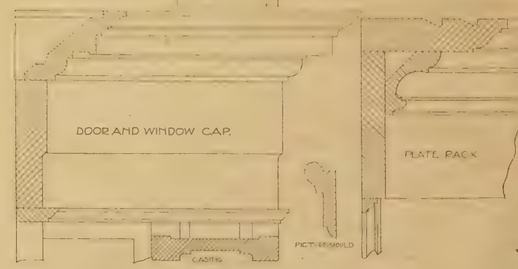


SIDE ELEVATION



ELEVATION OF FIRE PLACE





THE NATIONAL BUILDER

Vol. 52 CHICAGO, DECEMBER, 1911 No. 12



THE WISCONSIN BIRCH APARTMENTS, built at Chicago, Ill.

NATIONAL BUILDER DESIGN No. 348

L. E. Russell, Architect, Chicago

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $10,940.20

THE WISCONSIN BIRCH APARTMENTS

While the exterior is somewhat an index to the style of the house, in our modern conditions it really plays a small part in the comfort of an apartment. Aside from supplying light to some of the rooms the exterior influences the room but little, as the restricted lot limits the viewing of the property from a distance.

The apartment house architect, therefore, confines himself principally to the interior arrangement and decoration, the former being restricted by building ordinances, conditions of light, etc.

The value of birch is shown in the interior. In beauty of grain and color it resembles mahogany and at a cost that is very little above soft woods. Its adaptability to various finishes makes it a wood which harmonizes with almost any wall finish, fixtures or furniture.

*Materials figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

Estimate of WISCONSIN BIRCH APARTMENT HOUSE*

By I. P. HICKS

EXCAVATING.

288 yards excavating at 35c	$	100.80

MASONRY.

800 cubic ft. concrete footing, 25c	$	200.00
280 cubic ft. concrete porch floors, 25c		70.00
40 stone window sills, $1.50		60.00
6 triple window sills, $4.50		27.00
200 lin. ft. coping, 40c		80.00
6 stone brackets, $5.00		30.00
56 stone balusters, 30c		16.80
Stone steps		20.00
Stone trim for windows		18.00



7,000 press brick laid in front, $35.00	245.00
182,000 common brick laid in wall, $12.00	184.00
175 yards cement flor in basement, 50c	87.50
Wall ties	8.00
Total masonry	$ 3,046.30

IRON WORK.

3 10 in., 25 lb. I beams, 12 ft	$ 27.00
3 10 in., 20 lb. channel, 12 ft	21.60
8 3½x3½x3½ ft., 5 lb. L's	3.90
2 3½x3½x5½ ft., 5 lb. L's	1.65
Anchors and bolts	30.00
Total	$ 84.15

LUMBER BILL.

	Feet.
3 6x10x18 ft. girder	270
1 6x10x8 ft. girder	40
3 6x6x14 ft. posts	84
5 6x6x24 ft. posts	480
5 6x6x10 ft. posts	150
72 2x12x24 ft. floor joists	3,456
36 2x12x26 ft. floor joists	1,872
48 2x12x20 ft. floor joists	1,920
34 2x6x24 ft. ceiling joists	816
12 2x6x26 ft. ceiling joists	312
16 2x6x20 ft. ceiling joists	320
34 2x8x24 ft. roof joists	1,088
12 2x8x26 ft. roof joists	300
16 2x8x20 ft. roof joists	432
32 2x8x20 ft. for porches	864
12 2x8x16 ft. basement	252
6 2x8x10 ft. basement	81
15 2x6x14 ft. basement	210
6 2x6x16 ft. basement	96
24 2x4x14 ft. basement	216
8 2x4x16 ft. basement	88
180 2x6x18 ft. partitions	3,240
42 2x6x16 ft. plates	672
36 2x6x12 ft. plates	432
540 1x2x9 ft., furring strips	810
60 2x2x12 ft. bridging	240
60 1x4x10 ft. backing	200
Total ft. framing lumber	18,941

18,941 ft. framing lumber at $26.00	$ 492.46
6,900 ft. sheathing, No. 2, rough floors and roofs, $26.00.	297.40
300 ft. 8 inch, No. 1, shiplap, $27.00	8.10
400 ft. 1x4x8 ft. fir flg., $45.00	18.00
400 ft. ⅝x4x8 ft. fir ceiling, $32.00	12.80
5,130 ft. birch floor, $60.00, 2¼ face	307.80
720 ft. quartered oak, flg., 2¼ face, $90.00	64.80
Total lumber bill	$ 1,183.36

MILL WORK.

4 basement window frames, 20x14, 2 lt., $2	$8.00
1 twin frame, 20x14, 2 lt	4.00
6 windows, 20x14, 2 lt., $1.50	9.00
2 basement door frames, 3 ft. 0 in. x 6 ft. 8 in., $2.50	5.00
4 basement door frames, 2 ft. 6 in. x 6 ft. 8 in., $2.25	9.00
1 basement door frame, 2 ft. 10 in. x 6 ft. 8 in	2.50
2 basement doors, 3 ft. 0 in. x 6 ft. 8 in. x 1¾ in., $5	10.00
4 basement doors, 2 ft. 6 in. x 6 ft. 8 in. x 1⅜, $2.50	10.00
1 basement door, 2 ft. 10 in. x 6 ft. 8 in. x 1¾	4.50
1 door frame, 3 ft. 0 in., x 6 ft. 8 in., O. S	$4.00
3 door frames, 2 ft. 10 in. x 6 ft. 8 in., Tr. O. S., $3.50	10.50
4 door frames, 3 ft. 0 in. x 6 ft. 8 in., inside, $1	4.00
3 cased openings, T. O., 2 ft. 10 in. x 6 ft. 8 in., $1.50	4.50
3 cased openings, T. O., 5 ft. 8 in. x 6 ft. 8 in., $2	6.00
12 door frames, 2 ft. 8 in. x 6 ft. 8 in., inside, 90c	10.80
6 door frames, 2 ft. 6 in. x 6 ft. 8 in., inside, 80c	4.80
6 door frames, 2 ft. 4 in. x 6 ft. 8 in., inside, 70c	4.20
1 door, 3 ft. 0 in. x 6 ft. 8 in., 1¾ in	18.00
3 doors, 2 ft. 10 in. x 6 ft. 8 in., 1¾ in., $16	48.00
4 doors, 3 ft. 0 in., x 6 ft. 8 in., 1¾ in., $16	64.00
12 doors, 2 ft. 8 in. x 6 ft. 8 in., 1⅜ in, $4	48.00
6 doors, 2 ft. 6 in. x 6 ft. 8 in., 1⅜ in., $3	24.00
6 doors, 2 ft. 4 in. x 6 ft. 8 in., 1⅜ in., $3.50	21.00
6 transoms, 2 ft. 10 in. x 1 ft. 8 in., $1.50	9.00
3 transons, 5 ft. 8 in. x 1 ft. 8 in., $2.50	7.50
3 triple window frames, 2 windows 30x28, sash doors in center, 2 ft. 0 in. x 6 ft. 8 in. x 1¾ in., $3	9.00
2 window frames, 20x30, 2 lt., div., $2.50	5.00
3 window frames, 24x28 lt., div., $2.50	7.50
6 window frames, 28x20, 2 lt., $2.50	15.00
3 triple frames, 2 windows, 16x28, 2 lt., center 42x28, 2 lt., $3	9.00
3 triple frames, sash, 2 sash 10x14, center 24x14, $2	6.00
3 window frames, 40x28, $2.75	8.25



3 window frames, 26x20, $2.50	7.50
3 window frames, 20x18, $2.25	6.75
6 windows, 30x28, 2 lt., div., $2.50	15.00
6 sash doors, 2 ft. 0 in. x 6 ft. 8 in., 1¾ in., $6	36.00
2 windows, 20x30, 2 lt., div., $2.25	4.50
3 windows, 24x28, 2 lt., $2.25	6.75
6 windows, 28x20, 2 lt., $2.25	13.50
6 windows, 16x28, 2 lt., $2	12.00
3 windows, 42x28, 2 lt., $3.50	10.50
6 sash, 10x14, $1	6.00
3 sash, 24x14, $2	6.00
3 windows, 40x28, 2 lt., $3.50	10.50
3 windows, 26x20, 2 lt., $2.25	6.75
3 windows, 20x18, 2 lt., $2	6.00
150 plinth blocks, 8c	12.00
1,500 ft. casing, 12 ft. lengths, 3c	45.00
500 ft. head casing, 3c	15.00
500 ft. cap mold, 2½c	12.50
500 ft. fillet, 1c	5.00
200 ft. window stool, 2½c	5.00
200 ft. apron, 3c	6.00
700 ft. window stop, 1c., 14 ft	7.00
550 ft. door stop, 1½c., 14 ft	8.25
1,600 ft. base, 4c	64.00
1,600 ft. base mold, 1c	16.00
1,600 ft. floor mold, ½c	8.00
850 ft. picture mold, 1½c	12.75
3 mantels with book cases	450.00
3 medicine cases	18.00
Beam ceilings	40.00
Plate racks	15.00
Linen closets	36.00
Front stairs	140.00
Rear stairs, rail and bal	100.00
Pantry shelves, etc	14.00
Side boards	180.00
Total mill work	$1,767.30

CARPENTER LABOR.

18,941 ft. framing lumber, $10	$189.41
7,200 ft. sheathing, $8	56.60
800 ft. flooring and ceiling, $1.50	12.00
5,850 ft. flooring, $3.50	205.25
Setting frames	28.20
Finishing basement windows	10.00
Finishing basement doors	21.00
4 main O. S. doors, $4	16.00
4 large inside doors, at $3.50	14.00
24 inside doors, $3	72.00
6 cased openings, $2.50	15.00
50 windows, $2.50	125.00
6 sash door windows, $3	18.00
1,600 ft. inside base, 5c	80.00
850 ft. picture mold, 1½c	12.75
2 flight front stairs, $25	50.00
Rear outside stairs	20.00
Outside rail, etc.	10.00
Beam ceiling	12.00
Plate rail	6.00
Pantry work	9.00
Linen closet	15.00
Other closet	13.50
Side boards and book cases	45.00
Total carpenter labor	$1,055.71

RECAPITULATION.

Excavating	$100.00
Masonry	3,046.30
Iron work	84.15
Tin work, including roof	190.00
Lumber bill	1,183.36
Mill work	1,767.39
Carpenter labor	1,055.71
Hardware and nails	130.00
Plastering 1,770 yards, 27c	475.90
Tile floors	75.00
Painting	350.00
Plumbing	870.00
Electric wiring	150.00
Heating plant	950.00
Incidentals, 5%	521.39
Total estimate	$10,949.20

The above estimate has been made for birch finish with oak floors in dining rooms. The estimated cubic feet is 64,500, making the cost per cubic foot approximately 17 cents per cubic foot.

EDITORIAL NOTES AND COMMENTS

A MERRY CHRISTMAS TO YOU ALL!

With this number of THE NATIONAL BUILDER, we complete another volume and we feel assured that while we have not been able to serve our readers and advertising patrons in a manner we would have liked, we have done for them more, perhaps, than they expected, and we feel we have not been wanting in our efforts to give our patrons such material as their needs called for; if we judge correctly, the contents of the many letters we have received during the past year, giving us credit for being in line with modern advancement and progress. There was quite a pleasant feeling pervading our editorial rooms when, in summing up our year's work, to find we have less than a dozen complaints—all told—among the great many communications we have received. This condition of affairs is certainly encouraging, and tends to stimulate editors, publishers, and all concerned to better efforts in the future.

We make no boast because of our large circulation—the largest of any building journal published—and we only mention it as an evidence of our popularity among builders, contractors, and operative building tradesmen. We have avoided making boisterous claims as to what we have done or what we intend to do in the future, preferring to leave to the good judgment of our patrons the adjustment of our merits or demerits, and are willing to abide by their decision, as given by their continuation as readers, or otherwise. We do not claim to be the greatest, the biggest or the most unique building paper in existence, and no one has a truer knowledge of our shortcomings and defects than ourselves, and this knowledge tones down any exalted ideas we may have garnered concerning ourselves, and puts us closer, and in more direct touch with the people for whom this journal is intended, and to whom we are much indebted for many good and useful suggestions which we have adopted and profited thereby, and for which we have always been thankful; and this policy we intend to continue, with the expectation of holding our readers as helpers and fellow advisers.

As a rule we do not care to talk of ourselves, but the season of the year, and the closing of the volume, offer an excusable opportunity for placing ourselves in the limelight, for just a few moments, and this will answer for the year. We believe we are modest, and not at all given to "spread eagleism" on any subject, but there are times when we must make ourselves known, or we drop behind the procession, and soon get out of sight and lost for all time, something a great journal like THE NATIONAL BUILDER cannot afford. The journal is not up to our ideal of what a building paper should be, but we are gradually getting it up to that position, and in another year we hope to have so improved it in so many ways that its friends will be gratified at the changes, and will profit thereby to a measurable extent; and, while we are not expecting a very large addition to our subscription list, we are assured, judging from present indications, that a substantial gain in this direction is certain, which is a gratifying condition.

It may not be out of place at this juncture to say a few words regarding our contemporaries who are catering to the building public on the same lines as ourselves. We feel these journals are doing the very best for the interests they represent that can be done, and the men "behind the guns" are earnest and painstaking and possessed of more than average ability and are well equipped with the necessary mechanical knowledge to enable them to place before their readers, with a clearness unknown to ordinary newspaper men, the many technical and scientific subjects with which they are so often confronted. Only fellow editors of the technical press can fully realize, or appreciate the many difficulties and awkward situations the editor of a journal similar to THE NATIONAL BUILDER has to wrestle with, if they deal fairly with their readers, and we are persuaded that each and every one of the building papers published in America have been honestly, fairly and ably edited for many years. May all our contemporaries prosper—as we have—and may they all merrily enjoy the coming festive season and feel thankful—as we do—for all the blessings they and we have received in the past.

There are hundreds of unfinished buildings of all sorts in the northern states at this date on which there will be much plastering and stucco work, that will require a great deal of attention and care to prevent the work from being more or less injured by frost. Indeed, it is certain that a very large percentage of the plastered work completed after this date will prove unsatisfactory, as such work getting chilled by a frost-ridden gust of wind, while in a raw state, inflicts a damage on the setting mortar, that causes eventual "rotting" and consequent deterioration of the whole work, causing cracks in the walls and ceilings and final breaking away. All plastering should be done in fairly warm weather, and should not be dried out too rapidly, as this also tends to impoverish the mortar and weaken its adhesive qualities. We cannot understand why prepared wall boards and sheet plaster are not used to a greater extent, particularly in cold weather, as either one is easily applied, clean, requires no lath, makes an even smooth wall, cannot well crack and gives the best of satisfaction wherever used. While in some localities, prepared wall board, of one kind or another, is pretty extensively used, in others it is almost unknown, and we are inclined to think that if contractors, owners and architects knew more of it, and could be persuaded to try it once, its use would soon become general in finishing many kinds of buildings. It is particularly suited for bungalows, summer cottages, garages and structures of a similar nature, and owing to its being easily applied, and as easily finished and transported, it should commend itself to those who desire to build in a hurry.

The journalistic world has lost one of its greatest figures in the passing of Joseph Pulitzer. He was a wonderful man, and from a poor untutored emigrant lad, without a word of English in his vocabulary or a dollar in his pocket, he hewed his way to the highest position in journalism. It is true, he founded that school of newspaper practice known as "yellow," which was not, perhaps in the best interests of the people, but he more than compensated for this by his forceful advocacy of every movement that he thought would bring good results to suffering humanity. Blind for nearly twenty years, he still kept in touch with the world outside himself, and remained managing editor of the New York World, and cared for his large interests which amounted to millions of dollars, until his death.

Joseph Pulitzer's name in journalistic history, will range alongside the names of Thurlow Weed, Bennett, Bonner, Horace Greeley, Raymond, Bryant, Dana, and other shining lights of newspaperdom.

There are several morals to be found in the life and work of a man such as this, not the least of which is that sometimes a handicap, helps make a man great.

Many interests are at work to provide trained workmen, or educated workmen, in our varied industrial lines. One of the active agencies is the National Society for the Promotion of Industrial Education, which recently held its fifth annual convention at Cincinnati. Among the speakers were union leaders, prominent educators, and others interested in the subject. Not the least forcible argument was the fact, as expressed by Dr. J. M. Withrow of the Board of Education of Cincinnati, that we are using our ignorant and unskilled labor to produce and export raw material, such as pig iron, cotton, etc., and then buy it back in the form of fine machinery and manufactured goods. We export raw copper rather than dynamos, steel billets in place of linotype machinery. We are exporting crude materials to be made up into finished products by the better educated laborers of competing countries.

The general opinion prevailed that the psychological age at which the boy should begin his apprenticeship was from fourteen to sixteen, and it is by starting the education at this age that the best results are obtained.

The unions as well as the schools believe that education in the trades should be carried on in conjunction with such schooling as will be of use to the mechanic. The advanced mechanic will in time become the shop superintendent, provided he can acquire the necessary education, and it is by some system in which part time is given to study and an equal time to actual work at the chosen trade. Night schools are not within the reach of all, nor are all physically able to acquire an education at night after a day of toil. Only those who have acquired an education by such means can appreciate the effort required.

Not the least incentive toward higher education is the increase in pay. The life earnings of a trained mechanic are estimated to be about $20,000 greater than those of the trained laborer, and about $10,500 greater than the life earnings of the boy who "picks up" his trade.

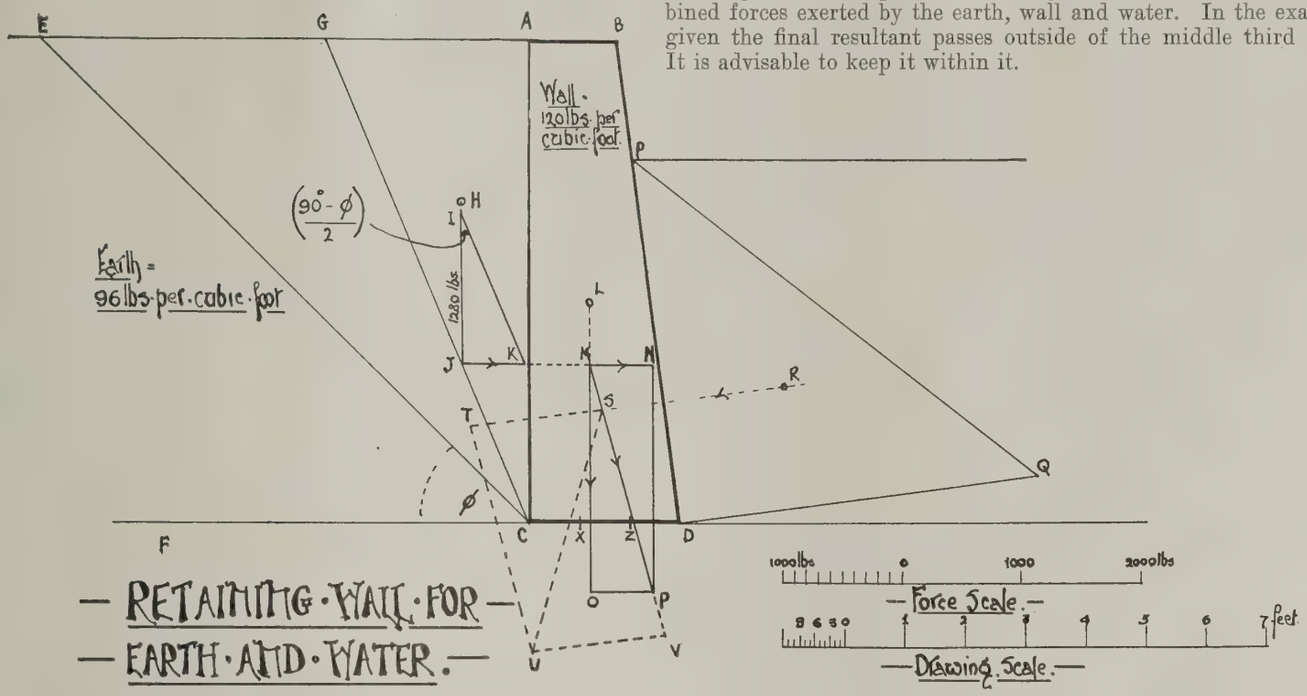
LEAVES FROM A STUDENT'S NOTE BOOK—No. 7

By GEO. METSON

HAVING in the two previous articles dealt with retaining walls for earth and for water, the wall that has earth one side and water the other can be gone into. All that is necessary is to combine the resultant of the forces exerted by the earth and wall with the force exerted by the water.

Taking the wall in the illustration, the earth exerts a force of which J K represents the magnitude and the direction. The weight of the wall exerts a force equal to M O to the same force scale; combined resultant is M P. The water exerts a force equal to S T, which represents its magnitude and direction. All so far is easily understood by reference to the two previous articles.

It is now necessary to combine the force S T with the resultant M P. Prolong M P to V, making P V equal in length to M S, then S V equals M P. Complete the parallelogram S T U V; when the diagonal S U represents the magnitude direction of the combined forces exerted by the earth, wall and water. In the example given the final resultant passes outside of the middle third X Z. It is advisable to keep it within it.



THE ROUND WALL OF CONCRETE

By JOHN UPTON

PROGRESSIVE workers are constantly meeting with new problems. One which might be called new is that of constructing forms for a round concrete wall. Such walls are built for water troughs, cisterns, silo foundations and even entire silos, so it is probable that some readers are interested in such work.

The first points are to determine the diameter, and from this, the radius of the circle and where the center of the circle is to be. Drive a stake at the center, using a wire or strip of board the length of the radius; lay out the circle of the ground and excavate for the foundation.

Remember that the foundation of a tub or stave silo should be nearly all built on the outside of the circle representing the inside of the staves and that these silos are measured from outside to outside. If the excavating is carefully done the bank may be used as the form for the outside of the wall as far as the top of the ground.

To make the forms mark the proper size circle on a level spot of ground. Take boards or plank eight to ten feet long and lay them around on this circle using enough of them to go around, and after tacking their ends together draw the circle on them. These boards should be so placed that the circle when drawn does not come closer than four inches to the inside edges of the boards for the inside form, and the same distance from the outside of these, for the outer form.

Allow one or two inches for the thickness of the forms according to the material to be used.

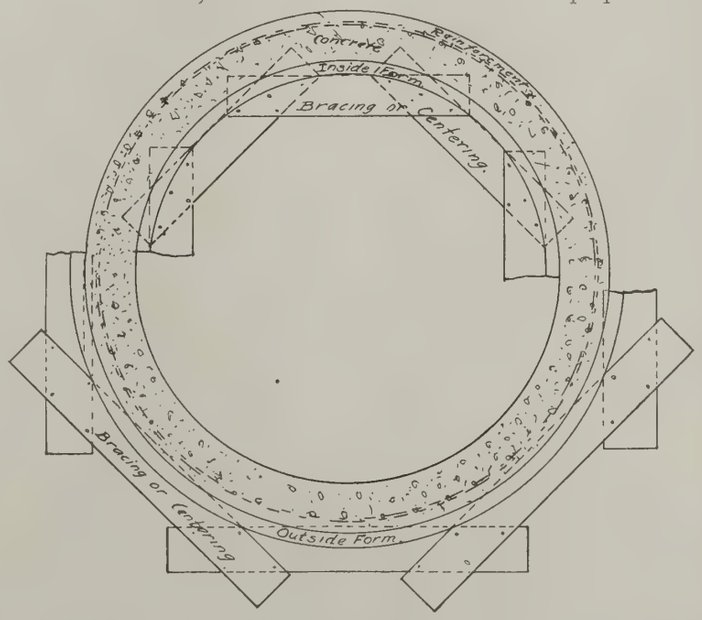
When the boards are cut to the lines drawn upon them you will have two circles, one a little smaller than the inside of the wall, the other a little larger than the outside.

If the wall is to be a low one perhaps you can get along with these, but if it is of considerable height, it will be necessary to cut two more like them so as to have one near the bottom as well as one at the top. If only one circle is used, place it near the top and fasten the forms at the bottom by some other means.

For the forms or lagging, use boards or two by fours, cut the right length and set on end between the two circles. These boards might be placed a few inches apart and the form lined with a strip of galvanized sheet iron.

This iron need not be injured except for a few holes at each end. After the forms are in place they should be securely braced in all directions.

Such a wall as this should have some reinforcement as there will be considerable strain on it. Heavy wire will answer in some cases but in others, bars of iron should be bent to the proper curve



and placed near the middle of the wall, a little closer to the outside.

Such a form made with hoops at the top and bottom may have a device for loosening and tightening it. This may be bolts for the outside forms and wedges for the inside ones. Then the forms can be raised and filled again and the wall built as high as desired.

SECRET ROOMS AND THEIR USES

By L. LAMPREY

UNDER the names of "secret closet," "secret room," "priest's room" or "hidie-hole" secret chambers and staircases exist in so many of the old houses of England that they are far from being a convention of the romance-writers. Less common in America, they yet have existed here in houses of Colonial times and even in some of later building. There is an old house in northern New Hampshire, built in 1818, of timbers more than two feet square, which has a secret room under the stairs, and no one save the present owner and one or two other persons know that it is there at all. This room is entered (when it is entered, which has not been for at least one generation) by taking out the front of one of the steps of the ladder-like front stairs, putting the hand in and opening up another stair, which makes a hole big enough to admit a man. That house was built not so long after the last war with England that it should have seemed impossible that the room might some day be needed. It is, and has always been, a farm-house of the better class, but most of the "hidie-holes" belong to houses, or castles, whose owners were of sufficient political importance to make such a refuge useful when the other party got the upper hand.

The secret room began to be a feature of English architecture when civil wars raged. Before that, the conqueror of a feudal manor simply took possession of the house and all who were in it, and the occupant of any secret room would have starved to death. But when men began to be hunted for their opinions or their deeds, their households not being molested, they could hide in such a secret room till pursuit had ceased or till they could find an opportunity to leave the country.

Most famous of the secret rooms of England is perhaps the one at Boscobel, in which Charles II hid before and after his still more famous hiding in the Boscobel oak. The room which is usually shown as his was occupied by one of his officers; Boscobel has more than one secret room, and the one in which the king lay concealed was under the cheese-room, an important but probably not frequently visited part of the kitchens, on September 6, 1631.

The usual place for the secret closet was somewhere near the chimney which rose like a tower in the midst of the mass of irregular buildings that composed an old-time English manor house. There were several reasons for this; the great chimney-breast would easily conceal such a room, the fire would make it impossible to investigate, and most vital reason of all, the chimney would keep it warm, and not too warm either, as people who have lived in houses which have the old-time chimney-cupboard can testify.

At Broughton Hall in Staffordshire there are rough steps up the chimney in the hall for about eighteen feet, into a good-sized room. It had no window and was probably ventilated somehow from the chimney itself. It now has a separate staircase and is used as a smoke-room.

An old house which affords one of the best examples of secret closets in good preservation is Pitchford Hall in Shrewbury. In a panelled room on the upper floor, a certain panel, the fourth or fifth from the chimney-breast, will slide sidewise if pushed in a particular way. Then one can reach in and withdraw a bolt, and a piece of panelling then springs backward, or downwards, showing a small cupboard or closet. In the floor of this tiny "cubby-hole" is a trap-door leading to a small room below which communicates with a cupboard in the drawing-room. Thus the dweller in the secret place could perhaps hear what was said about him while he lay in hiding, and could conveniently communicate with some member of the family. Pitchford Hall was built in the fifteenth century, and is what is known as a "half-timbered" house.

Gwydyr Castle, near Llanwrst in Wales, once the home of the Wynnes and now the property of Earl Carrington, has a most interesting secret room, as well as wonderful oak carvings and tapestries. There is a Jacob's ladder down to the bottom, and a subterranean passage is said to lead to the park and the river. This would seem to point to an earlier origin than that of most of the secret rooms, since it affords a way for the occupants of the castle, if besieged, to escape even though it was destroyed utterly. A part of the Gwydyr is built up from top to bottom, with no entrance whatever, and no one knows what is inside. A secret room of Glamis Castle in Scotland is said to harbor a spectre or a monster who destroys the peace of house-parties, but if Gwydyr has any such sinister secret in its walls no one can say what it is.

Harvington Hall in Worcestershire affords an example of another kind of secret room, the room under the stairs. The irregular rambling stairways of old houses give opportunity for such chambers, but they were not of course as well heated as the chimney-rooms or as accessible. In this old house three steps are pushed aside at a corner of the stairs, and a hole is revealed which leads into a dark room that could hold a troop of soldiers.

Shipton Hall in Salop has another dark room, between the floors of the house, reached by a ladder put up to a trap door in the ceiling of the kitchen. It may be remarked incidentally that when plaster came in, secret rooms and trap doors generally went out, for a trap door in a plastered ceiling would be all but impossible to conceal.

Compton Wynyates, seat of the Marquis of Northampton, not far from Sulgrave, the ancient home of the Washingtons, has a council chamber which is a vivid epitome of the dangers of its time. It occupies one whole floor of the tower, so that listeners would be absolutely baffled; there is but one stairway to the rooms below, but three to the upper apartments; it has six doors, and in a closet are pulleys and ropes. There is a hidng-hole behind the fireplace, and a "priest's room" above.

Baddesley Clinton, another old manor-house with a "priest's room," bears above its chapel door the significant motto, "The Catholic faith never changes." Handlip Hall has a secret room in which Father Garnet, a superior of the Jesuits, and three other men were hidden for several days. Liquid food was conveyed to them through a hollow reed. There are no less than thirteen hiding-holes in that house. The Jesuit college at Stonyhurst has several secret rooms, and, in fact, the secret room reached its greatest vogue from necessity during the religious wars. The priests, from their distinctive garb and the fact that they were vowed to non-resistance, may have been oftenest forced to use them, but there is no doubt that the same hole was sometimes used by men of both parties alternately as the house changed hands or sides.

The walls of Treago Castle at the four corner towers are six feet thick, and a long-forgotten room was found at the top of one of the towers, with a tiny window, a fireplace and folding desk.

Cheltham Hospital, once the hall of the Lords of Manchester, has several hiding-holes. Half way up its Jacobean staircase there is a wooden panel where once there was a stone that would turn in the wall and disclose a recess into which a man might scramble and find a chamber above and behind the hall fire. In case of pursuit or discovery the occupant of the room could climb further up the chimney and come out on the roof.

There are wierd stories of old houses built with staircases all round inside the walls, but these are rather the work of eccentricity than necessity. The secret chambers of old English houses were built in grim, dead earnest; it was a life and death matter to make them safe, and their existence was seldom known to any save the most responsible members of the family, and perhaps a trusted servant. It was the same way, for the most part, with the first of the colonial houses which had such rooms. They never gained any great vogue in this country for many reasons. First, the conditions have passed which made it necessary for a God-fearing man who had done no wrong to hide from pursuit by officers of the government. Second, the chief enemy whom the early Americans had to fear was that other early American, the Indian, and he seldom stopped to hunt for secret rooms; he burned the house down, room and all.

There was said to be a secret room in the minister's house at Hadly, Mass., where Whalley and Goffe lay hidden; there were secret rooms in some of the other old colonial houses, but more often there were secret passages out of the house. The Carlisle House, sometimes known as the Braddock House, in Alexandria, Va., is an interesting example of this arrangement. The present entrance is where the entrance of a colonial house usually is, at the front, but inside you find windows looking down into a small court yard. From this leads a long subterranean passage, with dungeons on either side for the storage of powder, prisoners or grain, to a small iron door or gate in the bank of the Potomac. Thus the occupants of the house, if besieged, could run along this underground corridor and escape by boat, and it was a not unusual plan for the pioneer colonial house. The last use of the secret room was for the storing of valuables, but this, too, has mainly

gone out, because it is useless in case of fire, and most people find electric lights and burglar alarms easier to manage.

Strangely enough, the last man to use a secret room in this country—perhaps the only one to use such a room in this generation—was Whitelaw Reid, present ambassador to England, and he did so for none of the reasons hertofore mentioned. So well was the secret kept that nobody but himself and an intimate friend or two knew the room existed until the Tribune building was remodeled. Then a little room was found up in the tower, with a desk and some simple bedroom furniture, and it was finally discovered that some years ago Reid used it quite often when kept late at the office. The plan also kept him out of the way of questioners till he had formulated his Tribune policy on any knotty point.

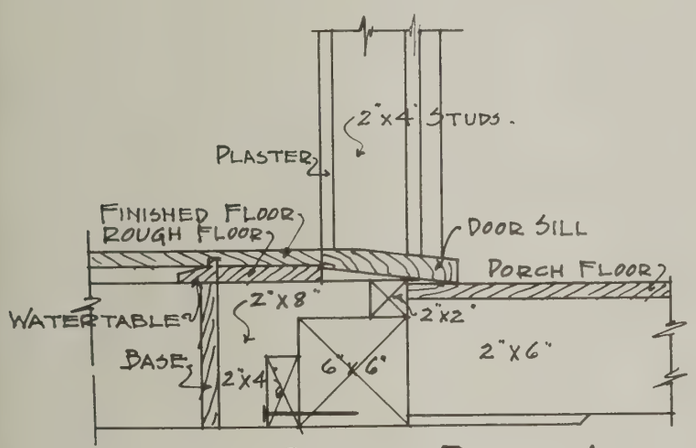
There is an atmosphere about a secret room which nothing can quite equal. The cunning workmanship, the artistic beauty of the carving which often conceals the crack in the wall, the ingenious devices employed to make each room different and difficut of discovery, have, like everything else in old-time architecture, a spirit of intense individuality.

BUILDING A PORCH

By I. P. HICKS

FRAMING solid sills, showing a good and easy method without mortising in the floor joists, also how to figure for porch floor base and watertable so that the porch floor will come tight up under the door sill, and watertable just come on a level with top of porch floor.

The question of framing sills and joists for houses is one of more or less interest to the carpenter for in some cases it means a whole lot of labor, particularly where the joists are to be framed into the sills. In some cities the building laws do not permit anything to be used for a sill smaller than a 6x6 and in this case the floor joists are generally gained into the sill, which makes an unusual amount of labor and is no better than some other method



FRAMING SILLS & PORCH JOISTS SHOWING HOW THE DIFFERENT PARTS MEMBER.

that would take much less time to do the work. For example, take a 2x4 and space the joists the proper distance and notch out 2 inches; this can be done in very little time with a saw and chisel; then spike the 2x4 on to the 6x6 sill just right to receive the joists, as shown in the illustration, and the sill is made, and is every way as strong and good as if it had been gained out, taking three or four times as long. Drive spikes directly under where joists rest to give the greatest strength.

Another important thing to always consider is to figure out just how the base and watertable will work out where they join a porch or come up to the outside doors. This is quite important for it looks much better if these member in some kind of shape that is practical. The watertable ought to either butt against the porch floor or else come just on top of it and butt against the end of door sill. If it comes above or below these two points it always makes more or less bad looking work where it joins porches or comes against door frames. In the case illustrated we have figured it to come with the bottom edge of watertable just on top of porch floor. This is figured 2x8 joists for house and 2x6 joists for porch floor, which is very often used in house construction. It is true that 2x6 joists are high for porch floors, they should be used in short spans not to exceed 10 feet between supports; this can be done by putting on double headers every 8 or 10 feet, as may be required. Constructed in this way it is possible to get a real stiff floor even with 2x6 joists.

It is better construction to use 2x10 joists for house floors and 2x8 joists for porch floors. In this case we would have to figure out a different width of base to make them member properly.

The illustration shows a base 7½ inches wide, which will work out just right where 2x8 and 2x6 joists are used. If you have different size joists, figure it out before you get too far along with your work for it does make a noticeable appearance in the work to have these things come right.

As the cost of doing work is always an interesting part to the carpenter we will tell you how we figure the cost of the work shown or indicated in the sketch.

Base and watertable per lineal foot, 4c.; framing main floor, $1.00 per 100 square feet; laying rough floor, $1.00 per 100 square feet; laying finish floor, 2¼ face, $2.00 per 100 square feet; smoothing, scraping, $1.50 per 100 square feet; framing porch floor, $1.50 per 100 square feet; laying porch floor, 3¼ face, $1.50 per 100 square feet.

WASTING TIME AND MATERIAL

By N. E. DUFFEY

MY occupation in connection with building construction for a number of years has given me many opportunities to think about and consider.

One thing I find that is important and that is the waste of time and material on many jobs that either the contractor and builder, and often the foreman, seems to lose sight of and neglect.

I find, in visiting the various jobs, material of all kinds wasted for the want of someone whose duty it should be to care for and keep it in some place convenient for the mechanics to use when needed. I have been on buildings where every room or apartment was littered with the boards of various lengths, pieces of joists, studding of different sizes, bricks, terra cotta and tile, with a covering sometimes of plaster or cement. Such material the mechanic too often passes over and goes to the pile that is clean and clear of such mixture, and he is not to blame for doing so. All material, lumber, brick, tile or terra cotta, when not used at the place and time, should be taken care of and put in its proper place with the material to which it belongs, and when wanted, could then be found without loss of time or spoiling of new material to make more waste.

The time lost on such jobs, when large, runs into days; the material into dollars. Employers will say, "time is money," and the dealer will say, "material is money," and when time is lost and material wasted, it counts double to the contractor.

Think of a carpenter chasing around to find a piece of 3x4-4 feet long for fifteen minutes, which is probably among the material above described, and after securing the piece wanted, in what condition is it to use a saw in that perhaps has just been filed? So often the same case occurs with a piece of board that must be planed. The length or width is right, but in what condition to use a plane on? Trim of all kinds and sizes is left to travel over, split and edges broken, flooring in the same condition, causing a waste of material to cut out the damaged edges and broken parts, besides the extra time it requires.

Such things I find on jobs where everything is seemingly rush and no one has time to stop or think about anything except the work they are doing just at that time, and from one thing to another, leaving the material with the waste to do the work in haste.

Does it pay?

COPPER ROOFING

By H. M. SANDERS

THE subject of "sheet metal roofs" is one which we have already treated in the past year in the columns of the National Builder in some of its phases, and from the standpoint of the specific use of some of the sheet metals, such as lead, zinc and tin roofs, and to some extent shown their comparative value as used for that purpose.

It is our purpose in this article to take up the subject of still another sheet metal—sheet copper—as one which is of growing importance in this department of our industrial life.

In presenting this phase of the subject of an ideal metal roof, we are aware that it opens up a subject of wide range of thought and experience, upon which all do not think alike. But, notwithstanding this, it is presumed that there are certain points upon which all can agree. First, perhaps, that the aim and purpose of a roof covering is for protection. Protection against unfavorable weather, exposure of climatic or atmospheric conditions, against rains or storms of any kind. All agree that a material used for that purpose should last as long as possible without repairing or having to be renewed. This, of course, brings up the question of its durability, etc.

At this point starts the divergence of opinion as to which of these metals, all things considered, is best calculated to meet these requirements.

Upon the point of the comparative value of sheet metals for roof coverings, the two main sources from which we may obtain information is, first, from a study into the nature and character of the different sheet metals used; and secondly, from practical tests in their use and application. But upon this matter of practical tests, we do not judge all metals alike, for in some the time limit of value is measured by centuries of use; in others, by a few years, more or less.

Living as we do at the present time in an age and under conditions where the time limit of values of material is measured by years and not by centuries of use, it seems hard at times to realize that one or more of the sheet metals has a value as to durability which can be measured by centuries of use. But we know such to be the case with the lead roof, which has lasted on many of the cathedrals of the Old World for upwards of 300 years. This fact alone, however, does not prove that lead is the only sheet metal of centuries of use, for on some of the church spires in England that were covered with copper 150 years ago, they are good today without having been renewed. This rather forces us to the conclusion that had copper as early a start as lead, with the Genii of the twentieth century to mould and shape its destiny, copper might have had as good, if not a better, record than lead, in moulding the requirements of a roof material of the past.

It will be remembered that in the early history of roofs, they were mostly flat roofs, as is the case today in nearly all the Asiatic countries, while now and especially during the past one hundred years there have been great and radical changes in the character and construction of buildings and their roofs.

This has brought with it a new set of conditions bearing upon the relative value of roof material, where durability alone is not the only essential quality or characteristic required.

At first thought, perhaps, the mind reverts to lead as being the best sheet metal for an ideal roof, but we find that sheet lead has its weak points; it has one characteristic that reflects seriously against its use on steep roofs; it has a peculiar creeping tendency which none of the other metals have. Other sheet metals like zinc, tin, copper, etc., have expanding and contracting qualities, but none of them, like lead, have a tendency to creep out of position when placed on a roof in an inclined or vertical position; for it has been known to creep out of position from 15 to 17 inches inside of two years.

Then again, in selecting an ideal roof metal under present day conditions which grow out of our economic use of material, both in the roof covering and in the framing of the roof itself to receive the metal, we find that there are other of the metals that are even better calculated to meet these new conditions and requirements than the lead roof.

As a fact, they all to a certain extent meet these requirements, but by the very nature and character of some of the metals themselves, they are better adapted for the purpose than others. So it would be presumed that the sheet metal that would meet the most, if not all the conditions necessary for a model roof, was the one best fitted for that purpose.

This leads us up to the point of inquiry as to what are the essential qualities of a model roof, and, secondly, which of the sheet metals used for roofing purposes will best supply them?

The following schedule may be considered as combining the essentials in the requirements of a roof covering of modern times:

1st—Durability.
2nd—Lightness.
3rd—Adaptability.
4th—Low expanding and contracting qualities.
5th—Low resisting properties.
6th—Toughness of texture.
7th—Moderate cost.
8th—A good appearance.

Taking the schedule of essential requisites of what is required to secure an ideal metal roof, let us see how far the various sheet metals are able to meet these requirements.

First: We will take the lead roof. We find that it possesses the first requisite, Durability, to a remarkable degree, but it does not meet the requirements of the second, Lightness; the chief objection being its great weight. It seems to possess the third essential, Adaptability, but rather in excess perhaps because of the softness of the metal, together with its great weight, which often causes it to creep out of position, as already spoken of.

In meeting the other five requirements of an ideal roof—from the third to the eighth—it fails largely, though in the seventh requirement, that of Moderate Cost, it compares favorably with sheet copper as to first cost of the metal, but it requires a heavier constructed roof to receive it.

As regards the use of zinc roofs, they seem to compare favorably with lead or copper roofs in none of these eight essentials, except in cost, unless we make exception in favor of its comparative lightness and adaptability under certain conditions. The average length of life of a zinc roof, according to different authorities, varies from twenty to thirty years.

Comparing still further, the comparative values of lead, zinc and copper roofs, let us consider their fire resisting qualities. The melting point of lead is 612° F., zinc 736° F., and copper 1,975° F. Thus is shown the great advantage of the high melting point of copper over the lead or zinc. This, comparatively speaking, would go to show that the copper roof is quite immune from being affected by fires in adjacent buildings, and a source of protection in keeping a fire within the building itself, whereas a lead roof under the same conditions would quickly melt, and a zinc roof would catch fire at a much less heat, and by its very nature as a metal reduced to an oxide under intense heat that will burn forcibly and thus be destroyed.

Now, in regard to tin and galvanized iron roofs, how do they compare with the other sheet metals spoken of in meeting the requirements of an ideal metal roof? This brings us to the consideration of another and somewhat different class of roof metals, for they are a different class by themselves.

We speak of a lead roof because it is a lead roof, and we speak in the same way of a zinc or a copper roof, because they are zinc or copper roofs, but we cannot so speak of a tin or a galvanized iron roof, for they are not tin or iron roofs in the same sense as when speaking of a lead or copper roof.

When we speak of a sheet of copper, we know that not only the surface of the sheet is copper, but the body plate of the metal as well, but when we speak of a sheet of roofing tin, we are speaking of a sheet metal where the surface only is of tin and the body plate of the metal is of a baser metal.

Hence, we speak of it as belonging to another and cheaper grade of sheet metals, which, because of this fact, does not stand on the same footing for durability as sheet lead or copper, although under certain conditions in the past history of its introduction and use it has a record of over seventy years' durability.

So the position of tin and galvanized plated metal assume rather of a dual position, combining tin and iron or steel in the one case of sheet tin, and zinc and iron or steel in that of galvanized sheets.

These three metals, tin, iron and zinc, in their crude ore state are practically as pure and durable as lead or copper, but we find

that in the process of working these metals into sheet form to be of general, practical use in the industry, the working out the dual combination changes the character and to a great extent the durability of the product in sheet form.

This grows out of the fact of the nature and character of the tin and zinc or spelter in their pure state as an ore metal. They are of a brittle, crystalline nature and must be alloyed with another softer and tougher metal to be of practical value as a metal in sheet form.

In view of the foregoing and what has already been stated in our former article on Tin Roofs, they cannot fill all the requirements of an essentially "Ideal Roof."

As we review the advantages that sheet copper possesses over all the other sheet metals spoken of as meeting the requirements of an ideal roof, we find that it possesses not only superior fire-resisting qualities, but it is tougher in texture and has lower expanding and contracting properties, and these, together with its lightness, seem to make it the one metal that will best meet all requirements of the ideal roof, especially of our better class of buildings where permanency and durability may be looked for and desired.

It is quite true that on a large class of the cheaper grade of buildings, the cost of a roof often becomes a question of paramount importance to consider.

This, of course, is often a drawback and disparagement to the introduction of a more complete and perfect roof, the first cost of which is more expensive. Even then, this fact alone is no assurance that such a roof would not prove the cheapest roof in the long run, especially so, since so many of the cheaper grades of metal roofs have to be removed so often every few years, besides being constantly repaired at intervals between times. Under such conditons of constant renewals and repairs, the cheap roof would often prove much more expensive than the original cost estimate of even a copper roof.

The idea of such possible conditions existing is rarely thought of or properly considered by those who have such a class of work in charge. It goes without saying that the owner of the building expects and has a right to expect a good and substantial roof. He does not let out the work to the lowest bidder with any other thought than that it shall be well protected with a substantial lasting roof. In ninety-nine cases out of a hundred, if he knew, or was informed of the fact, that the copper roof would outlast several tin roofs and would be the cheapest roof in the long run, although more expensive at the start, he would surely adopt it.

Now, who is to blame that the owner of the building does not know this fact?

Some will say, perhaps, that the architect is to blame for he should have required it in his specifications. The fact that the architect has specified some cheaper grade of roof than the copper shifts the blame from the shoulder of the contractor of the building. But does this leave the blame wholly with the architect? We may allow that he should know better or be better posted as to what is the best roofing material, but his judgment is based largely upon the standard of appreciation within the trade itself of the value of the different metals for roofing purposes. If we want a higher standard of appreciation in the public mind generally, as to what is the best material to use for specific purposes, the trade itself must show it by a higher standard of excellence. For up to its own level and no higher can it be raised. This all being true, we must lay the blame where it belongs, mostly at the threshold of the trade itself.

So we must conclude that all those who are interested in the growth and development of the sheet metal industry, and in its future success as an important branch of our industrial life, realize that we can raise public interest and appreciation of the use of the sheet metals in any direction of its varied application up to the level, and no higher, than that which exists in the general trade itself.

We can only secure a higher and broader appreciation on the basis of a higher standard of excellence, as before stated. To this end, our ideals must ever be moving us onward and upward toward the goal of perfection.

In the foregoing we have set forth some of the main reasons why we believe that the copper roof is to be the "Ideal Metal Roof" of the future. In our next article it will be our aim to show by illustration, Why.

MAGNESIT FIREPROOF BRICKS

By ROBERT GRIMSHAW, PH. D.

IN AN interesting paper in Kalk, Sand und Zement, Paul Schnurpfeil considers the subject of fireproof bricks made with magnesit, particularly those varieties from the county of Gomör in Hungary and the Veitschtal in Steiermark (Styria). They have the advantage over the celebrated material from the Island of Euböa, that at a high temperature they form a cinder without melting.

Before the crude magnesit is burned, it is freed from quartz, lime and dolomite, it is then burned at a high white heat in a shaft-furnace lined with magnesit. When a red heat is reached, the magnesit loses its carbonic acid and becomes anhydrous magnesia, which is slimy but somewhat binding, and can be formed into blocks under high pressure.

In the burning process the loss by shrinkage is considerable; being about 50%. For this reason it can be used for fireproof bricks only when thoroughly burned. In this operation the specific gravity rises from 3.0 to 3.8; the magnesit becomes very free from pores, is hard and unaffected by water or carbonic acid, and can stand the pressure of quartz in the fire without combining therewith.

In order that it may form a good clinker, it is desirable that it contains 2 to 4% of iron sesquioxide ($Fe_2 O_3$). The presence of this material seems to have a similar action to that of a similar amount of argillaceous earth sesquioxide of aluminum ($Mn_2 O_3$) in garzite.

From the fully-burned magnesit the limey impurities are separated and it is then stored in a dry room with a sloping floor, at the lower end of which there is a ball mill which in 10 hours can grind five tons to No. 60 size; the product falls into cars for transport. The mill takes 12 H. P.

The ground magnesit is mixed with about 1% of water by spreading a thin layer on the floors, sprinkling it, and shoveling well together. The mixture is stored for a few days and then sieved. It is best to have all storage room and other floors in the plant made of cement.

If the magnesit is well burned there will be less water absorbed than if the burning be imperfect. For this reason it is important to ascertain by test the requisite amount of water to be added. The mixture should ball up easily in the hand, but fall apart readily to the touch.

Next comes molding in hydraulic presses. Enough for one block is weighed off by hand and the form filled; the rotating press table being so placed that the mold comes exactly under the ram; a second workman starts the latter. The table is turned further and the molded block is forced out automatically; the now empty form is wiped out and the block set on edge on an iron slab. The blocks are then taken to the drying room; they must be handled very carefully, else they will slump down. Three men tend the press and bear off.

A fresh pressed block 230 x 118 x 63 mm. = 9 x 4.65 x 2.54 inches weighs 4.6 kg = 10 1-3 lbs.; when dry, 4.35 kg = 7⅞ lbs.; when burned, 4.2 kg = 7¼ lbs.

It is best to dry these blocks in the air, in well-closeted but well ventilated rooms, on iron slabs. During the cooler months this room is warmed by exhaust steam; the blocks are laid on cars which run slowly down the tracks in the dry-kiln and carry the blocks from them to the kilns for burning.

The blocks, which at first were very unstable, get harder and tougher in drying; and when ready for burning may be stacked, like other fire-proof bricks, in the kilns.

Magnesit blocks can be burned at the same time as the Dinas bricks; some kinds, with a greater percentage of iron, are burned like tiles in the upper part of the kilns at a temperature corresponding the Segels' cones No. 11 or 12. The bricks must be so set in the kiln that they do not come in direct contact with the flame; it is therefore advisable to protect them by a row of other bricks.

Burned magnesit bricks are solid and strong, and ring well. When slowly warmed they do not spring. When exposed to the higher temperatures, there is no fear of either swelling or shrinkage, for which reason they are well adapted for high basic furnaces.

ROOFING WITH THE STEEL SQUARE
THE MANSARD ROOF

By J. H. B.

THE mansard, Dutch, or double-pitched roof is one which might well be used to a much greater extent than it is, being as easy to put on as any other roof, using very little more timber, and allowing of far more room inside than the ordinary span roof. It consists of two distinct roofs, the lower one of which is very acute in pitch. This should be so arranged in height as to allow the ceiling joists to lay on the top of it, thus forming a series of tie beams to take the thrust of the upper portion.

As a rule, the bottom part of the roof is formed with upright gables, so as to give the full length of the building for the room inside, and the upper part being hipped, does all that is required in the way of strength. Such a roof as this is shown in elevation in Fig. 87, in plan in Fig. 88, and in sectional elevation in Fig. 89. In the latter drawing, A represents the floor joists, and the dotted lines B the upright studding which will form the side walls of the room.

The roof shown is of the flush eaves style. Thus there are no projecting feet to the rafters; therefore, the best method is to mortise the plates, and to stub-tenon the rafters into them, so that they finish level on the outside.

The upper plates must be halved or mortised together so as to form a rectangular frame to take the rafters of the upper part of the roof, and the lower rafters should tenon into the plates, so that they come level with the latter at the upper side; thus, when ready for fitting in, the rafters will be as Fig. 90. For the sake

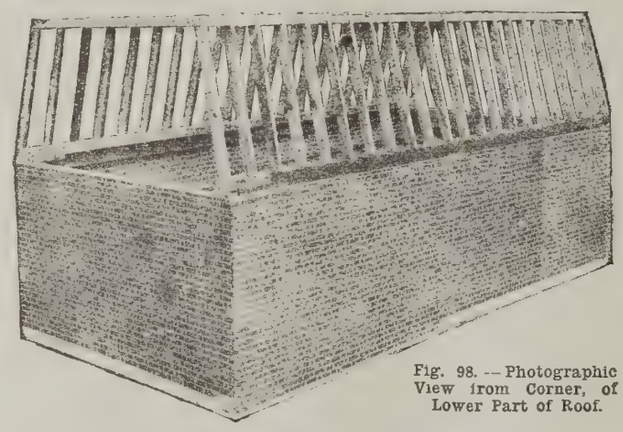


Fig. 98.—Photographic View from Corner, of Lower Part of Roof.

of stability while the roof is being erected, it is as well to allow several of the tenons to go through the upper plates, and to pin them; this is simply a safeguard for the time being. When the roof is once fixed, it will be perfectly safe with the stub tenons only.

In the drawings the pitch of the lower part of the roof is 15°, and the method of getting length and bevels of the rafters is shown in Fig. 91; thus the square placed to the 16-in. and 8½-in. marks, and passed along six times, will bring it to 8-ft. rise, which, allowing for 7-in. floor joists, boards, and plaster, will allow of a room of 7-ft. 3-in. pitch.

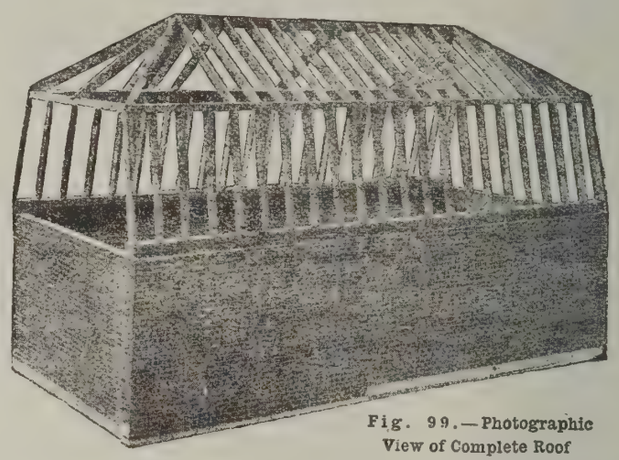


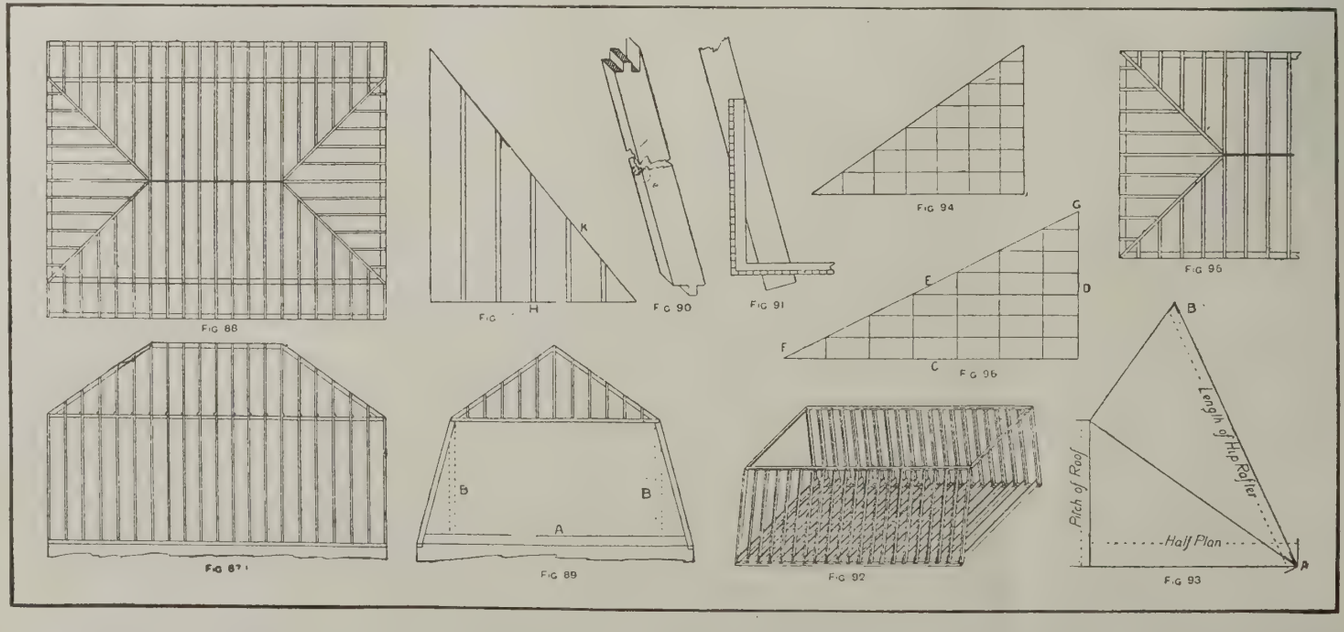
Fig. 99.—Photographic View of Complete Roof

The angle of the shoulders at top and bottom will be the same, and the projecting lip at the top end will be at right angles to the shoulders, dying out to a feather edge at the upper side of the plate.

Fig. 92 shows the lower part of the roof erected as it should be before the upper part is begun. The erection is easy if set about in the right way. The rafters should first be fixed in position, and the upper side plates put on and pinned (if prepared for this), propping them up temporarily. The end plates can then be put on and fixed, the props removed, and the floor joists fixed to plates and rafters as shown, adjusting the former as required before the joists are fixed.

The ceiling joists should be fixed before the upper rafters are put on; they will then keep the plates in position, otherwise they might be thrust outwards during the fixing of the rafters.

The upper roof, as shown in Figs. 87 and 98, is framed in the ordinary way, and may be raised the same as other roofs. Fig. 93, shows a method of obtaining length and bevels for hips. Fig. 94, shows the manner of getting length and cuts for common rafters. Fig. 95, exhibits a plan of the upper portion of roof. Fig. 96 is a method of getting length and bevels with the steel square. Fig. 97 gives a method of getting lengths and bevels for jack rafters or cripples.



HOW TO TELL POOR PAINT By A. ASHMUN KELLY

THE surest test of an exterior paint is its wearing on the surface to which it has been applied. But this is like planting a Grimes' Golden apple tree and waiting ten years to know whether it is such or merely a Ben Davis or other inferior fruit. While it is beyond the power of the chemist to determine whether the young tree will bear a certain kind of apple or not, it is quite easy for him to analyze paint and tell its true character. But it is not convenient to run to him with the pot of paint and have it analyzed, as it takes time and is costly. And we might give here formulas for physical tests of paint that the contractor might use for determining the true character of the paint he has in hand. This plan would involve time and considerable apparatus. It is very doubtful if one contractor in one thousand would care to do this. No master painter does it. How then shall he tell when a paint is poor? We must suggest a very easy and practical way. Well, there is the ready mixed paint bearing a label which is the trade mark of a well known and reliable paint manufacturer. That is a very good indication of a good paint. But, the paint maker puts out more than one brand. Then get his first grade. Paint makers are trying to get out a paint that will give perfect satisfaction in every way. It is a mistake to suppose that their firs aim is to turn out a paint that will produce the most profit. The matter of profit is important, but success depends upon giving satisfaction, and this a poor paint will never do.

An expert painter can tell a paint by very simple physical tests. The odor is one test. That will tell him what it has been thinned with. An outside paint should have only pure raw linseed oil as a thinner, the quantity of driers not being sufficient to influence its odor. The oil and pigment together form a distinct odor that is unmistakable to a painter. Then the fineness of the paint is another index. A paint whose base is white lead or zinc white, or a mixture of both, will be perfectly free from grit or sandiness. It ought to be as smooth as butter. If coloring has been added to it, it should still be smooth, for any staining pigment should be ground butter-fine. If a mixed paint looks very glossy in the can, and works under the brush rather soapy, it is poor. While a good paint will work smooth and easy under the brush, at the same time it will not have that soapy feel that an emulsion or rosin oil paint will have. This is difficult to describe, but the experienced painter knows it very well. The paint that works "short," that does not flow out well under the brush is a poor paint. It contains benzine. The paint that thickens up when left standing for some hours is a poor paint; it contains rosin oil.

The requirements of an exterior paint, for we will not consider interior paint now, although much that pertains to the one is a requisite of the other, are that it shall be durable, both as to body and color. That it shall be free from grit and adulteration in body or base and thinners. Perhaps the word durable will cover the whole case, for if durable, then that is all we can require. That will mean a paint fast to the light and weather as concerns its color, as far as possible. For all colors will fade, even white lead fading out whiter; or, rather, it is the oil in it that whitens or bleaches.

The kind of lumber and the degree of dryness of the lumber influences the wearing of paint. Hence we must not condemn the paint when it goes wrong on wrong lumber. To elucidate this point would require another chapter. But speaking in a general way, a paint should be reasonably weather proof, it should be able to resist water and sun, injurious gases, salt water, or the air from salt water, etc. It should have good covering power, for the paint that will not cover up well is a poor paint, lacking in the proper paint material. White lead paint, properly mixed, will cover perfectly. True, it will not cover say a black mark, with one coat, nor a surface badly discolored, one coat, but a case of this kind is remedied by adding a little coloring to the paint. A little trick well known to expert painters. A good paint is the opposite of the poor paint, hence by ascertaining what a good paint is shows us what a poor paint is. A very poor paint may show unusual gloss, looking even better in this respect than the best lead and oil paint, but time will show that it is a fraudulent paint. Its gloss will soon dim and at last perish utterly, and the base with it. Rosin oil paint is of this sort, and of all poor paints this is about the limit. In course of time it will "alligator" where the sun and weather gets at it, and it will remain soft and sticky where it is protected. The trouble of removing this paint is worse than the loss of money involved in its purchase and application.

To contractors who do the painting I would suggest a plan used by some large master painters, namely, get the paint made by some reputable paint maker, have your own formula, and get the paint in paste form, so that it may be thinned on the job.

White lead is a natural dryer, and so also is raw linseed oil. Hence little driers are needed. Too much will injure a good paint. To grind white lead and oil to a paste requires, for old Dutch process lead, 92¼ lbs. lead and 7¾ lbs. oil. Or practically a gallon of oil to 100 lbs. lead. Such a paste lead should be mixed with from two to three gallons of oil to the 50 lbs. of lead. This will give a good gloss paint for exterior use. Thinned to the ordinary painting consistency, the paint will cover about 500 square feet one coat, to the gallon. The mixed paint that will not come up to this standard of efficiency is a poor paint.

SOME ROOF FRAMING By A. A. STAFFORD

So many times in the twentieth century, has the NATIONAL BUILDER had drawings and explanations of roof framing, it seems almost needless to say anything more about it. But, I see in every issue where some "Chip" asks about roof framing, and mostly hips, valleys and jacks, it seems a problem a little beyond the ordinary carpenter to figure out, as many, like myself, have not had book learning enough. Now I wish to say for the benefit of those who wish to profit by it, there is another way. Seeing things where there is nothing, and by illustrations, a carpenter, to be a keen mechanic, must be able to see clearly a full detail of his work by looking into space. When he can do that he knows just what he is doing all the way through.

At this time, I will try to illustrate a plain corner section of hip roof, one side of hip backed where the roof board carries on to it the proper height of common rafter. Now to get this, observe that this method is the quickest and simplest by which these backing lines were ever obtained on a hip rafter. See Fig. 1, take a piece of hip rafter stuff, saw the seat (or bottom), cut it clear to a point, place it on your square with the point to the corner just like it would set on the corner of the plate. Just where the edges of square and sides of stick crosses is gauge lines and a center line on top will be where to cut for a perfect fit if nicely done, works on any pitch. Now to get the hip to set just high enough. After finding the distance from the corner of the piece to the gauge line, take a hip stick and gauge it, from gauge line measure down hip plumb line for seat cut, plumb measure must be same as it is on common rafter at this point. See AA, Fig. 2. The thickness at this point must be made to suit job where it is built. These drawings are not to scale, merely show position of rafters.

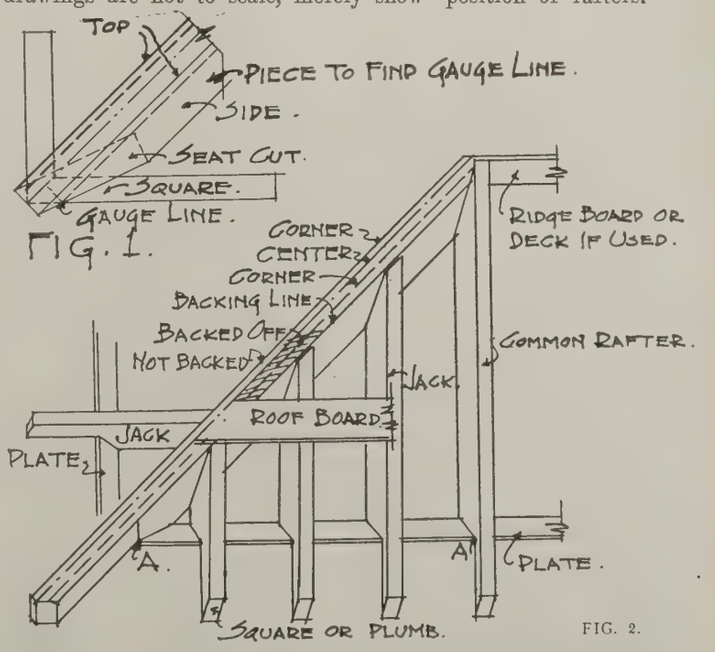


FIG. 2.

STRUCTURES SUBJECT TO MECHANIC'S LIENS

By W. J. STANTON

UPON the same lot or tract of land may be two or more structures, each of such a character that if it were there alone, a separate claim of lien might be enforced against it. Where such is the case, may a claimant proceed against one or all of the structures, or, if his right to proceed against all or more than one can be affirmed, does he lose his right to proceed against that one because he has not sought to subject the other or others to his claim? The word "structure" is used here to denote any thing or piece of property against which a lien can be claimed and enforced for work done or materials furnished upon or about it.

Several buildings may be disconnected and intended for separate occupation, and yet they may have been constructed for one owner and under a single contract in or by which no duty was imposed of keeping a separate account of the work done or materials furnished upon either. Where such is the case, a person furnishing materials or performing labor upon all the buildings may, in a majority of the states, include all in a single claim of lien and in a single suit for its enforcement. On the other hand, if the contract shows the amount of work to be performed or materials to be furnished upon each building, each must be treated separately in the claim for a lien, and a claim of lien upon all the buildings cannot be sustained.

In some of the states, however, the statutes controlling this subject have seemed to treat each building as distinct, and hence have been construed as not warranting any claim of lien extending to two or more distinct buildings. Thus, in Connecticut, it was said that the statute of that state "creates a lien upon every building in the construction and repair of which, or in any of its appurtenances, the claim arose. It provides that such claim shall be a lien upon the land on which the building may stand, the building and its appurtenances. It follows, therefore, that in order to be entitled to claim a lien pursuant to the statute on any building for work done upon any other building, the latter must either be an appurtenance of the former or land upon which it stands, as these terms are construed. And the same principle must apply when a lien is claimed upon several buildings for work done generally upon all."

The cases to which we have just referred involved claims of liens upon two or more structures upon all of which the claimant had performed labor or furnished materials. Where, however, he has not done any work or furnished any material for some of the buildings or structures, it would seem clear that his claim must be restricted to the building or structure upon which he did work or furnished material, except where several buildings or structures constitute a single plant, each being, irrespective of the date of its construction, a part of the common whole. In some of the states, however, the statute seems to attach the lien to a lot of land, and hence it has been held to include buildings thereon to which the claimant did not contribute either labor or material.

Thus, in Massachusetts, the owner of a lot upon which four buildings were already erected and a stable intended for the use of such of the tenants as would pay the best rental therefor, contracted for the erection of two additional buildings without making any subdivision of his lot, and the contractor was held to have a lien upon the lot, including as part thereof, the four buildings in the erection of which he had no part. This rule and holding is contrary to the general rule applicable to the subject. The statutes of Iowa provide that a mechanic or materialman who furnishes labor or material for any building or other improvement upon lands, by virtue of a contract with the owner or his agent, shall have a lien upon such building or improvement, or upon the lands belonging to such owner upon which the same is situated, and that the entire land upon which such building or improvement is situated, including the portion of the same not covered therewith, shall be subject to the lien. A building was erected upon a lot upon part of which another building already stood, the lot never having been divided, and the question then arose whether the materialman or mechanic had a lien upon the house to the construction of which he had furnished nothing. The court held that the "statute should be construed as to give a lien only upon the building for the erection of which the material was furnished or the labor done and upon the land upon which it actually rests, and, in addition thereto, upon the other land properly appurtenant to the building. Hence in this case appellants would have no lien upon the other house or upon the grounds occupied by it, not being properly appurtenant to the building for which the materials were furnished. Here material was furnished for a new house, an independent structure. Upon the same lot there is another structure. The two buildings are not so situated as to be used by the same persons or as one dwelling house, but they are separate and distinct; and a certain portion of the lot must, of necessity, or by reason of convenience, be used in connection with each house. In other words, in such a case the lien extends to the particular improvement and the land upon which it is erected and to such land surrounding the improvement as is properly appurtenant thereto."

Where work is done or material furnished in the construction or repair of a portion of a building, the lien extends to the whole thereof, though the work consists in adding thereto a new apartment, as a kitchen or a new wing, and doubtless the claim of lien cannot, at the option of the claimant be restricted to the new apartment or addition, where to so restrict it would prejudice the owner of the property by separating it into distinct fragments in the event of a sale to enforce the lien. The physical connection of its several parts is not necessary to constitute a single structure. If the apartments in a dwelling were separated by unenclosed and uncovered passageways, it might still be regarded as a unit, and a lien claimed and enforced accordingly. This is more commonly true of the buildings or structures forming part of a plant designed or used for the purpose of manufacturing or carrying on some other business in which it is found desirable, convenient or prudent to employ disconnected buildings instead of confining the operations within a single structure.

Where several structures erected on a tract of land or lot are designed for a united enjoyment, the law treats them as a unit in relation to the liens which it gives. They are to be considered constituent parts of a whole, incapable of separation without injury. An owner may see fit not to have his kitchen attached to his residence although adjacent and upon the same tract. In such case it would be unreasonable to contend that the mechanic could have a lien only upon the latter for his labor in constructing it. The kitchen alone would be valueless. In the case in which this statement was made, the plaintiff sought to foreclose a lien on the property of a smelting and refining company for work done and labor performed in furnishing, constructing and erecting buildings and machinery for the use of a plant consisting of several buildings not under the same roof nor physically attached to one another, and it was claimed that a single lien could not be asserted against the whole, but that each building or structure should have been the subject of a separate claim of lien. The court further said: "In the case at bar, the object was to erect a plant consisting of buildings and machinery necessary for the smelting of ores. Either from choice or necessity, or both, some of the structures were physically separate, but all were component parts of the whole. The building in which was contained the principal machinery was useless and valueless without the pumphouse, and so with the office and tramway. Each was necessary to the accomplishment of the object sought by the improvements and in the purview of the statute, did not become separate and distinct buildings simply because they were not physically attached, and because it was seen fit to designate the several component parts by distinct names."

The same principles were applied to another case involving a claim of lien against the property of a smelting company for furnishing material and constructing the smelter, scales, assay office, bins, boarding houses and other appurtenances.

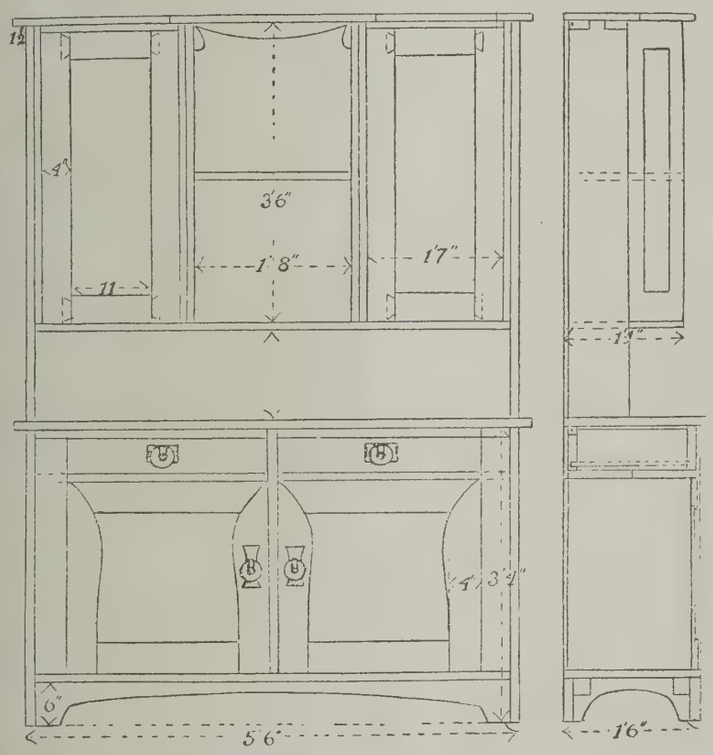
Winter or summer the bedroom windows should never be closed except on such occasions as blowing rainstorms. Sleeping in cold air is all right if heavy enough clothes are used and the head is properly protected by a nightcap, or woolen hood or whatnot to suit the season. Dangerous to sleep in an overheated bedroom where the heat dies down seriously before morning. Risky leaving a hot sitting room and going into cold bedroom and cold sheets. Lots of folk believe that a big bedroom does away with the need of open windows. Nothing to it. Many people cannot breathe foul air without at once getting a heavy, sleepy, stupid headache, a sneezy, running nasal catarrh or a dry sore throat. Such natural warnings should be heeded and not defied.

A DINING ROOM SIDEBOARD

By GEO. F. RHEAD

THE dining-room sideboard, illustrated in Fig. 1, and in front and side elevations, Figs. 2 and 3, presents no difficulty in construction, and is in size to suit the average room. If mahogany is considered a too expensive material, pine or cherry could be employed, and the latter, if desired, stained to exactly imitate the more expensive wood. Walnut would look well; indeed, some of the old walnut furniture rivals on all points that of the more popular woods of the present time.

The article may, of course, be any size, the measurements being readjusted to suit requirements. The carcase of the lower part is the first thing to be considered, and is illustrated in Fig. 4. The sides of this measure 1 ft. 5 in. by 5 ft. 5 in. (including tenons); rails, 5 ft. 5 in. by 4 in.—these latter being dovetailed into the top of the sides as shown in Fig. 4. The center partitions, measuring 1 ft. 5 in. by 3 ft. 3 in., is tenoned or screwed into these and the base. The two drawers supports are sub-tenoned into the sides and the center division, with an intervening space for the drawer from the top of 5 in. Four drawer-runners extending from



FIGS. 2 AND 3. FRONT AND SIDE ELEVATION OF SIDEBOARD.

the inner of the drawer supports are screwed to the sides and center divisions. The top measures 1 ft. 7 in. by 5 ft. 8 in., and should be a nicely marked piece of material, and, if possible, got out of one piece of wood; but if a difficulty is experienced in obtaining a board of sufficient width, the expedient of "matching" together two narrow boards must be made use of. The boards may, if preferred, be dowelled together. The top is screwed to the lower carcase with screws from the underneath side of the top rails of same before they are fixed. The boards to which the doors are hinged are fixed by screws from underneath the bottom and through the top rail. They measure 2 ft. 8 in. by 4 in. In the construction of the doors the frame is curved on the inner side to introduce a more decorative and uncommon effect. The doors should be roughed out full size on paper before cutting. The framework is 4½ in. wide in its greatest width, and ¾ in. thick. The framework will be most easily joined together by means of the tongued mitre joint, this being illustrated in Fig. 5. Mark and saw out the groove shown in the sketch, making it a third the width of the material. Saw down and chisel out. It is necessary that the grain of the slip of wood employed for the tongue be at right angles to the grain of the frame material. Glue up, and when dry cut away that part of the tongue which comes outside the joint.

We now proceed with the upper part of the sideboard. The measurements and form of the top board are shown in the plan, Fig. 6. The material for this should be 1 in. thick. The top overhangs the sides and front by 1 in., and the edges in our diagram are left plain; but they may be moulded if desired. The sides measure 4 ft. 6 in., and are sub-tenoned into the top, the joint being made further secure by means of blocks of wood glued underneath as shown in the side elevation, Fig. 3, the lower shelf

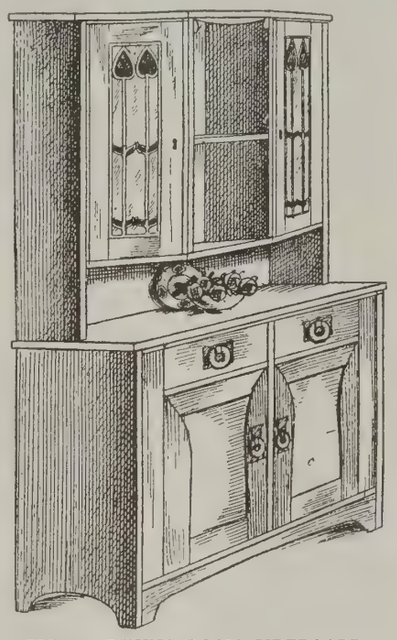


FIG. 1. DINING ROOM SIDEBOARD.

being fixed into the sides in the same manner, but with the exception of the blocks. The size of the lower shelf is indicated by the dotted line in Fig. 6.

The doors are hung on hardwood slips, one of which is shown by A in the plan, Fig. 6, and these need very careful planing to fit. Narrow slips are also glued in position for the doors to close against. The framing of these doors may be tenoned or dovetailed, two pieces 2 ft. 5½ in. by 4 in., and 2 ft. 1 in. by 4 in., including tenons, being required for making each. The back edges are rebated to receive the panel, which may be of leaded or plain glass,

FIG. 4. CARCASE OF LOWER PART.

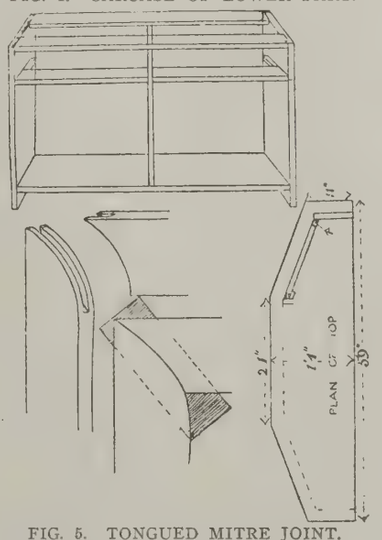


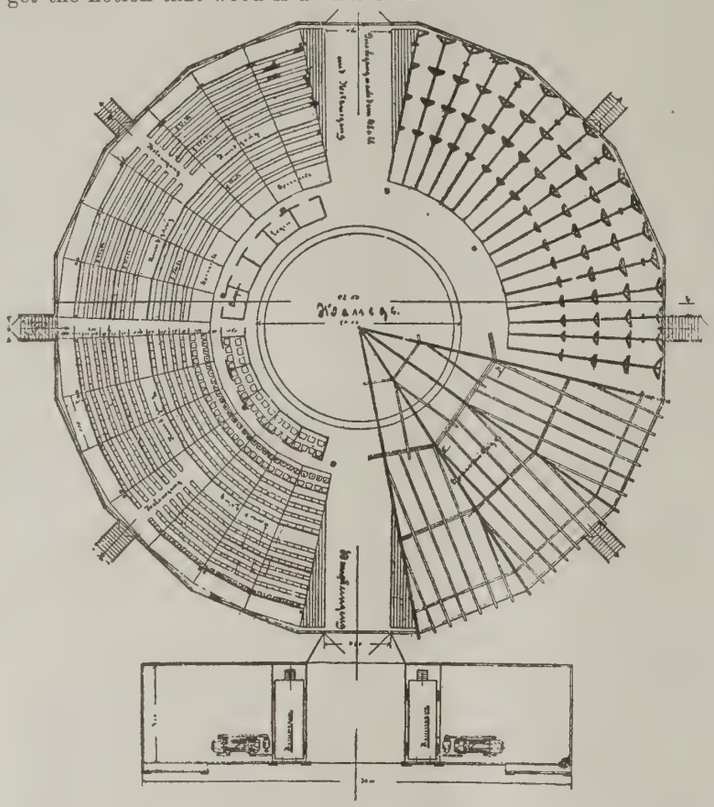
FIG. 5. TONGUED MITRE JOINT.

or wood—preferably the former, as it gives a pleasing ornamental appearance to the object.

The two separate parts of the article are kept in place by dowels, but not glued, the detachability being found a great convenience for moving. Before finally fixing together, the back edges of the whole carcase must be rebated to receive the back covering.—English Mechanic.

IMPORTANT CONSTRUCTION IN WOOD

FOR all that wood has been pushed to the rear by iron and steel, brick and cement, there comes forward at times an instance of the adaptability to construction, which is the more important, as these instances are on lines usually supposed to be monopolized by some one or other of the rival materials named. Considering the many districts where wood for building is still plentiful and where iron is not yet cheap, it may be well not to get the notion that wood is a "has been."



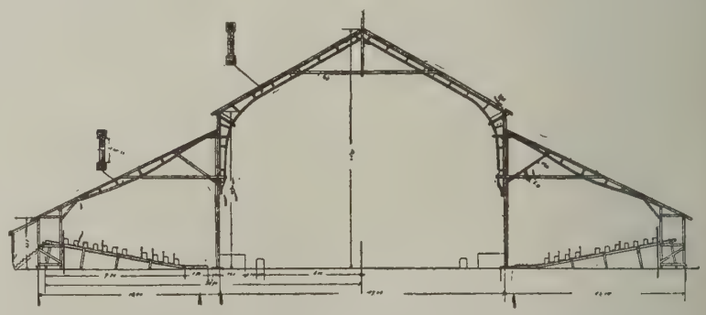
A very good example of the resurrection of wood as a building material is shown in the transportable building of the Sarrasani Circus (called Sarrasani because the name of the owner, Stosch, is not sufficiently romantic). It was built in Cassel very largely according to the ideas of Herr Stosch, and among its special features are that it must be transportable, firm, weather tight, capable of being steam-heated, and have a good appearance. The builder was Emil Herhardt. The entire circus takes up about 5,000 sq. meters, which, being transposed into our measures, means about 5,380 sq. ft. The exhibition tent is sixteen sided, with a diameter of 42 meters, or 138.3 ft., has a facade of 30x7 meters, or 98.4x27 ft., and has in connection with it five similar "tents," each of 22x10 meters (=72x32.8 ft.), for stabling, kitchens, dining-rooms, wardrobe, etc.

The construction of this building delights the eye of the previsional builder, and attracts also the layman. The sixteen-sided exhibition tent or auditorium consists of an eight-sided middle building with eight supporting pillars, having about 19 meters (=62.3 ft.) spans each, and at total height of 16 meters (=52.5 ft.). Each of these eight pillars is composed of four separate timbers, bolted together for the purpose of securing extra elasticity and also great firmness, as the four timbers interlock. Around this eight-sided building there is a sixteen-sided annex carried to a height at the outside of 3½ to 4 meters (= 11 ft. 3½ in. to 13 ft. 1½ in.), by a system of columns. The secondary members are constructed, with special regard to the necessity of frequent transportation, of light, air-dried spruce, without the use of glue—a glycerine and lime compound being used instead, this latter having been used in building for the last 1,000 years.

By this method of construction all warping and splitting is avoided. The roof is of cloth just as in the ordinary summer circus tent. But in order to keep the building as warm as possible, inside, there is within the outer weather and storm-proof covering, which is fastened to the timbering with leather straps and with ropes, a second inner roof below the timbering, so that there is between the two cloths an air chamber over the entire building. The side walls, which are in all other circus buildings made of sailcloth, are here of woodwork, in order to obtain an absolutely tight room, which may be easily made warm and kept warm; these side walls consist of a double layer of tongued and grooved boards with felt paper between them.

In order to facilitate rapid taking down and erecting, the sections of the wall are so arranged that they consist of light panels, each with tongued and grooved joints, and readily attached to the timber frame of the work by screws or hooks. This makes the wall stiff enough to enhance the rigidity of the uprights.

The seats, for about 4,000 people, are arranged very practically. There are four wooden frames so arranged that they resemble triangles and which may be laid inside each other and thus may be transported without taking up too much room. These frames are so constructed that they permit the attachment of cross-pieces, with notches above and below, and in these cross-beams there are inserted bench-legs, which fit the notches and thus bind the whole together. The bench legs have sinkings, in which the seats are inserted, and thus the whole forms a series arising in steps in the usual manner. Every bench leg will fit every cross-piece, so that in setting together there is no necessity of bringing specially-numbered pieces together, the result being that the seats can be put together in five hours. The cross-pieces are put on the supports, and all through the construction every piece will fit just as well on one side of the building or in the same row as anywhere else. No tools are necessary to put the whole together; the entire

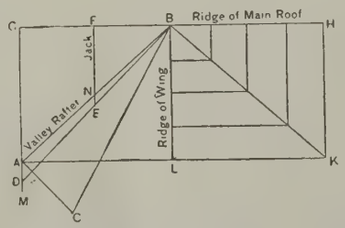


seating capacity for 6,000 people, together with the flooring, takes up only one ten-ton wagon, which is an advantage only spruce could confer; iron would be much heavier.

It must not be imagined that safety from fire has been lost sight of. Entrance to the building is, under normal circumstances, through the main entrance, the gallery being reached through the two middle entrances. But in case of panic four further emergency exits can be opened; further, there is a wide exit towards the stables.

JOINING WING ROOF TO MAIN ROOF

The illustration shows a plan of construction in joining the roof of a wing to that of the main building. In the sketch G H represents the ridge of the main roof. B L represents the roof of the wing. B A and B K are the valleys. For the true length of the valley rafter from A, erect A C perpendicular to B A, making A C equal to the rise of the roof. Connect B and C. Then B C is the length of the valley rafter and the angle at C is the bevel of the same. Draw the line B D in length equal to B C, in such a manner that the point D, corresponding to C, shall fall in the line G M. Extend the jack-rafter F N until it meets the line B D



in the point E. Then E F is the length of the jack, and the angle at E is the top bevel of the same. The bevel will be the same as the main rafter.

AN INEXPENSIVE COTTAGE

All over the land, but especially in the smaller cities and near manufacturing plants, there is a constant demand for the small inexpensive cottage, suitable for the mechanic or clerk ambitious to own his own home with a little plot of ground.

Such a house, having all the comforts of the more elaborate buildings, can be built for less than two thousand dollars. The illustrations show the floor plans and photograph of the completed house as designed and built by W. L. De Long at Waterloo, Iowa. It will be seen that there is no waste room on either floor. The space for closets on the second floor is about five feet high at the door and slopes down to about three feet at the outside wall, making considerable storage space without resorting to the third floor or attic.

Being rectangular on the ground, there is no extra expense for internal angles or bay windows, and still the building is excellently planned. It will be noted that by the arrangement of the stairs from the kitchen to the basement going down three steps to a landing opening to the outside, the awkward and inconvenient "outside cellarway" is entirely avoided and access to the basement is as easy in winter as in summer.

It is to be noted that the living room and dining room are finished in red oak, which makes a particularly durable finish and

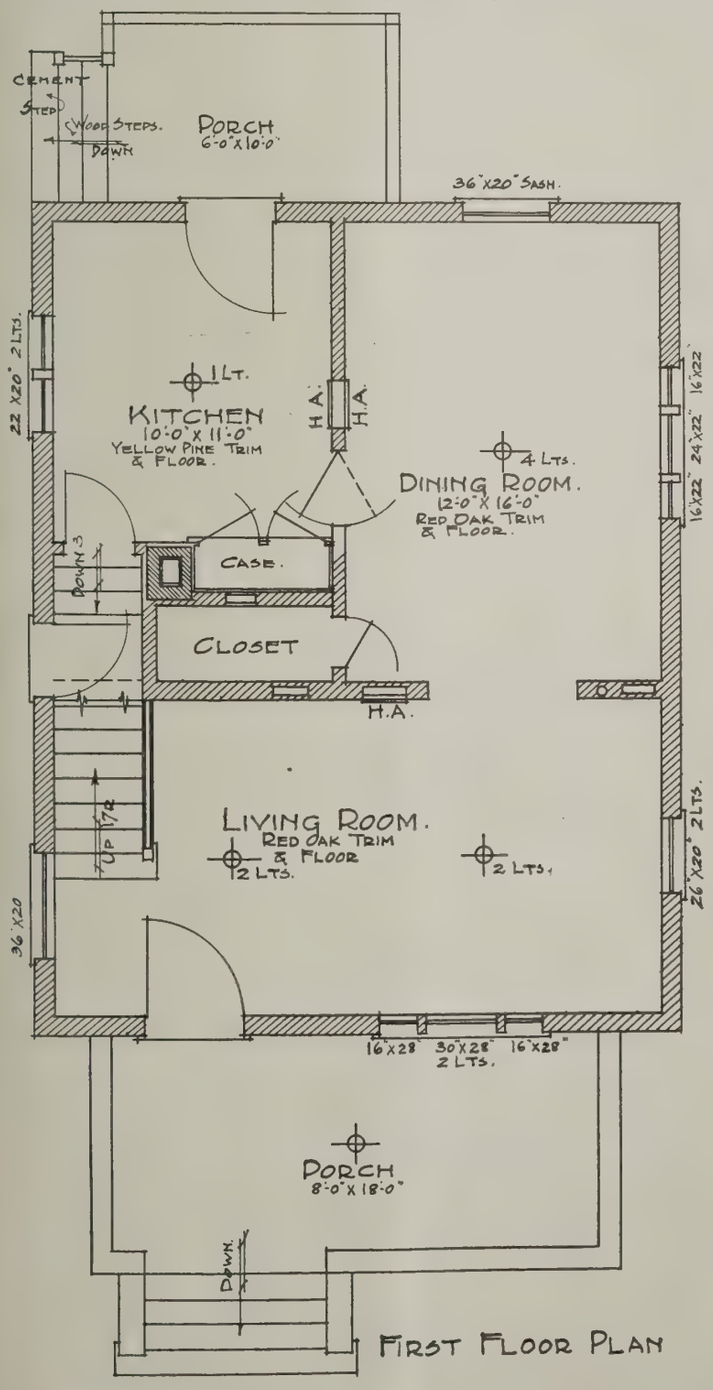


H. F. DeLong, Builder. Waterloo, Iowa.

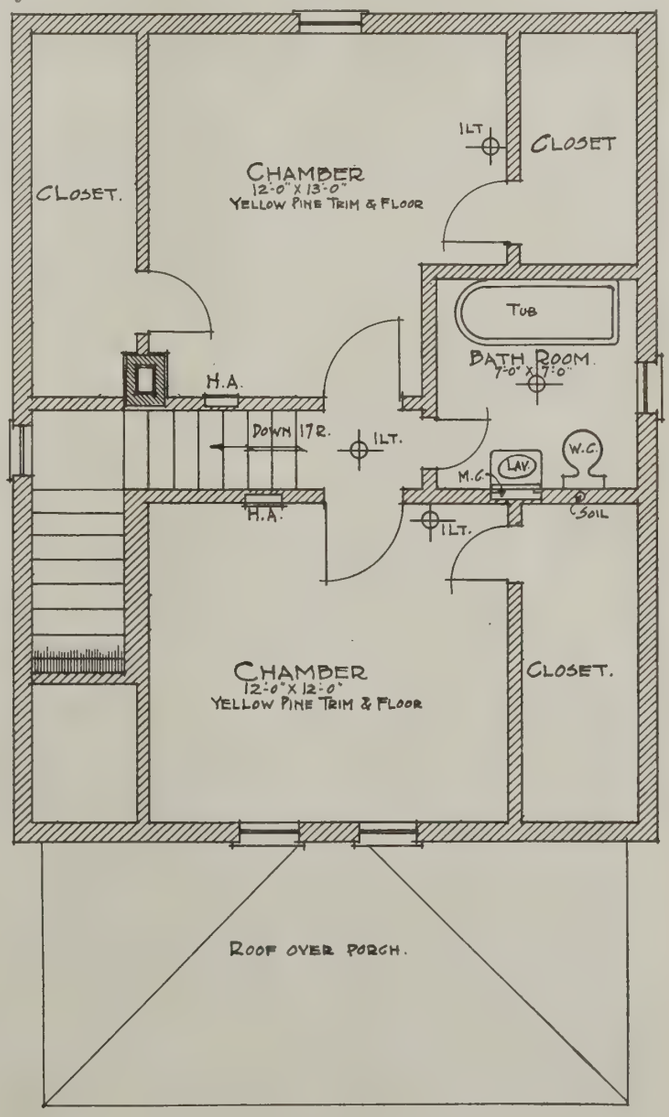
lends itself to a great variety of color schemes. In fact, with the possible exception of birch, no wood is so popular on this account.

A great many houses of this character have been erected through the building and loan associations throughout the country. As generally conducted, this means a payment of $20.00 or less a month for about ten years, which is practically what one would pay for rent for a house of this character.

Owning their own homes greatly increases the standing and credit of the owner, and in times of adversity he has far more sympathy and support than those who are free to come and go as they wish.



FIRST FLOOR PLAN



SECOND FLOOR PLAN.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

PLATE XXIV. LEFT SIDE ELEVATION.

IT is an easy matter for the student to finish this elevation since he has completed the others. Notice that the right and left side elevations face the opposite ways on the paper. The front elevation should still be used to project the dimensions over.

PLATE XXV. REAR ELEVATION.

This elevation presents no new problems, but it illustrates a method often used, of breaking a railing to show some part of the main building, in this case the rear door.

This plate finishes up the plans and elevations of a building. They are always accompanied by details, which we will take up with Plate XXVI.

Never use a scale for a ruler.

Draw all horizontal lines with the T-square and all vertical lines with the triangles, then they will be at right angles to each other.

Do not fill the pen too full of ink. The pen of medium size should carry about ¼ inch.

A careful draftsman leaves his drawing in such condition that anyone could easily proceed with the work where he left off.

Pencils should be sharp and lines light. The draftsman should not bear down on his pencil so as to leave a ridge in the paper.

Care should be taken with dimensioning. Never use a slanting line for a fraction or it may be misunderstood. For example 1 and 5/16 may be taken for 15/16.

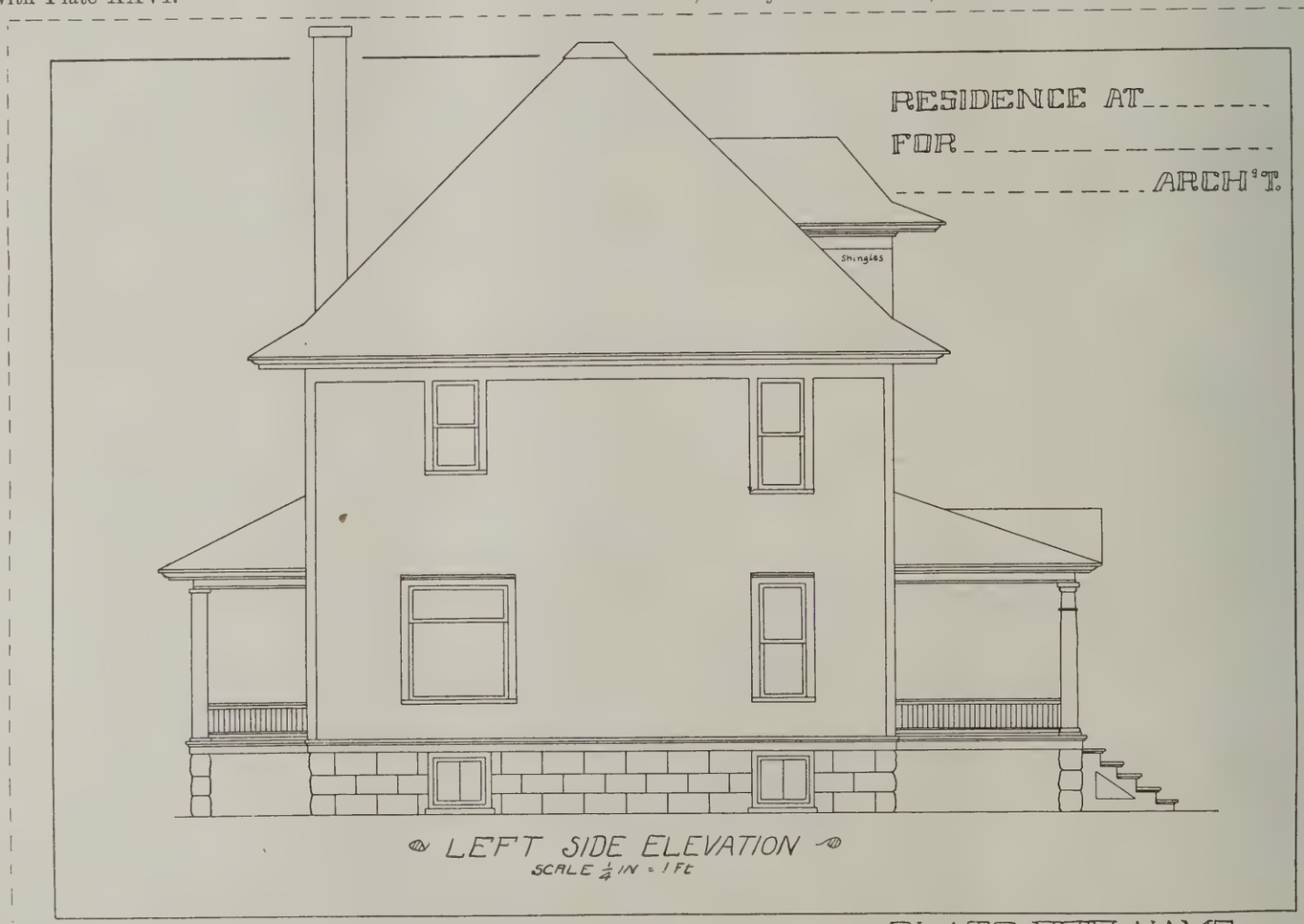


PLATE XXIV. NAME.

DRAFTING KINKS.

It has occurred to the writer that it would be useful for the young draftsman to know a few of the things that are in the daily practice of professional draftsmen, time-savers and money-savers that they have heard of or worked out for themselves. A few of these things have been mentioned before, but they are now repeated to emphasize their practical worth.

Do not run inked lines past their destination, though it is a good plan to do this in penciling.

If a short inked line is to be taken from a drawing and it is not to be gone over again with ink, a sharp knife blade is the best instrument to use. But if it is to be inked over it should be erased and re-glazed with soapstone or by rubbing a blunt instrument of ivory or celluloid over the spot.

Thumbtacks should not be withdrawn with the fingers. Use a knife.

Pens should not be filled over a drawing.

Ink should never be left in pens, as it corrodes them.

Horizontal lines should be inked from the left to the right. Vertical from the bottom up.

Dimensions should be pricked off from the scale with the dividers. Very fine depressions are all that are needed.

Circles and curves should be inked in first, before straight lines. First ink the smallest and afterward the largest circles or arcs.

The erasers should be kept clean. This can be accomplished by rubbing them over fine sandpaper where they have become soiled.

After filling the ruling pen nearly close the nibs and try the line on a piece of waste paper.

Blue prints that are wrinkled after drying may be flattened by rubbing them with a hot iron.

To indicate the position of a center that is to be used again, lightly pencil a circle around it; never enlarge the hole.

If a mistake has been made in scaling, do not attempt to cover it by putting in the right dimension, but erase it and do it right the next time.

The needle points of the compasses should be a little longer than the pen or pencil points.

Never ink in a portion of a drawing until it is entirely penciled.

Never trace a set of working drawings until the last one is finished, as they may need revising as the work proceeds.

Some draftsmen make their original drawing on tough tracing paper, ink it in, and thus save a little on the cost of tracing cloth. This practice is not to be recommended.

The draftsman should keep all of the original data given him on a job, so that if an argument occurs, the blame may be put upon whom it belongs.

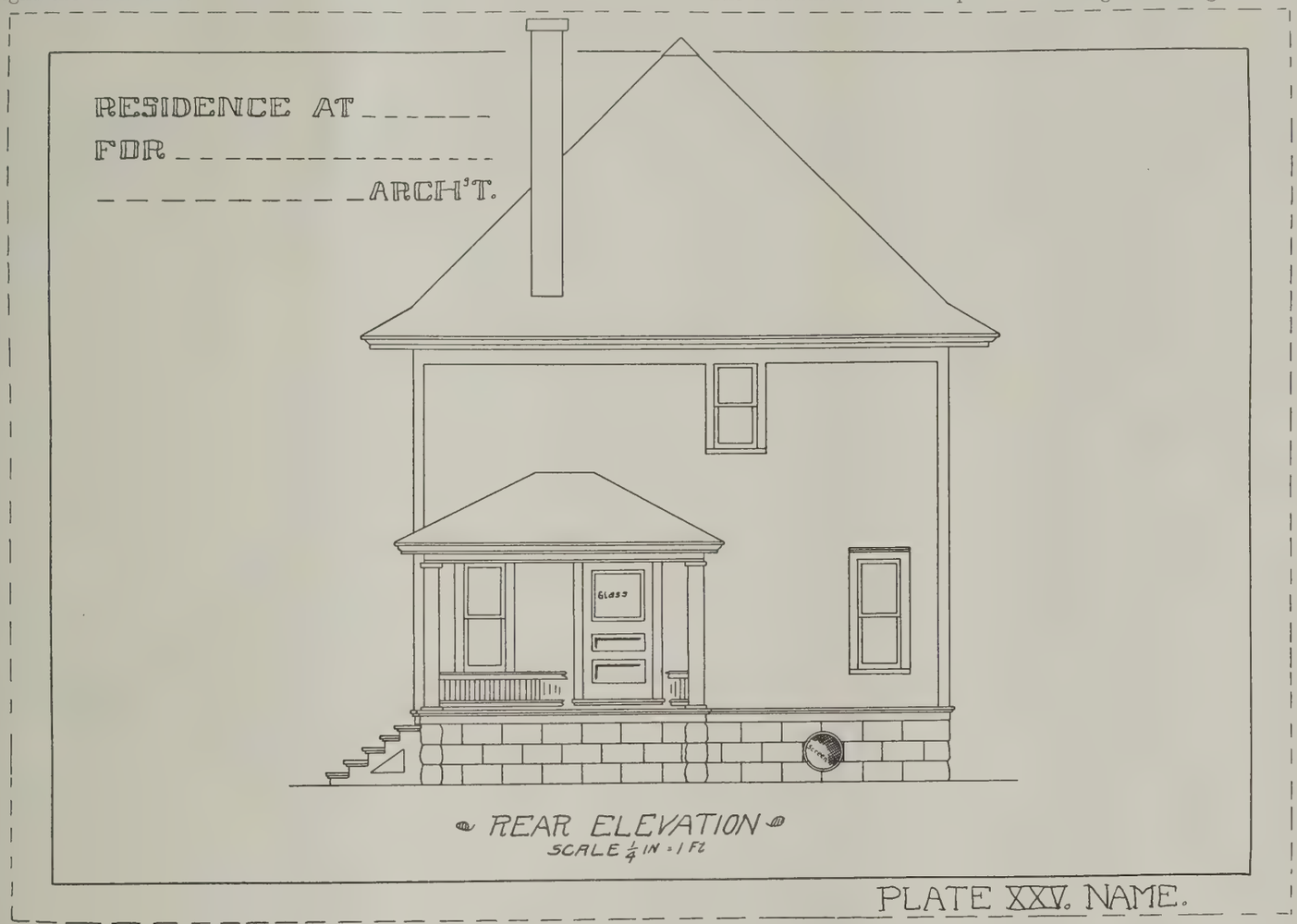


PLATE XXV. NAME.

Avoid fingering the drawing sheet as much as possible; in pointing to any part use the pencil and not the finger.

Never use the upper edge of the T-square as a cutting edge, as a slight nick will cause inaccurate work as long as it is used thereafter.

Great care should be taken to keep the drawing boards away from heat and damp, as these will cause the wood to warp and they are liable to open the glue joints.

Section lines should be inked in last and it is not necessary that they be penciled in before hand.

A substitute for a printing frame may be found by using a thick pad placed upon a flat surface upon which is placed the tracing and the printing paper. Good contact is secured by means of a piece of plate glass, which, being heavy, forces the tracing and the paper firmly between it and the pad.

Keep your instruments clean and sharp. Sharpen your ruling pens on a fine knife stone when they become dull.

(To be continued.)

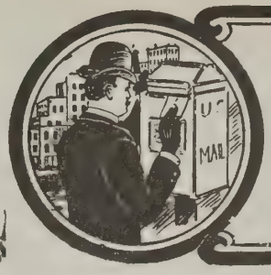
A FLOORING NAILER NEEDED

By J. CROW TAYLOR

We have nailing machines for making boxes and doing cleating and quite a wide range of shop and factory nailing and also some special machines for driving shingle nails, but a thing that seems to be needed now is a floor nailing machine, a machine with which one can nail hardwood flooring, using a finish or casing nail. This complicates the problem of making a nailing machine, because the majority of nailing machines separate the nails and handle them by the head and it would take pretty close manipulation to handle finish nails or casing nails in this way. On the other hand, the nail with a head on it is not good for blind nailing in hardwood flooring.

One strong reason for the need of just such an invention is in the fact that one of the greatest impediments to the progress of hardwood flooring is the tedium of nailing it. We are getting to the point where in some sections of the country oak flooring in common stock and thick strips can be had for the same price as pine. It makes such an infinitely better flooring, both in the appearance and durability that where the favors are even it should always have the preference. That it has not already made much more progress is due to the fact that it is difficult and tedious to nail it. Hard dry oak is pretty hard stuff to drive a nail through and the nails have to be driven home with a set and as a consequence the average carpenter doesn't like the job.

It is time to come to it though and really the carpenter shouldn't be fighting shy of it, because it means more work for him. Yet, there is no gainsaying the fact that the carpenters stand in the way of progress of common stock in hardwood flooring and the thing it will take to get him out of the way is the invention of some machine or appliance for nailing hardwood flooring that will render this work easy, light, and rapid. That is one of the things the trade needs badly right now, is a floor nailing machine.



OUR READERS' PAGES

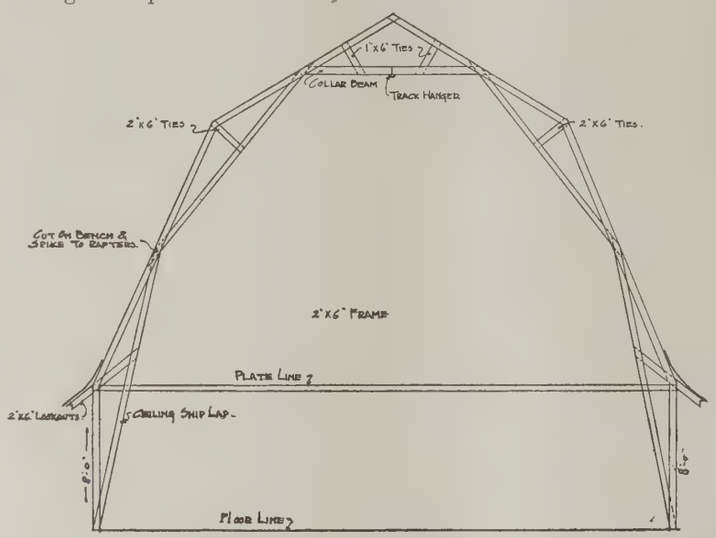
[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]



CURB ROOF.

From "R. E. P.," Ellsworth, Kans.

Here is a style gambrel roof that has given more than satisfaction. You will find less timber and as I consider more of, and a better brace from the fact of going below the plate line for a seat and each brace meeting the main rafter in or near center, making a complete set of braces from one side to the other. Furthermore, the tie or collar beam serves as tie, also for hanging track to. The feature of this is the taking weight from plate line. Ceil brace rafter from side wall to first rafter. Shiplap makes good material for same. The cornice is open, using flooring from lookout to 18 inches above plate line and end cornice same. Cut all brace rafters on bevel and spike to main rafters.



Hope this will meet with the approval of your correspondent or any one wishing a gambrel roof that will not spread the frame of building.

CEMENT FLOORS IN DWELLING HOMES.

From "Witts," Philadelphia, Pa.:

W. H. C., Des Moines, Iowa, can make first class cement floors by using expanded metal as a reinforcing medium on which to lay his cement. Joists may be placed three or four feet apart, then boarded over with rough stuff, or lined with corrugated metal and the expanded metal lathing laid on this with joints on joists, then cement with good stuff made of one part cement and two parts clean white sand. This can be polished as smooth as glass.

ESTIMATING FLOORING.

From Carpenter, Chicago.

I offer the following in answer to question as to the amount of flooring it requires to cover 100 square feet of surface of the various widths. It must be remembered that there is just as much loss in matching on a narrow board as a wide one; therefore, where the loss is 30% on flooring 1¾-inch face, below is given the amount of D. & M stuff required, to cover a space of 100 square feet; under 1 inch thick is figured as inch thick:

Face width.	1 in. and under.	1¼ in.	1½ in.
1¾ inch	143 ft. B. M.	179 ft. B. M.	215 ft. B. M.
2 inch	137½ ft. B. M.	172 ft. B. M.	206 ft. B. M.
2¼ inch	133 ft. B. M.	167 ft. B. M	200 ft. B. M.
2½ inch	130 ft. B. M.	162 ft. B. M.	195 ft. B. M.
3¼ inch	124 ft. B. M.	155 ft. B. M.	186 ft. B. M.
5½ inch	114 ft. B. M.	143 ft. B. M.	171 ft. B. M.

Note—5% to 10% should be added for waste, according to conditions.

HINGING DOORS.

From "Worker," Rochester, N. Y.:

In reply to the query of "Frank C. N.," Ponoka, Canada, it is safe to say there is no stringent rule on the matter as so much depends on the doors, the positions in which they are hung and the kind of hinges used. The top hinge is nearly always placed its whole length below the top-rail of the door, and the lower hinge is generally placed an inch or two above the bottom rail. This gives the screws a solid setting in the stile. If a third hinge is used, as in heavy outside doors, it may be placed to advantage about six inches below the center of length of door. The way I lay out my Eyebrow windows is about as follows: I cover the whole roof with roofing boards, than lay out the window on the boards, in such curve as may be decided upon, and cover and shingle this over in the usual way. The frame and sash are set up first of all, and give the lines for a final finish. After this is done, the back of the window is cut out, rafters and all, if so desired. It is a very simple method, and after the first job of the kind the workman will find the whole process as easy as "falling off a log."

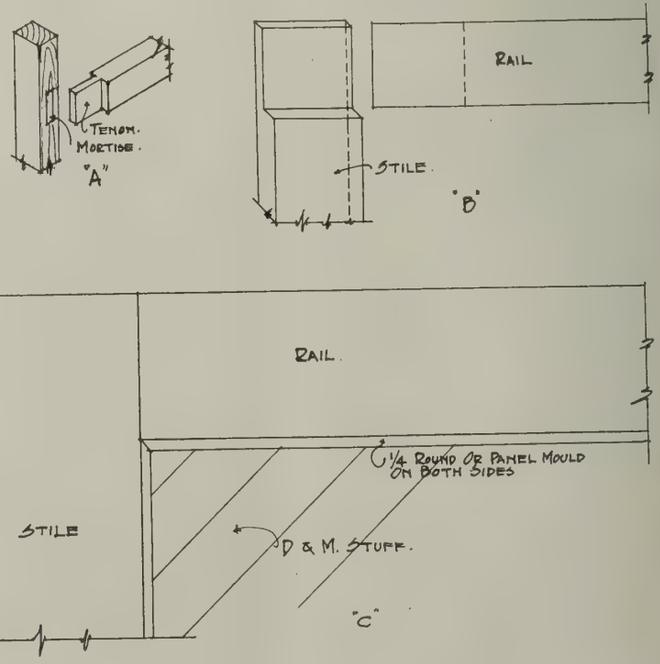
MORTISE AND TENON JOISTS.

From Contractor, Chicago.

To answer this question would require quite a good sized volume. I would suggest that the reader get a copy of Hodgsons' Light and Heavy Timber Framing.

I will, however, try to offer one or two hints. The proportion of a mortise and tenon should be from 1/3 to 2/5 the thickness of the material used, illustration (A) shows a mortise and tenon to 1/3 proportions.

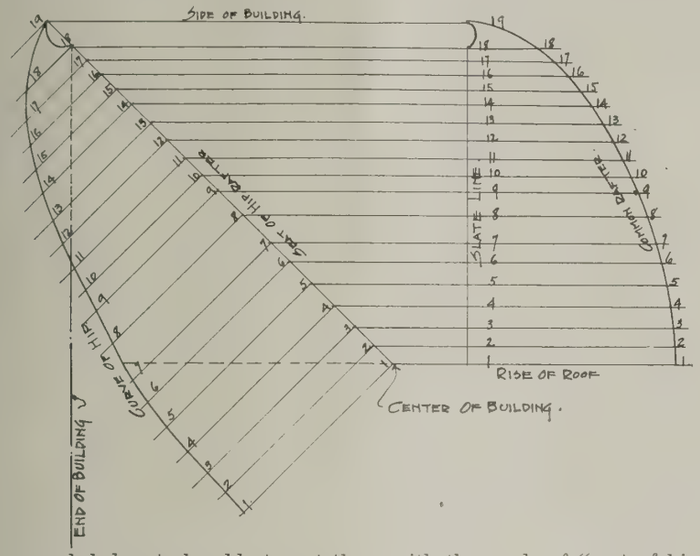
With reference to the large barn doors, the writer makes a frame of 2½ inches thick stuff, the stiles about 5½ inches wide, bottom rail 10 inches to 12 inches wide, center rail about 8 inches wide, top rail same as stiles; this can be either mortised and tenoned together as at (A) or halved together as at (B) with the D. & M. panels stuck in with a ¼ rd. or suitable panel mould on both sides as shown at (C). I trust this may be of some service to my brother reader.



CURVED HIP RAFTER.

From J. Wm. H., Niagara Falls, N. Y.

Having been an interested reader for some time, I have been waiting to see an answer to C. J. H.'s inquiry, as to how to proceed to lay out a hip rafter for plan. Now as the brother does not say, I take it for granted he is referring to a square or right angled building. At any rate, the principle will apply to any angle as long as the proper angle of the seat of hip is given. First, lay out common rafter, whatever curve it may be, then draw parallel with the rise of rafter lines dividing same into any number of spaces, the more, the more exact will be the result. Extend far



enough below to be able to cut them with the angle of "seat of hip and side of building," then with dividers take each one separately and transfer height of same from where the line cuts the angle of hip line, and at right angles to it, erect a corresponding line to the original height (see cut), trace through these points and trouble is over.

I hope that the brother will be able to grasp the principle, for it will help him in a great many cases, but if more extensive explanations are needed I will gladly and cheerfully give them, if he will let me know through these columns.

This is not the exact curve the brother gives, but just an example of how to lay it out. I think it is plain enough.

DUTCH CURB ROOF.

From "H. F. G.," Grabill, Ind.

In regard to the question of A. O. R. of Eastwood, Minn. I have never built a barn like this but I have seen several. There is one in our town and I saw one in Beaverton, Mich. It did not have the brace from the studding to the rafter, but that will better it.

You can tell the boy who asked about hand saws that I have Disston's, Bishop's, McIntosh's and Atkins', and am well satisfied. Be your own chooser and your own loser or gainer. Make them guarantee them.

HOME MADE REFRIGERATOR.

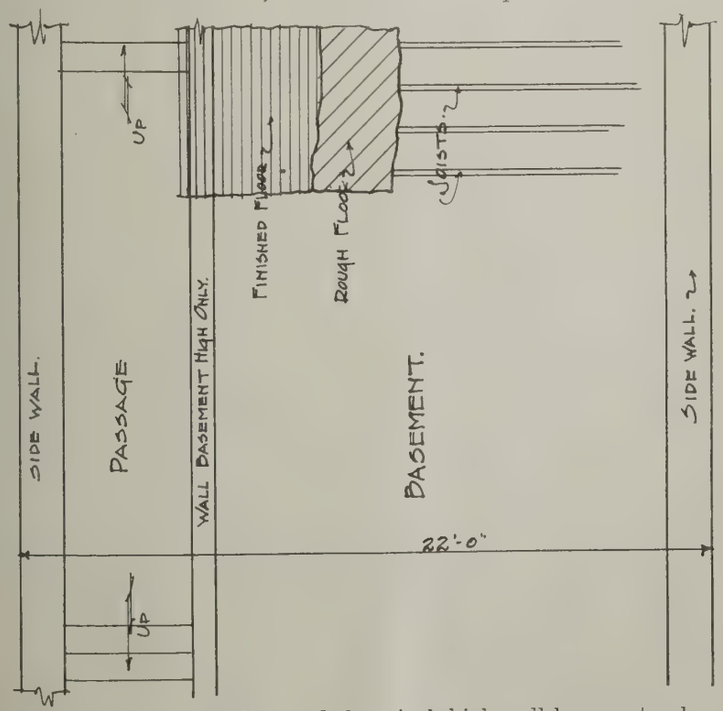
From Old Hand, St. Louis.—If E. G. M. has more time than he knows what to do with and can get his ice cheap in the summer, it is all right for him to make a home-made refrigerator. If he were asking how to build an icehouse to hold the summer's supply, we might help him out, but for a small family refrigerator, he doesn't say about how large, it will be a whole lot cheaper and better to buy from the well known manufacturers of those goods. They have been at the business for years and have the materials, and know how. However, I don't want to discourage him. If he will dig up his May number of THE NATIONAL BUILDER, he will find how to build the walls of his refrigerator, and he is probably ingenious enough to make the doors so there is no chance for the air to leak out when the door is closed. A small box should be lined with galvanized iron to keep the wood dry, and provision must be made for the water to run off. This must be in the form of a trap, so that air won't run out at the same time. Remember to keep in cold air, the box must be as tight as to hold water. Use plenty of the paper made for refrigerators, and if you can't get cork boards, that is cork shavings pressed into sheets, use dry sawdust and tamp it in well.

I think the best shape for a home-made box is like a chest, for then the cold air stays in—it is heavier than warm air, and not so much ice is melted when the box is opened.

QUESTIONS

From Reader, Chicago.

Being a reader of your paper, I desire to ask through its columns for some advice, the sketch shows the position of the two



outside walls of a building and the 8-inch high wall basement only forming the side of side passageway, which goes down four steps to the basement floor level.

My trouble is, the floors above this 8-inch wall are raised about 1 inch above the level at the outside walls. There is a common floor stripped with 1x2 inch strips and then a 7/8-inch hardwood floor on them.

What I would like to know is what is the cause? And how it can be remedied? The building is about six years old and shows no sign of cracks in the walls anywhere. I shall feel grateful for some expert's opinion on it.

From D. H. B., Alice, Texas:

I wish to make a wooden cistern 10 feet in diameter and 8 feet high. I am going to use five hoops, which I think will be enough. I want to know all points about it—how to obtain the bevel for the staves; how to obtain the length of the hoops; also in ripping the staves I wish to know how much to take off, so that when put up it will taper as usual. Kindly give me all the information necessary to build a wooden cistern.

From Nixon, Quincy, Ill.:

What are the proper dimensions for a concrete mixing box and how is it made and used?

HIP AND VALLEY RAFTERS.

From N. W. I., Coatsville, Pa.:

How will I proceed to get the bevels at foot of valley rafter for a roof having a front gable? Also how will I get the depth of valley rafter at seat, so that the front gable rafters will strike the center of the valley rafter?

From C. F. K., Cincinnati, Ohio.

I want to build a press brick mantel in the corner of a room. Would like very much if some one would give me a suitable design with plan and details, or tell me where I can get an assortment of designs. Any information will be greatly appreciated.

Please publish the above in the next issue of THE NATIONAL BUILDER.

GILDING ON MARBLE.

From A. L. C., Smith Falls, Ont., Can.

I would like to know through the columns of THE NATIONAL BUILDER the best materials to use to letter with gold on marble.

TILES AND TILING.

From "Country Plasterer," Quacknic, N. J.:

I wish some one who knows would tell in these columns how to lay floor tiles, and how to hang them on bath room walls, and for facing chimney breasts for mantels and other work. I have had several little jobs of tiling to do this last summer, and could not get a man to do the work properly, so had to send to Newark for an expert and this ate up all the profits on the work, and more too. I take it that many small towns and villages all over the country are situated as we are here, and when a job of tiling has to be done, a man from the nearest ctiy must be sent for to do the work. It also happens often that builders will persuade the owners of buildings not to use tiles because of the extra cost, which is always magnified by the contractor, in order to discourage their use. I have discouraged owners more than once because of the reasons I have mentioned. If a better knowledge of the methods of laying and hanging tiles was more diffused among workmen, I am sure the use of these beautiful productions would soon be doubled, and many of our cheaper buildings would be made much prettier and more artistic in their interiors.

A GRANDFATHER'S CLOCK.

From "A Learner," Erie, Pa.:

I am going to try my hand at making a case for a clock, that will be a veritable grandfather's clock, when completed. I have an old clock that has hung on the wall of my father's house ever since I can remember. It is an excellent time keeper, and on its face is engraved: "1764, Dublin," Thatcher, maker; and the face is somewhat quaint, is of metal, and seems to have been plated over at some time or another. The face is about ten inches wide and a little more in length. There is a pendulum, weights and chains, and it will run nine or ten days after once being wound up. What I want to make is a simple plain case, something similar to mission furniture, only I want it made of oak and finished in the natural wood. I hope some of my fellow readers will help me out, as I intend making the case this winter is possible. I have made quite a number of pieces of furniture and other useful articles, designs of which I have taken from the good old NATIONAL BUILDER, to which I have been a subscriber for more than eighteen years.

STAIRS AND BRICKS.

From "Contractor," Green Bay, Wis.:

I submit two questions to which I would like answers from a number of my fellow readers, viz.: Is it necessary that bricks be made wet before laying in a wall, when the temperature is near the freezing point? Is a six inch rise and a twelve inch tread the best proportion for an easy going stair step?

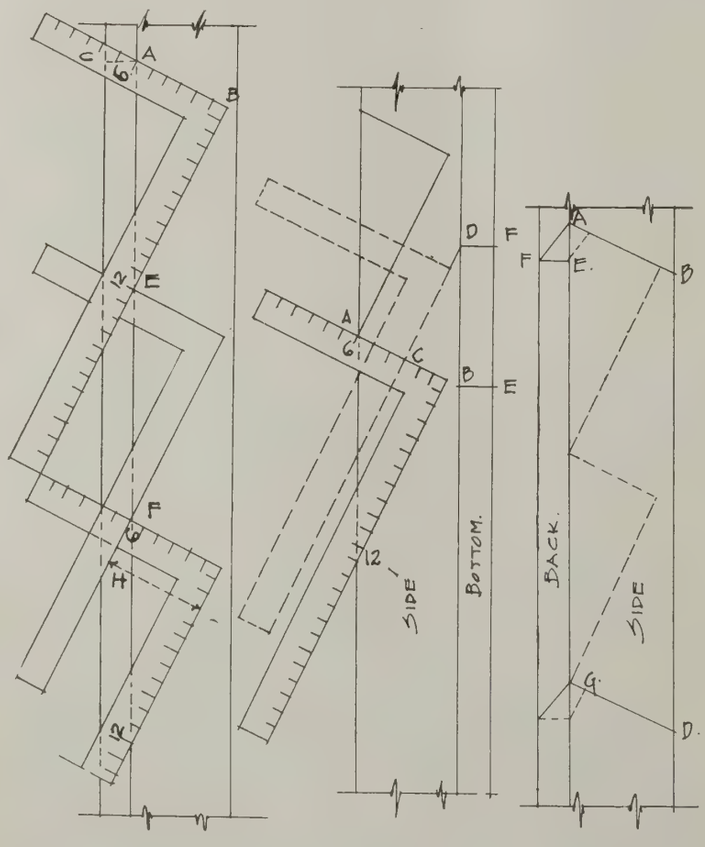
SOME RAFTER PROBLEMS—By JAMES BARRY

LAYING OUT COMMON RAFTER.

Place square on stick at AB, as shown in sketch No. 1, 6-inch and 12-inch, the pitch of roof being 6-inch rise to 12-inch run.

Cut to CAB. To get the length of the rafter, place the steel square diagonally on the rafter with 6 inches on the tongue and 12 inches on the stock as shown, A to E, and then move it along top edge of the rafter as many times as there are feet in half the width of roof as shown at AEF.

Move square along diagonal at 6-inch and 12-inch top corner



of stick. If there should be a fractional part of a foot, such as 3 inches, in one-half the width, place square the same as before and set off the distance required on the blade. Mark as before down the bevel HG. Don't forget to allow for ridge pole, one-half the width of which can be taken from amount of the half shown, or taken off at G when laying out the rafter.

LAYING OUT THE SEAT OF COMMON RAFTER.

Set off from top of stick on down bevel the height top of rafter stands above plate, from A to C. Move square along on (3 inches in this case) side of stick until the edge of tongue comes to C, as shown by dotted lines. Mark along the blade of square the seat of rafter GD. (See Fig. 2.)

Now square across bottom of rafter from B to E and from D to F and your troubles are all over. Now cut to EBC, which is your cut for outside of plate. FDC is your level cut for top of plate. The projecting ends can be cut to length after being placed.

LAYING OUT JACK RAFTERS.

The bottom end of jacks are laid out same as common rafter, as shown in Fig. 2. The down bevel is also the same as shown at AB. (Fig. 2.)

In order to mark side bevel, find exact thickness of stick and set off distance on side.

Now square across back at EF, and mark diagonal AF, which is the correct bevel to fit against side of hip.

Cut to FAB. Select straight stuff for pattern.

With accurate pattern made and cut fit jacks in pairs and mark on both sides of stick.

BEVELS

The subject of splayed work, says C. Cloukey, in the *Wood-Worker*, as occurring in the construction of pedestals, hoppers, bins, tanks, etc., is one of much interest and usefulness to the mill man, who often has such work to lay out. Nearly every treatise on carpentry and joining has the subject well illustrated, and the figures given here are not all new ones; in fact, being so old as to have lost their origin. However, it is but seldom that the directions and descriptions are sufficiently lucid and explicit to enable the novice to get certain results from the book. For instance, he may work out the drawing and get the bevels right, but be uncertain whether to apply the marks on the face or on the edge. If on the face, the description of the figure does not tell him that he must apply it on both sides of the piece and saw to both marks, and does not tell him how to get the starting points on the other side.

It is evident that if the outside dimensions of the hopper are given, it will be possible to lay off the face cuts for the outside without making a drawing at all, except to get the width of the side of the hopper, as in Fig. 194. We will take for example, a hopper 2 feet deep, 4 feet square at top, and 2 feet square at bottom, the splay or slant of which would be 1 foot. We will assume a thickness of 1¾ inches for convenience, which will give say, 2 inches across the bevel, making a difference of 4 inches in outside and inside dimensions of hopper, and have top and bottom edges beveled to horizontals and the corners joined by a butt joint. The bevels for edges may be taken from Fig. 194, and if so desired, the whole layout may be made on the square-edge piece, as set forth in Fig. 195, which shows a transparency of a board from which one side

of the hopper is to be cut. It is shown somewhat in the perspective, in order to better illustrate the horizontal bevels *a a*, which should be laid off on the ends of the piece from the angle obtained from Fig. 194, and gauge the lines *e b* to mark the limit of the bevels.

If the outside dimensions are given square a line across the middle of the outside, as shown at *c d*, always keeping in mind that in this figure the inside of the board is next to the eye. This line should be squared clear around the board as it will be needed on both sides. Now, from the center line each way lay off 10

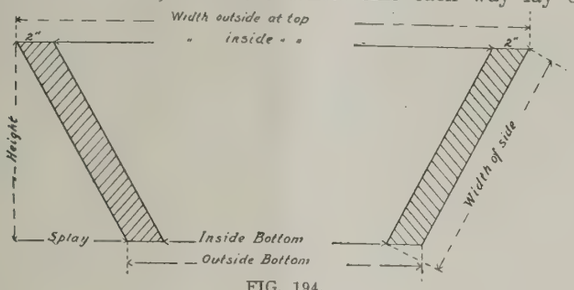


FIG. 194.

inches on the line *b* and 1 foot 10 inches on the line *f*, and when the points opposite, above and below, are connected by straight lines, you have the layout for the outside of the hopper. Repeat the above measurements on the inside of the board, and you will be surprised to find the inside wider than the outside; but this is correct and necessary, as a glance at the Fig. 194 will show that the sides of the hopper splay evenly, and it therefore follows that as the side of the hopper in question tilts back or outward, the outside must be cut away from the square sufficiently to allow the side to fall into place. When the outside measurement is given, we cut the inside wider, but when the inside dimensions are given, we cut the outside narrower.

The lines for the face cuts should be extended to the edges of the board, so as to give connection with the lines on the opposite side of the board, as shown at *i*, Fig. 195, and in case the top edge

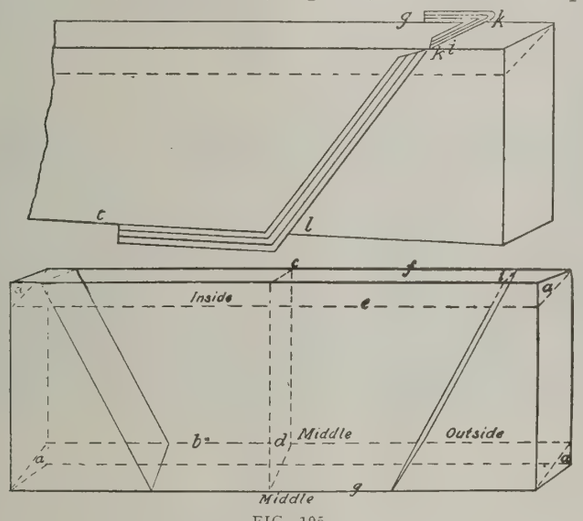


FIG. 195.

is left square with the side, it will give the proper angle across the edge.

Of course, the workman will understand that for a butt joint only two sides of the hopper need be worked as described, the two remaining sides simply being nailed or joined to the two already prepared and the waste ends sawed off flush; or in case the butt end is gained into the adjacent side, more or less should be left on the piece for a chime, as it always does in the case of tanks.

Figure 196 shows a graphical method of finding the bevel for a hopper having a miterd corner. It will be noticed that the section shown at *x* is similar to those in Fig. 194 and shows the splay of the sides. To proceed with the drawing, lay off the line *ab*, and from this erect the section *x*, representing a side of the hopper just as it would stand when fastened into the finished work. Now drop the three perpendiculars from *cd* and *m*, then draw the horizontals on *pz* and *l*. It is now plain that we have a picture of one corner of the hopper, looking down from above, and that the next line drawn from *l* to *n* represents the miter cuts when the sides are together, but cannot be taken off on the bevel square from the paper, as the line *ln* shows a compound slant. To obtain the angle to put on the square, extend the line *pz* to *k* and from *k* draw a line to *l*. The angle formed by the lines *kl* and *kg* is the proper set for the square, or it may be set on the angle *tlk* if preferred, and the board laid off from the bottom edge.

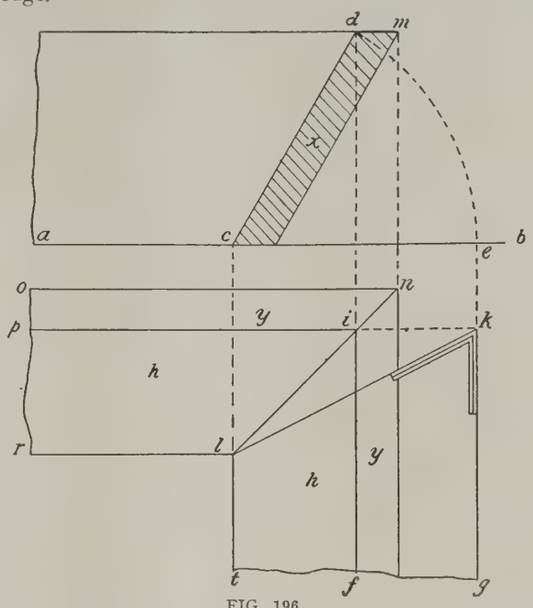


FIG. 196.

Now, whether the dimensions are given for the outside or for the inside, begin at the middle of the side, as directed in the previous example, measure out half the distance required, and from these points lay off the face marks. The workman should understand that in case the example calls for a hopper 6 feet square at the outside of the top, 2 feet deep, it will not be necessary for him to figure out how large the hopper would be at the bottom, for he will have the slant of the sides on his bevel square from the angle obtained, like that at *lkg* in Fig. 196. The method of applying the bevels is shown in Fig. 197.

If the piece is beveled off to the level on top before laying off the face cut, the workman may get his dimension marks on the edge of the top, outside or inside as the case may be, and from these points lay off the regular 45 degree miter cuts on the level edge of the board. The mechanic will understand that the surfaces represented by *yy*, Fig. 196, are the same as the top of a regular square box, and as they are horizontal or level surfaces, the miter will be regular across the corners; but if he would lay the miters cut before the tops are beveled, he must use the angle *lkg*, Fig. 196. If he lays out the corners with

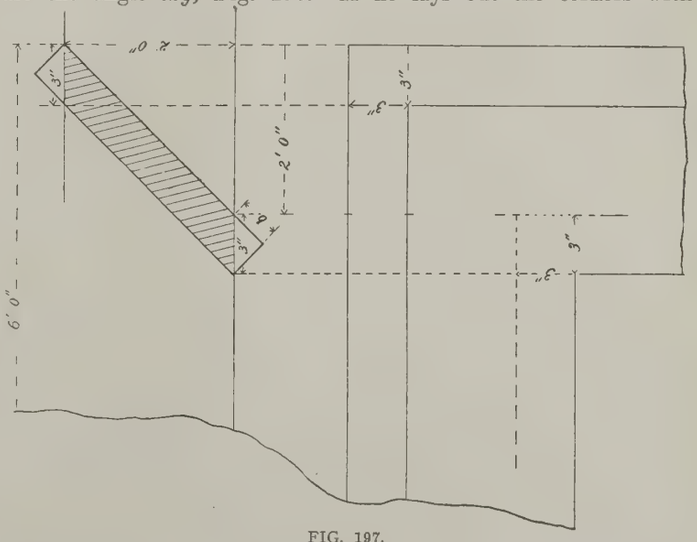


FIG. 197.

the miter square, he may then make all his face marks with the bevel square set at the angles shown in Fig. 196.

In Fig. 198 is shown a method of laying out a splayed hopper with mitered corners, wherein no diagram is made to find the miters for the corners, but the simple plan shown which is similar to Fig. 196, and is designed to show the width of the side, the bevel of the top and bottom edges, and also how much larger the hopper is outside than inside.

OUTDOOR STORAGE CELLARS

ON every farm in any locality there is need of a good outside cellar. In cold climates they afford the best and cheapest winter storage for fruit, vegetables and bees. They are just as valuable in summer for keeping berries, milk and butter. In the southwest such cellars offer the only means of safety during cyclones. Because they can do all the work themselves, farmers everywhere are building their cellars of concrete.

BUILDING THE WALLS AND FLOOR.

The most popular size for the average farm is a cellar 10 by 14 feet, inside measurements, with a self-supporting arched roof 5 feet above the floor at the sides and 7 feet 8 inches in the center. All of the side walls are 8 inches thick, therefore dig the hole 11 feet 4 inches by 15 feet 4 inches and to the depth desired, usually 5 feet. At one end cut out the earth to a width of 4 feet 4 inches and slope it upward for seven concrete steps with a rise of 8 inches

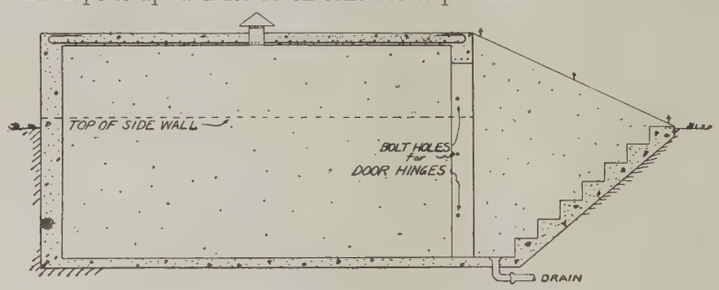


FIG. 1. LONGITUDINAL SECTION.

and a tread of 10 inches and for a thickness of 4 inches of concrete back of the steps proper. Arrange for an 18-inch landing at the bottom of the stair.

Make the side-wall forms of 1-inch siding on 2 by 4-inch uprights spaced 2 feet. As the concrete floor will be 4 inches thick, set up the forms on 4-inch concrete bricks. Above ground level use outside forms similar to the inside. To curve the end wall forms, lay them out with a 6-foot string in the same way as described below for arch rings. At the entrance end, to provide for a doorway, set between the forms a frame of 2 by 8-inch stuff 3 by 7 feet in the clear. Mix the concrete 1 part Portland cement to 4 parts bank-run gravel, or 1 part cement to 2 parts sand to 4 parts crushed rock. A sack of cement equals 1 cubic foot. With

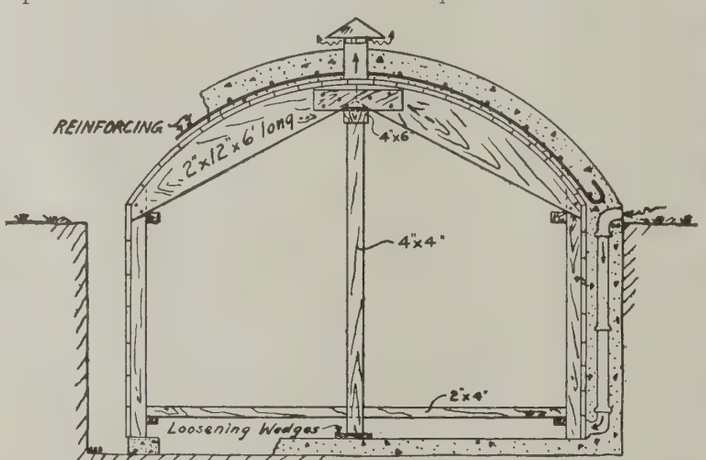


FIG. 2. CROSS SECTION.

the forms in place, lay the 4-inch floor the same as a sidewalk, but without joints. Fill the wall forms in 8-inch layers with mushy wet concrete, and 6 inches from the top of the side walls and 1 inch from the outside, place two ⅜-inch steel rods the full length of the cellar. In the concrete two inches above the door frame, lay three four-foot lengths of ⅜-inch rods. Roughen the top of the walls so as to insure a good bond with the roof. Build the stairway with a 4-inch thickness of concrete behind the steps proper. Each step has a tread of 10 inches and a rise of 8 inches. The side walls of the cellar hatchway extend above the door opening of the cellar proper, so that outside sloping doors may be added. In the top of the hatchway walls, while the concrete is soft, bolts are set heads down for holding the wooden sill to which the strap hinges are later attached.

THE SELF-SUPPORTING ROOF.

When the side walls are one week old, begin on the roof. To give the roof a rise of 2 feet 8 inches, arch rings are needed. For laying out the rings, choose a floor or a bit of level ground. To one end of a strong string fasten a pencil and tie the other end to a nail driven firmly in the floor with exactly 5 feet 11 inches of string between the pencil point and nail. Mark out half a circle. Across the circle lay a board exactly 10 feet long so that its ends just touch the mark. The part of the circle above the board represents the arched inside of the roof. Place boards for the arch rings over the mark on the floor and nail them together. Mark the curve upon them and cut them to the mark. Brace the arch well as shown in the drawing. Spacing the rings two feet apart, six will be needed. Fasten them securely in place to 2 by 6-inch liners spiked to the side wall forms. Cover the rings tightly with

With the roof form ready, place the reinforcement upon it. Use ⅜-rods 14 feet long. Space them 6 inches apart crosswise and 12 inches the long way of the cellar. Wire the rods together where they cross. The roof must be 5 inches thick. Carefully work exactly 1 inch of concrete between the rods and the sheathing. Tamp the concrete until the liquid cement flushes to the top and then finish the surface smooth by means of a wooden float and steel trowel. Do not stop for anything until the roof is finished. In two to three weeks the concrete roof will be strong enough to support itself; then the forms may be removed.

Ventilation is necessary for most cellars. While building the wall make one or more air-shafts (similar to a chimney-flue) of 3-inch tile, by imbedding them in the concrete wall, with an opening inside at floor level and another outside well above ground line. By this arrangement fresh air is admitted. Place a tile chimney



FIG. 3. THE COMPLETE CELLAR.

in the concrete roof and cover it with a galvanized iron hood for removing the foul air. If built late in the fall, protect the fresh concrete from freezng by covering it with clean straw or with old carpet so suspended as to leave a dead air space between the concrete and the covering.

Below is given a list of the materials required. The prices are higher than in most localities. If good screened pit gravel is used, no sand will be needed.

BILL OF MATERIALS.*

Crushed Rock, 13 cu. yds. at $1.10	$14.30
Sand, 6½ cu. yds. at $1.00	6.50
Portland Cement, 22 bbls. at $2.50	55.00
Rods, 40 Pieces, ⅜ in. x 14 ft., 206 lbs. at $0.02¼	4.65
Total	$80.45

*Consult local dealer for prices.

The cellar shown in the photograph is 18 by 18 feet by 8 feet deep. It is located on an apple farm. The owner finds it a profitable investment as he has his own storage and keeps his apples until the market is no longer glutted with "wind-falls" and "seconds."

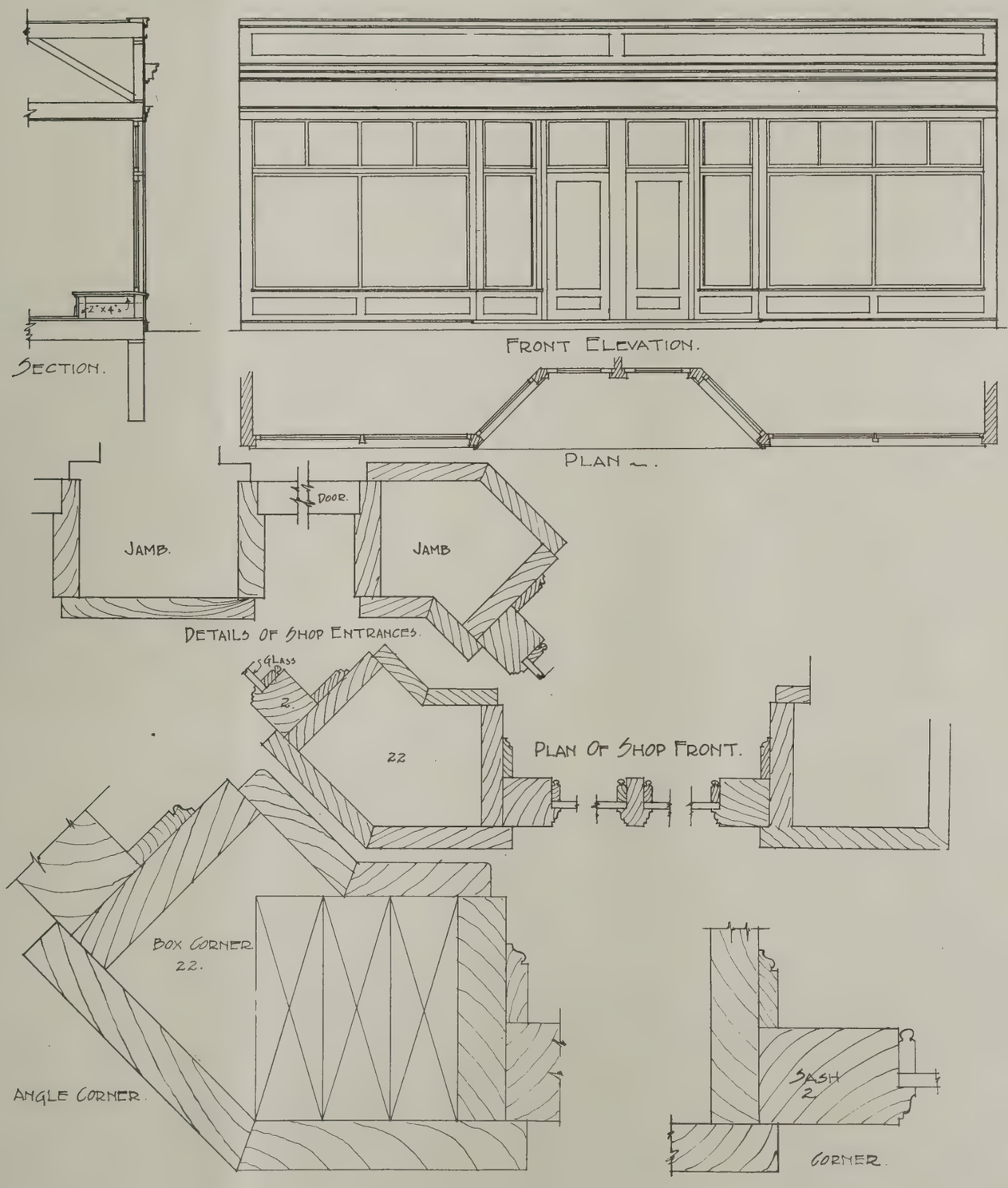
BUILDING BUSINESS ROOMS

DWIGHT L. STODDARD

IT OFTEN happens, not only in small towns, but in large towns as well, that business rooms are wanted, yet they do not go to the bother of getting a real architect to draw the plans, but leave it entirely in the hands of the carpenter to plan and build it. It is true it is very simple, as it is only a room enclosed, covered likely with a tar and gravel roof; yet as simple as it is, many carpenters find it difficult to arrange the main thing, which is the entrance.

I enclose drawings I have just finished for a building with two store rooms that is to do business on our street.

Note the elevation and construction, then notice the detail of the front. After studying the plan and smaller drawing, see the larger drawing of the sash, and then the general construction of the studding, jambs and casings. Note that three, two by six can be nailed together to form support for the front and then additional pieces can be nailed to them to form good nailing for the finish. Now, this way, a good support can be had for the front, something that is often neglected; the entrance can be built similarly, which makes a good support for the door jamb, and makes a good door, as, unless properly supported, the jamb springs and makes the door too loose or to tight, as the case may be.



Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Southern Ontario. Corrected by F. G. Frants.	Los Angeles, California, by Courtesy of B. & G.
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM S 2 S	M ft. BM R G
2″x4″ to 8″ up to 16′, No. 1	yp $20.00	h $24.00	op $22.00 to 24.00
2″x4″ to 8″ up to 16′, No. 2	16.00	22 00	21.00
2″x4″ to 8″ 18 & 20′, No. 1	21.00	26.00	23.00
2″x10″ up to 16′, No. 1	21.00	24.00	24.00
2″x12″ up to 16′, No. 1	22.00	25.00	24.00
2″x14″ up to 16′, No. 1	24.00	26.00	25.00
Each 2 ft. over 20 ft., add per M	1.00	2.00	1.00
Select stock as above, add per M	5.00	*	10.00
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
1″x3″ to 1″x8″, No. 1	yp $35.00	wp $35.00	rw $35.00
1″x10″, No. 1	35.00	40.00	36.00
1″x12″, No. 1	40.00	42.00	37.00
1¼″x3″ to 1¼″x12″, No. 1	42.00	45.00	50.00
1½″ and 2″ same as above	42.00	42.00	52.00
1″ drop siding, No. 1	25.00	35.00	26.00 to 30.00
½″ lap siding, No. 1	18.00	30.00	18.00 to 20.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM D 2 S
1″x4″ to 1″x8″, No. 1	yp $18.00	wp $30.00	op $25.00 to 30.00
1 x8″ to 1″x10″, No. 1	18.00	h 24.00	25.00 to 30.00
1″x10″, No. 1	18.00	24.00	30.00 to 35.00
1″x10″, No. 2	15.00	22 00	25.00 to 30.00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.
½″, T. & G. Flooring No. 1	yp $30.00	wp $40.00	op $40.00
½″, T. & G. Flooring No. 2	25.00	wp 30.00	35.00
Add for ceiling per M	1.00	1.00	1.50
Add for partition per M	2.00	2.00	2.50
⅜″x4″, Ceiling No. 1	25.00	np 30.00	27.50
	100 ft. run	100 ft run	100 ft run
4¼″ Moulded Casing	yp $1.85	wp 2.00	rw or op $3.00
4¾″ Moulded Casing	2.10	2.50	3.50
7¼″ Moulded Base	3.25	4.50	6.00
7½″x9¼″ Moulded Base	3.75	6.00	8.00
1⅛″x4¼″ Moulded Window Stool	3.00	4.00	7.50
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	re $3.50	be re $3.75	rw $2.75
Shingles, No. 2	3.00	*	1.75
Shingles, fancy	5.00	8.00	rw 3.75
Lath, 4 ft., No. 1	yp 3.60	wp 5.00	4.50
Lath, 4 ft., No. 2	2.75	s 3.75	3.50
Pickets, 1″x3″x4′ 6″, dressed	40.00	*	25.00
Pickets, 1 x3″x4′ 6″, rough	*	*	20.00
	Piece.	Piece.	Piece.
6″x8′ Post split	Cdr $0.13	*	re $0.30
8″x8′ Post split	.20	*	.40
8″x8′ Post whole	.44	Cdr $0.30	.50
6″x8′ Post whole	.25	.25	.40
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3.50	$2.85	$3.00
Nails, cut, common	4.00	3.00	3.10
Nails, wire, fine finishing	1.60	4.00	3.50
Sash Weights, cast iron	1.50	2.25	1.60
Tarred Felt Paper, best 2-ply	Roll. *	Roll *	Roll *
Tarred Felt Paper, 3-ply	*	*	*
Red Rosin, Atlas brand	.90	$3.50	*
Red Rosin, durable brand	.75	.60	*
Black Neponset	*	2.50	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*		$9.00
Brick, blue, at kilns, No. 1	*		6.50
Brick, blue, at kilns, No. 2			6.00
Brick, white, delivered, face	7.50		
Brick, red, delivered, backing	7.00	*	*
Brick, delivered, dry pressed	7.00	*	*
Brick, vitrified, dry pressed	18.00	$17.00	*
	*	*	*
Lime, best gray	bbl. $1.30	bbl. *	bbl. $1.80
Lime, best white	1.40	*	2.00
Cement, Portland	0.95	1.80	2.15
Plaster, calcined	2.40	bbl. $2 50	2.25
Hair, 8 lb. per bush	.25	*	0.48
		Plaster (patent) $6 per ton. White Rock $11.00 per ton.	

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

BUILDING TRADES INTERESTS IN THE COURTS.

Where, in an action for breach of a contract to construct a building for plaintiff according to a specific pattern, the uncontradicted evidence showed that the house constructed was not a substantial performance of the contract, it was the court's duty to grant a peremptory instruction for plaintiff.—Nance v. Patterson Bldg. Co., 131 S. W. (Ky.) 484.

Where defendant undertook to build a house for plaintiff which should be a duplicate of another at a specified price, plaintiff was under no obligation to bear the consequences of a misadventure in the work, such as defect of concrete work due to its being put down in frosty weather.—Nance v. Patterson Bldg. Co., 121 S. W. (Ky.) 484.

Where defendant contracted to built a house for plaintiff according to a sample, plaintiff was not required to accept a house which was not like the sample, though equivalent in value or utility, but was entitled to refuse performance if the structure tendered was different from that required, allowing only for immaterial deviations involving neither change of plan, material, nor general character of workmanship. —Nance v. Patterson Bldg. Co., 131 S. W. (Ky.) 484.

Where defendant failed to perform a contract to construct a house for plaintiff, and, after the house constructed had been refused, sold the same for $50 more than plaintiff had agreed to pay for the house contracted for, defendant, in an action for breach of contract, in which plaintiff sued for the earnest money and for the difference between the market value of the property if completed according to the contract and the contract price, was estopped to claim that the house would not have been worth at least $50 more than the contract price.—Nance v. Patterson Bldg. Co., 131 S. W. (Ky.) 484.

Defendant contracted to construct a house for plaintiff complete to duplicate another house, named in the contract. The house was not completed on the date specified, and it was undisputed that the foundation was different from the one taken as a pattern. The arrangement of the openings, doors, and windows was different, and the cement construction of the cellar was inferior to that of the pattern house, nor was the new house provided with suitable sewer or drainage pipe so as to carry off the waste water. There was a sink hole in the back yard which overflowed and foul water found its way into the cellar running a more or less constant stream through the same. It also appeared that some of the concrete work in the cellar and the tunnel to the street was cracked because of faulty workmanship and material. The stairway in the front hall was also 5½ inches narrower than in the pattern house. Held, as a matter of law, that there was no substantial performance by defendant, and that plaintiff was justified in refusing a tender of the house and could recover the money paid and the difference between the contract price and the market value of the property if the house had been completed as required by contract.—Nance v. Patterson, 131 S. W. (Ky.) 484.

That a contractor may recover for repairs to a building, he must show a substantial compliance with the terms of his contract, or that he did work upon or furnished materials for the building which were of substantial benefit thereto.—Keys v. Garben, 128 N. W. (Iowa) 337.

Where, in a contractor's suit to foreclose a mechanic's lien for repairs on a building, the evidence showed that he did his work in an imperfect and negligent manner, and conferred no real benefit on the property, which was not in as good condition as when he commenced work, there was no substantial compliance with the terms of the contract, and he was not entitled to recover.—Keys v. Garben, 128 N. W. (Iowa) 337.

Where certain mechanics and material men, constructing a building for a bankrupt, had claims for which they were entitled to liens, such liens were not canceled, either in whole or in part, by several book accounts for supplies furnished by the bankrupt to the lien claimants; the right of set-off being permissive, and not obligatory.—In re Kyte, 182 F. (U. S.) 166.

Where, in an action on a building contractor's bond, conditioned for the erection of a building and delivery of the same free from claims to plaintiff, the obligee in the bond, who had contracted with the owner to erect the building, the evidence showed that it was the custom of plaintiff to receive payments in acceptances, and that the contractor knew of the custom, and that before an acceptance was received by plaintiff and charged against the contractor the latter was informed that the same was for lumber furnished to him for the building, and that the contractor checked over the lumber bill which the acceptance was to pay, and acceptance was properly received in evidence, though on its face it showed no connection with the building in question.—Caldwell v. Concho Building & Loan Ass'n, 131 S. W. (Tex.) 625.

A contractor for a building, who let the contract to a third person, who gave a bond conditioned for the erection of the building and the delivery of it to the contractor free from claims, need not see to it that payments made by him to the third person on account of the building are actually so applied by the third person, and the surety on the bond may not escape liability by merely showing that the third person did not apply payments received from the contractor to materials acquired for the building.—Caldwell v. Concho Building & Loan Ass'n, 131 S. W. (Tex.) 625.

BOOK NOTICES

In reviewing "The Library of Work and Play Books," last month, we stated the works could be purchased singly. The publishers, Messrs. Doubleday, Page & Co., of Garden City, New York, inform us the work can only be obtained in sets of ten volumes, the price of which is $17.50. We make this correction so that readers about to send for single volumes may know the conditions.

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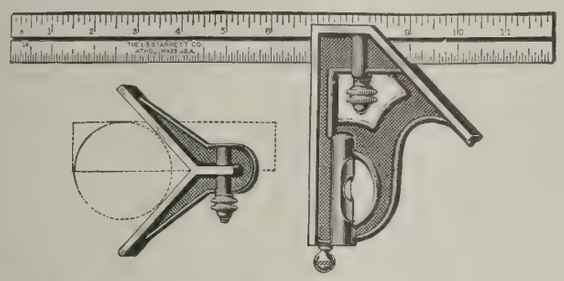
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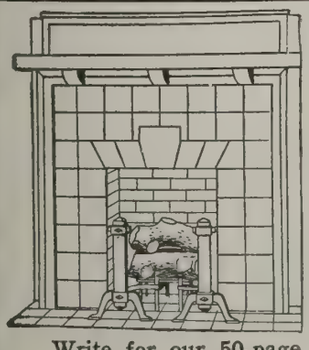


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There have always been locks and hinges of some kind, but the door check is distinctly the product of modern civilization and it has only been within the past few years that they have been in extensive use in residences. There is good evidence, however, that they will be in general use very soon, for those who have ever used them always want them, and the builder who induces his client to let the door checks go in comes in for especial thanks. Sargent's door checks will be found equal to the rest of the line in smooth working efficiency and durability. They are easy to attach and adjust, from the fact that they work either left or right handed without having to change the parts, and the patent adjustable feet is an exclusive feature that also greatly simplifies attachment. The company issues a special booklet on the subject of door checks which it will pay any builder to get.

By the way, why not take advantage of the long years of study and experimenting which the Sargent company have given to hardware problems? It has cost them a great deal of money, but will cost you nothing. If you will write Sargent & Co., 53 Leonard street, New York, mentioning about the kind and cost of house you are planning you will be sure to get literature that will be helpful and instructive.

THE HUMMER GRINDER.

The man who makes two blades of grass grow where one grew before has little or nothing on the man who can decrease by one-half or more the time or effort it takes to do necessary work. Where would we be without the many time and labor-saving devices, such as steam engines, sewing machines, etc.?

In the building trades there has been a constant endeavor to cheapen construction by various means—labor-saving machinery cuts up the lumber formerly hewn out by hand, pneumatic tools take the place of sledge and hammer. But there is still a great deal of hand work necessary. Tools must be replaced and sharpened and one of the greatest improvements has been along the line of shortening the time necessary to repair, replace, sharpen, etc.



The Luther Grinder Manufacturing Company, 219 Madison street, Milwaukee, have for several years had their grinding machines on the market. A recent improvement consists in the grinding agent, which they call Dimo Grit from its consisting of microscopic diamonds. This gives a peculiar fast cutting quality not obtained by other materials and many times faster than the old-fashioned grindstone. Not the least qualification claimed for Dimo Grit for fine works is the fact that the grinding will not injure the temper of the finest edged tools.

The Luther Grinder Manufacturing Company have recently sent out a large catalogue showing the manufacture of Dimo Grit in the terrific heat of the electric furnaces at Niagara Falls. The catalogue also gives much detailed information regarding sharpening tools and should be in the hands of every mechanic. Send for catalogue showing cut-off, rip and jig-saw attachments for small shops.

ISOMETRIC PERSPECTIVE OR PROJECTION.

There are frequent occasions when a perspective drawing of an object will convey a much clearer conception than any number of plans, elevations, sections, etc. The perspective stands out as the true appearance of the object and it is possible to show the object as it will look completed from any angle or point of view.

Few mechanics and not all draughtsmen, possess the faculty of making proper perspectives. The laws governing them are rather complicated and call for some study and practice to become proficient.

Isometric drawing, while the name is formidable, is really a simple method of showing an object so that its principal dimensions, lengths, breadth and height are shown in their true length. To some extent it resembles perspective work, but lacks the diminishing effect of distance and entirely eliminates the horizon line, vanishing point and station point. In effect it takes the place of both plan and elevation as the lines which are ordinarily shown are the true length and can be measured or dimensioned with accuracy.

The Norman W. Henley Publishing Company, 132 Nassau street, New York City, have prepared ruled paper by which this class of drawing is greatly simplified. It is only necessary to trace over the lines to get a representation of any object and with the outline given it is a simple matter to complete intricate drawings.

We understand that the Henley Publishing Company will send further information and sample sheets to those who mention the NATIONAL BUILDER.



Look for the "Big Chuck" when you buy a brace

THEN look for "The MARK of the MAKER" and you can be sure it's a

P.S.&W. "SAMSON"

YOU can't mistake the Samson Ball-bearing Chuck. It fits the hand comfortably and the weakest wrist can release it instantly, or get a tighter grip than you can get with any other brace by using a vise.

The Samson is the top notcher in the most complete brace line on the market.



Don't forget to look for the trade-mark. It stands for 92 years of experience, ability and progress in tool-making and is put on every item in our line of Guaranteed Tools for Carpenters.

P. S. & W. Guaranteed Chisels

THIS is another of our guaranteed lines that you ought to know. It leads in the big things—variety, completeness, quality, design, workmanship; and it leads in every little detail—finish, temper, perfect fit of handle and shank, blade ground to a sharp edge, etc.



Write today for our Free "Mechanics' Handy List," a 170-page book containing 35 pages of valuable information and a complete catalog of over 200 tools for Carpenters, Machinists, Electricians and Tinsmiths.

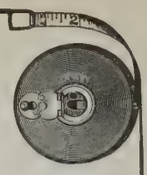
THE PECK, STOW & WILCOX COMPANY

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Established 1819 Address correspondence to 32 Murray St. NEW YORK CITY Five Large Factories

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

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With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

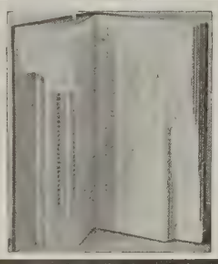
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New York - Windsor

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By FRED T. HODGSON, Architect

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NEW and up-to-date. Do not mistake this edition for the one published over twenty years ago. This is the latest practical work on the Steel Square and its uses published. It is thorough, accurate, clear and easily understood. Confounding terms and phrases have been religiously avoided where possible, and everything in the book has been made so plain that a boy twelve years of age, possessing ordinary intelligence, can understand it from beginning to end. It is an exhaustive work, including some very ingenious devices for laying out bevels for rafters, braces and other inclined work, also chapters on the Square as a calculating machine, showing how to measure Solids, Surfaces and Distances—very useful to builders and estimators.

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The book is so indexed that you can instantly find the proper table and as surely know you are right.

One mistake in figuring the old way costs you many times the price of this book.

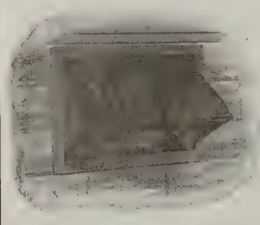
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State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO

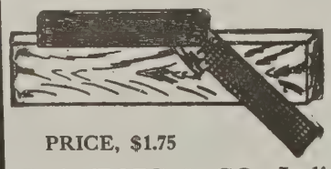


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Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

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Topp's Framing Tool A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



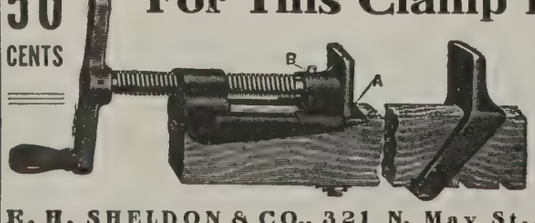
Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.

PRICE, $1.75

G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.

50 CENTS For This Clamp Fixture



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

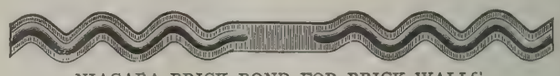
Write for Catalog of Sheldon's Clamps and Vises

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NIAGARA BRICK BONDS.

The use of face brick is made practical only by a means for tying the face brick to the common brick backing, for the common brick is, as a rule, considerably larger than the face brick. Where a thin putty joint is used, as in the better class of work, the disparity in size is even more noticeable. In some sections of the country an attempt is made to bond the face brick in by headers whenever the courses come together, but this takes additional brick, and the headers do not improve the appearance of the front of the wall. Sometimes the face brick have the inside corners clipped to allow a common brick to toe-in to the facing. Many face brick are broken in this manner, and the resulting job is not as strong as a wall in which the brick are all properly bonded.

To accomplish ideal results, the use of metal wall ties are indispensable. While these are made in several designs, the one shown



NIAGARA BRICK BOND FOR BRICK WALLS.

herewith, as made by the Niagara Falls Metal Stamping Works, have several features of interest. It will be seen that the shape is such that considerable effort will be required to affect them when built in the wall. The makers claim that a single tie will stand a breaking strain of 1,000 pounds, so that it will be seen that the face brick can be firmly held in place.

For brick veneer buildings a somewhat different tie is required, as shown in the lower cut. This permits a firm nailing against the



BONDS FOR VENEER ON WOOD FRAME.

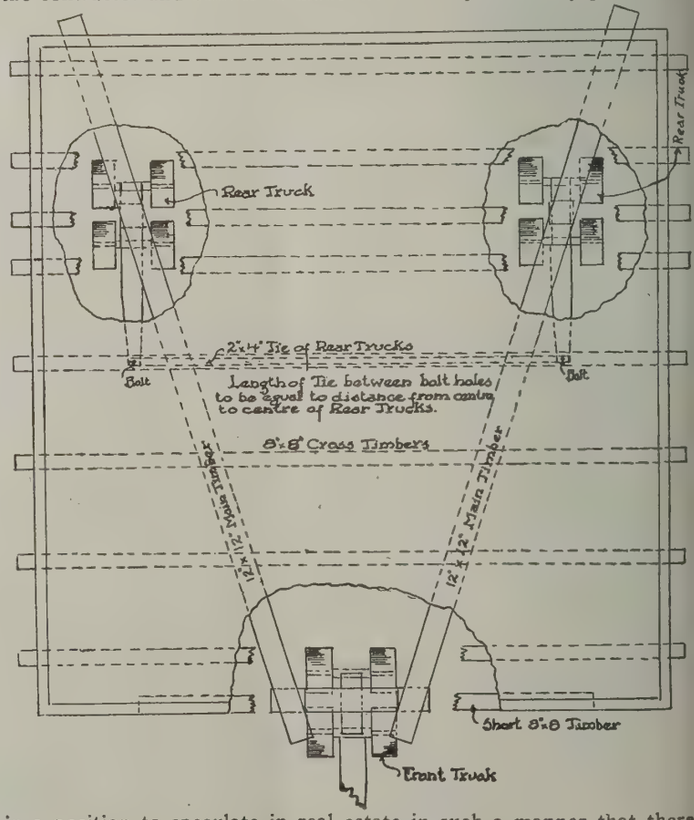
sheathing, while the peculiar shape of the tie prevents its slipping out.

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., has just issued a pamphlet describing these ties, as well as some of the other goods they manufacture, and will, we understand it, send this free to anyone asking for Pamphlet 57B. Every builder and mason should be posted on these goods, as there are frequent occasions when they can and should be used.

HEAVY HOUSE-MOVING MACHINERY.

The easiest way to meet the high cost of living and have the luxuries for yourself and family is to earn more money. The contractor who uses his gray matter nearly always succeeds, while the man who plods along with his eyes shut to the many opportunities for making money right near home continues to throw out remarks about the high cost of everything.

The illustrations shown with this article suggest a new way for the contractor and builder to make more money. It really places him



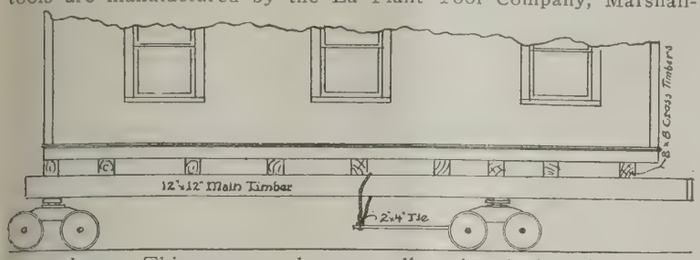
in a position to speculate in real estate in such a manner that there is not one chance in a hundred for him to lose out.

Suppose the contractor has a job which necessitates the removal or wrecking of an old residence. It takes time to wreck a building, to divide up the lath, the flooring, the siding, timbers, etc., pile them up around the building, and then cart them away for storage. Even if the contractor can use some of these materials on another job, or can sell them at a fairly good profit, there is not the money in it for him that he can get for the whole building. Suppose instead of wrecking the old building he can place it on three sets of trucks or

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

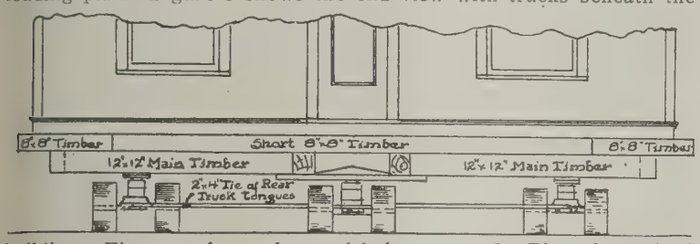
wheels, move it a mile away to some other lot, and then, after fixing it up a little, sell the house and lot at a good profit.

The old way of moving a building is a hard and unsatisfactory job, but modern methods have made it possible to move large, heavy residences and other buildings a considerable distance in a very short time. The best up-to-date, heavy house-moving machinery and tools are manufactured by the La Plant Tool Company, Marshall-



town, Iowa. This company have a well equipped plant for making heavy house-wrecking steel trucks which have proved a wonderful success for contractors and builders.

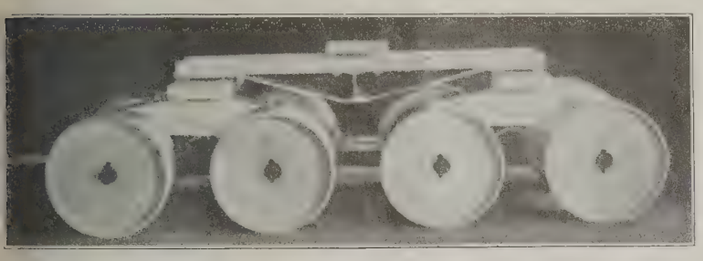
The illustrations shown in this article will give a pretty good idea of the whole system of moving heavy buildings quickly from place to place. Figure 1, for instance, shows the method of loading the building on timbers and trucks. Figure 2 shows a side view of the loading plan. Figure 3 shows the end view with trucks beneath the



building. Figure 4 shows the steel bolster on a La Plant four-wheel truck.

Figure 5 shows a large frame building being moved away from a lot where a new building is to go up and being taken up to another place.

A La Plant outfit generally consists of three trucks of two, four



or eight-wheel type, which are capable of moving a large sized building. The rear trucks have a short tongue five feet long and are kept together with 2 x 6 cross-ties to keep the trucks in line with each other and in proper relation to the front truck. Each rear tongue is hung to timbers above with chain or rope. The trucks are built on scientific lines that are both practical and mechanical. They are constructed on an interchangeable system whereby they may be worked singly, in pairs or in fours, to meet the requirements of the job.



The contractors and builders who are now using the La Plant Tool Company's outfits are very enthusiastic over them. Reading matter, showing many illustrations of houses being moved and views of these steel wheel trucks, can be had at once by writing the manufacturers.



Asbestos "Century" Shingle Roof—Eighth Church of Christ, Scientist, Michigan Avenue and Forty-fourth Street, Chicago, Ill.
Architect, L. E. Stanhope, Chicago, Ill.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

The time to think about the durability of your client's roof is *before* you put it on—not after the repair bills begin to bother him.

Look over all the roofings in the market.

You'll find that only one is truly permanent—Asbestos "Century" Shingles, made of *reinforced concrete.*

Asbestos "Century" Shingles are protected by basic patents. They are the only *practical* roofing made of reinforced concrete in the world today.

You can get Asbestos "Century" Shingles in shapes to suit any architectural style—in several sizes—and in three colors: Newport Gray (silver gray), Slate (blue-black), and Indian Red.

Send for quotations, and booklet "K. & M. 1911."

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The
KEEN KUTTER
JUNIOR
$1.00 Safety Razor

has done, and is doing, a great deal for a nation of shavers. It has changed a necessary toilet operation from a disagreeable ordeal into a pleasurable experience. Not because it is big and costly, for it is neither —but because it shaves easy, fast and smooth—with no effort and no trouble.

This perfect little razor lies on the face *flat,* and at just the angle necessary to shave *diagonally.* You couldn't make it shave wrong or skip or jump if you tried to, and as for the quality of the job—the best barber in the land couldn't improve on it.



No. KJIION
KEEN KUTTER
JUNIOR
NICKEL-PLATED
PRICE $1.00

Keen Kutter Junior Safety Razors are *fully guaranteed.* That means that what we've said about it is true or you—the purchaser—will get your money back.

A Keen Kutter Junior Safety Razor and a Keen Kutter Strop and Stropper are a combination hard to beat.

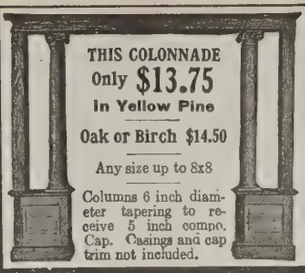
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THIS is positively the best Colonnade for the price in the market today. We want every Contractor and Builder to take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

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Contains the designs of over one hundred bungalows and cottages suitable for summer homes. Prices range from $800.00 up. You can secure from us blue prints and specifications of any designs shown in this book. Order this book, as you will find in it just the design needed for that summer cottage. Remember the price is only $1.00.

Porter, Taylor & Co., 358 Dearborn St., Chicago

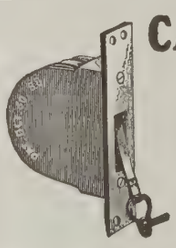
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PARKHILL PITCH GAUGE

on a square gives the easiest method ever devised to mark roof framing—and by far the quickest. Complete framing for **any** roof pitch—of hundreds—marked on the timbers inside of 5 minutes. Any hip in a few seconds (7). And in 17 seconds all the following:—Side bevel for jack; miter bevels for roof sheathing, facia, plancher, purline, and a hopper; also length and cuts for an irregular hip. Other cuts, etc., with equal ease and speed.

The PARKHILL PITCH GAUGE has no equal AS A STAIR and BRACE GAUGE

See illustration in National Builder for September. If these statements strike you as strong, it costs nothing to verify them, as a Gauge Set with directions will be sent you prepaid for $1.50, with the privilege of returning it inside of 30 days and get your money back.

JOHN PARKHILL, Reference—First Nat'l Bank **ROCHESTER, MINN.**



CALDWELL SASH BALANCE

Does away with weights and cords and VASTLY more durable.

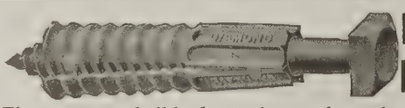
Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N.Y.



Diamond "N" Expansion Shields

The corrugated ribbed exterior surface gives increased holding power. The longitudinal ribs at the outer end of the shield prevent the shield from turning when the screw is inserted.

THEY HOLD AS LONG AS THE WALL LASTS

DIAMOND EXPANSION BOLT CO.
90 WEST STREET, NEW YORK.

Improved Quick and Easy Rising Steam
Electric and Hand Power Safety

ELEVATORS



and Dumb Waiters, Automatic Hatch Gates
SEND FOR CIRCULARS
KIMBALL BROS. CO., Council Bluffs, Iowa

GOOD ADVICE FOR COLD WEATHER.

The Chicago Portland Cement Co. are sending this bulletin to contractors.

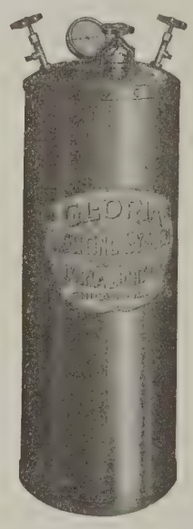
Don't let the weather deceive you—the days are warm, but the nights and mornings are cold. Cold weather is not conducive to quick setting, and long time sets mean slow hardening, thus reducing the strength of the concrete for a considerable period.

Mr. Contractor, as a precaution, watch the weather—give your work ample protection, and most important of all—heat the materials and the water. This will insure satisfactory work.

IMPROVED LIGHTING SYSTEMS.

Did you ever stop to consider that the main advantage of day over night was the matter of light? This one quality alone describes all the physical conditions—the only conditions we can perceive with our senses. The only way we can turn night into day is by a flood of light.

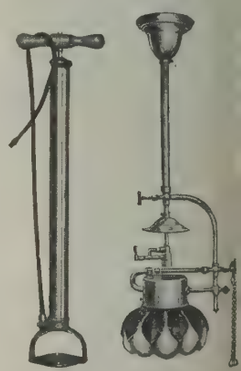
For ages man depended on sunlight for all of his hours of labor and business. To be seen about at night was tantamount to being on an evil errand and this same rule holds true to this day in many plases where modern lighting methods have not been installed.



From a business standpoint, plenty of light is indispensible. There is no better advertising medium, and it brings the largest returns for the money invested. The most prosperous stores are those that are best lighted. A poorly lighted store does not attract trade, as its gloom lacks invitation and conveys no suggestion of the good things which are displayed on the counter. Personally, now, would you enter a poorly lighted store in which you could scarcely find your way about, or a brilliantly lighted store, where every detail stands out plainly, and the goods are presented as well as in daylight?

A great many stores depend on the gas and electric light companies. Where the service is good, the results are good, but often costly. In the smaller towns and cities, the electric light companies have a custom of shutting down sometimes at 11 p. m., sometimes at midnight, and not running at all during the day.

It is for places such as these, requiring good lighting at a reasonable cost, that the Gloria Light is designed. In principle it consists of a tank, placed where convenient, in a shed or room outside the buildings entirely, from which tubing extends to the lighting fixtures or lamps. A few strokes on the pump is sufficient to keep the system in operation for several days, and the light is available at any time, day or night. These systems can be easily installed after the building has been erected and is in use. By the use of these lights, both the interior and exterior of the store or residence may be brilliantly lighted at a minimum of cost.



Each lamp is independent of all the others, so one or more can be turned out without affecting the others. It is also to be noted that there is nothing to wear out or be replaced except the mantels, which are the same as used in ordinary gas lighting.

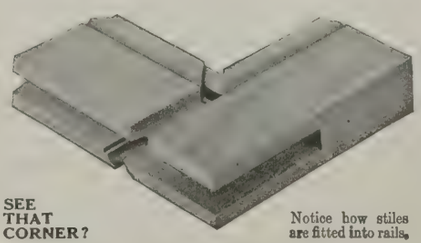
The Gloria Light Co., 1265 Washington boulevard, Chicago, Ill., claims that this system is ideal for the small store, whether in city or country, and for residences, whether within the limits of commercial gas or not. The information which they are sending out to interested parties is interesting and instructive, and we urge everyone to take advantage of their liberal offer.

Misuse of Tools

There was a fellow in our shop,
His work was at the bench,
And every time he struck a blow
He used the monkey-wrench.

And when he found his wrench was gone,
With all his might and main,
He went and got his neighbor's wrench
And commenced to strike again.

—Exchange.



MADE TO ORDER FLY SCREENS and SCREEN DOORS

WE use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th St., Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

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WHEN YOU GET TO **SASH CORD** USE **SILVER LAKE**

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



SILVER LAKE BRAIDED SASH CORD

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THE STANDARD

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For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but **one coat of paint.**
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
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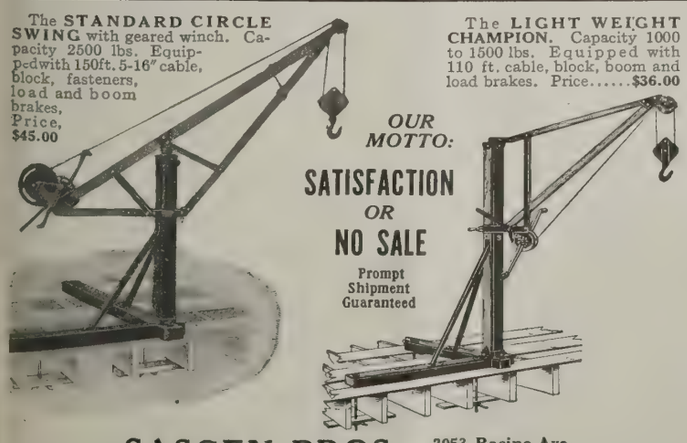
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Our co-operative department gives complete instructions for laying
BAYONNE or GULF STREAM
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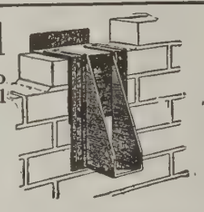
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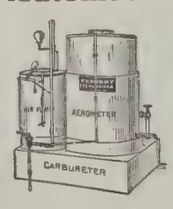
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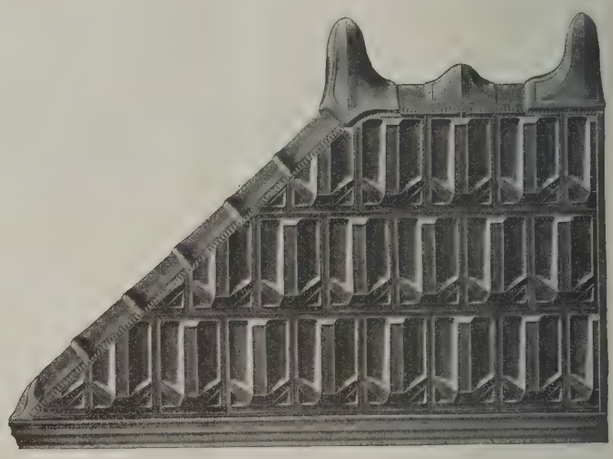
METAL TILE ROOFING.

In the erection of our houses we have a double duty to perform. We must make the building satisfactory to the owner to live in, and we must also make the outside appearance such that there is no reason for unfavorable criticism. Too often we seem to work with a total disregard for our neighbor's artistic feelings, and frequently say the law gives us the right to make our buildings as ugly as we wish. It is only too true that there is no law to compel one to be artistic, but we sometimes wish there were. When we see a barn-like structure disfiguring a fine residence district, or a three or four-story tenement perched on a narrow lot beside some beautiful lake where land is plenty, we wish there were an art censor.

Why should not the exterior be as pleasing as the interior? Why should we buy cut glass for the sideboard and the poorest quality for our front windows? Why should it be "nothing too good for the parlor; nothing too cheap for the roof"?

We frequently hear of leaky roofs. Oh, yes, some people expect a roof to leak! Do we ever hear of a basement wall being faulty? Sometimes, and then the builder catches it from all sides. But why spend money for an elaborate cut stone foundation and watertable, and cover the roof with the cheapest grade of shingles and know, yes, know, that in a few years you will see water stains on the ceilings and find the things in the attic all soaked and winter almost on you. The first time this happened, the was possibly a little excuse for it, for no one knew any better, but in the light of present day knowledge, one is going right against the recognized principles of construction when anything but the best is put on the roof. Submit it to an expert and see what you hear.

For many years the value of sheet metal for roofing has been generally recognized. As a protection from weather it is rain, snow and wind proof. As a protection against fire, it will hold out until the framing is burned from beneath it, and has even been known to hold in and practically check a fire by settling down like a blanket. Thus, for utility, metal excels, and as for appearances, one can get the same detail as in stone or any other material, as well as some designs which belong entirely to metal.



METAL TILE WITH RIDGE AND HIP FINISH.

As to the form of roofing, there is a wide choice. It may be in large sheets, as corrugated iron, used on factories, sheds, etc.; in flat sheets for flat roofs of apartment houses, stores, etc.; or it may be in highly ornamental stamped plates or tiles.

While resembling in finish the clay tiles used both here and abroad, they have none of the disadvantages of the clay product. Being stamped in the same press, they are all exactly the same size, not subject to shrinkage in burning, and the edges are so thin and flexible that they can interlock, making a perfectly tight roof. It is generally said that a clay tile roof is as tight as the tarred felt put on under the tile, but with metal tiles there are no open joints for the snow and rain to blow in.

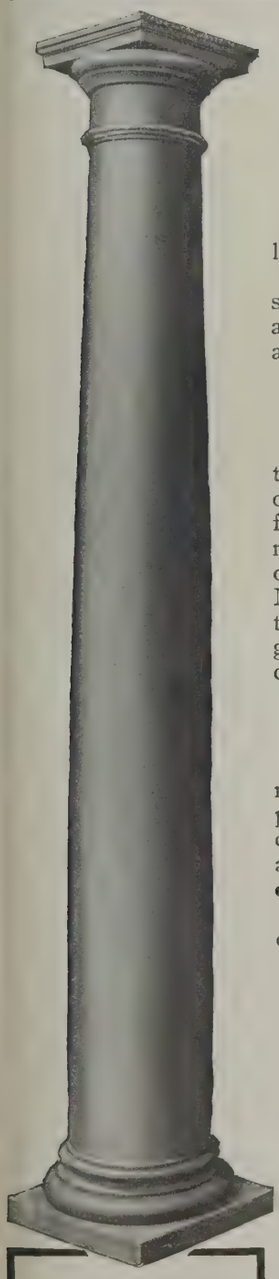
Among the manufacturers of metal tiles and roofing, the Kanneberg Roofing and Ceiling Co., Canton, Ohio, are prominent. With an experience of twenty-five years in the sheet metal line, they are fully competent to understand the most exacting requirements in the roofing line. Their catalogue "E" showing several styles of tiles, as well as the various other shapes necessary to go with them, is being sent out to interested carpenters and contractors. If you are not on their list, write them at once. We understand that if THE NATIONAL BUILDER is mentioned they will place your name on file; not only for catalogue "E" but for future information as it comes from the press.

"DURABILT"

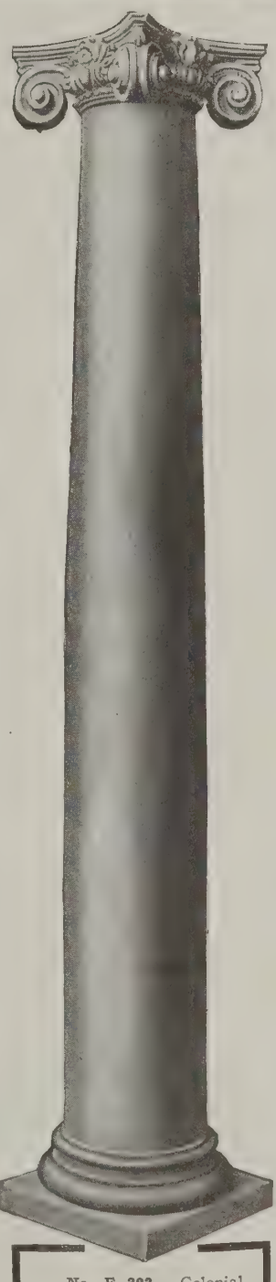
"Durabilt" is the trade mark for Harris & Cole Bros.' red gum and oak trim and moldings and red gum and oak finishing lumber. It is a well known fact that when a manufacturer places a trade mark on his goods everyone has more faith in it. The architect, contractor and builder know where to go and go quickly if anything is wrong in regard to quality and manufacture.

The Harris & Cole Bros. are the first in the building field to trade mark trim, moldings and finishing lumber. It is their intention to specialize on fine red gum and oak. The accompanying illustration shows a piece of quarter-sawed red gum taken from stock. The upper end of this piece shows a small strip of sap red gum and shows the beautiful richness and coloring of this wood. It is enough to convince the most skeptical that a residence finished in Red Gum would be something that everyone would admire and want.





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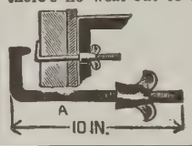
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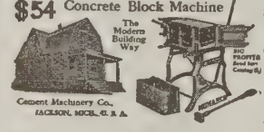
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"I thought it meant Portland, Me., where it's made."

"It is none of your business to think anything. You are wrong, besides. It means Portland, Ore., and the West must pay for all its advertising in this sheet, or I'll know the reason why."

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Harris & Cole Bros. have a large, well equipped factory at Cedar Falls, Iowa, and have been favorably known to the lumber industry for many years. Architects and contractors who are laying out their work for next year would do well to specify "Durabilt" Red Gum or Oak trim, molding and finishing.

To give our readers an idea of the beauty of red gum manufactured by this company, Mr. Harris states that while visiting the plant of a large automobile company a short time ago and during a conversation with the officers, he pulled out of one of his pockets a piece of Red Gum Casing, No. 8309, finished with just one coat of white shellac on both sides, both edges and at the ends. He asked the officers of the automobile company and some of the workmen what kind of wood the piece was. They all replied, "Circassian Walnut." Then they stepped over to their finished cars and put Mr. Harris' piece of Red Gum Casing beside their material and remarked that they used nothing but Circassian Walnut in certain parts of their automobile, and called attention to the fact that both were the same woods. The Red Gum sample resembled Circassian Walnut so closely that even the most expert workers and handlers of fine interior woods could not tell the difference.

Red Gum is daily gaining many enthusiastic friends. The one thing necessary to do in specifying and using Red Gum is to take a few precautions in manufacturing and placing it in the building. It is well for the architect, contractor and property owner to be sure that the mill in which the job for the interior finish is to be done, is



PANEL OF "DURABILT" RED GUM.

a well equipped plant and one that can properly handle Red Gum to get the finest effects. In that case, there is one chance in a thousand which might occur where the wood is not understood.

Harris & Cole Bros. in placing the "Durabilt" trade mark on their materials are really giving a guarantee as to quality and workmanship. A building finished in "Durabilt" Red Gum would pass for Circassian Walnut. If the property owner did not care for that finish, he could have Red Gum finished to resemble the finest mahogany. Of course, the difference in cost between Circassian Walnut, Mahogany and Red Gum would be well worth considering.

The sample of red gum shown in above cut was furnished by the Waterloo Varnish Co., Waterloo, Ia.

"Durabilt" stands for quality, fine workmanship and beautifully grained Red Gum and Oak.

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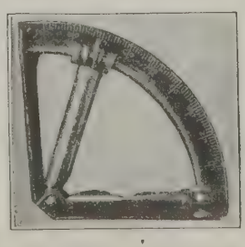
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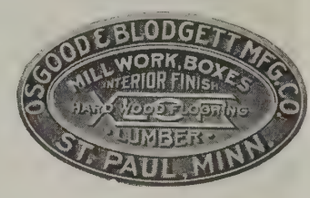
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While maple flooring is well liked, and specified by many architects, contractors and property owners, yet for those who want a high class wood flooring at a lower price, Wisconsin birch will fill the bill, besides having a number of other good qualities not found in maple.



For instance, birch makes a rich-colored, handsome grained floor—that stays in place as well as maple. Property owners sometimes object to hardwood flooring on account of the danger of the rugs slipping. This objection is done away with where birch is used, for rugs do not slide on it as on maple or other woods. Birch is not slippery and is, therefore, easy to walk on. Besides, it is practically noiseless. Well seasoned birch flooring will last as long as the building and wear as smooth and as long as maple.

The Osgood & Blodgett Manufacturing Company, Twenty-seventh and Duluth streets, St. Paul, Minn., with an experience covering more than thirty years continuous hardwood production state that a whole house can be floored with their birch cheaper than with knotty first fencing.

Their X L C R, 3/8-inch birch flooring, having extra strong tongue and groove as shown in the accompanying illustration is well liked by not only architects and contractors but also by the carpenters, who find it very easy to lay. While it may be true X L C R hardwood flooring is better known in the northwest than in some of the neighboring states, yet its high class grades and fine appearance when laid and long wearing qualities are gaining many new customers for it.



A sample of X L C R birch flooring will be sent postpaid to readers of THE NATIONAL BUILDER and those interested in a mighty good low cost flooring.

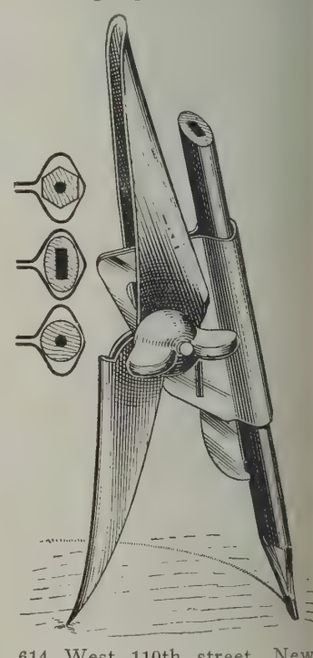
Many lumber dealers are carrying X L C R flooring. The Osgood & Blodgett Company also manufacture a very fine Michigan rock maple, oak, black walnut and cherry flooring; all under their own trade mark.

POTTER BROS. SPECIALTIES.

How many times we try to do our work with improper tools, and how much needless work we do to get our work right, when the whole trouble is our lack of proper equipment. Suppose we set out to make some nice dowelled joints. The holes should all be exactly the same depth, but how many of them are? We fuss and worry at the job for a while, and then perhaps fit a block to stop our bit at the right place. There is a little tool made to help right at this place. The Peerless Flexible Bit Gauge is readily attached to the shank of the bit, and indicates exactly when the right depth is reached. As the indicator is flexible there is no danger of marring the face of the work or catching and throwing the bit off when boring a shallow hole.



Another tool of great utility is the Peerless Scriber, also shown on this page. How often it is necessary to draw a circle on a rough board, and how hard it is to do it without the proper tools. A scriber of this character is free from many of the inconveniences of the old fashioned compass, for it is strongly made and will accommodate any kind of a pencil or the ordinary scratch awl without adjustment. The manufacturers of these two articles, Messrs. Potter Bros., 614 West 110th street, New York City, advise us that they have had a wonderful sale for them—orders for 300 dozen frequently coming in from the large hardware concerns. So general are the sales that it is probable your local hardware dealer can supply you. If not, write direct to Potter Bros., 614 W. 110th st., New York City.



Every carpenter should have these two handy tools in his kit. The first man to use them on a job will find them the handiest in his entire collection.

A girl's heart is naturally light when she strikes a match.

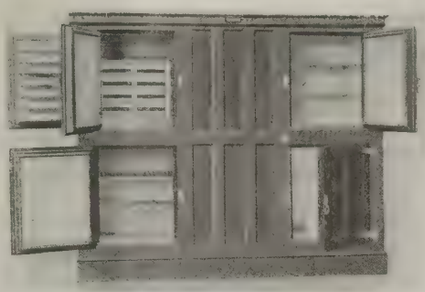
Leading a woman to the altar is usually man's last act of leadership.

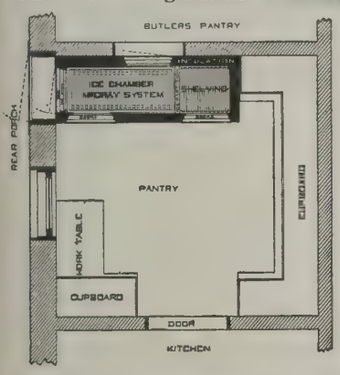
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The plans of well built homes are not complete unless they include McCray Refrigerators. We will build one to order or co-operate with you in adapting one of our stock size refrigerators to your plans. Let us know what space is at your disposal and we will give you our advice free of charge. The illustrations show one of our special refrigerators and its location in the house. The arrangement shown here is a very convenient one as the entrance to the storage compartment can be had from either the Butler's Pantry or the Kitchen Pantry. Write for our free book, "McCray Refrigerators in American Homes" which shows many convenient arrangements





for both built-in and stock refrigerators.

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and the first cost is not all important—it's the first cost plus repairs.

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RED CEDAR SHINGLES
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because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

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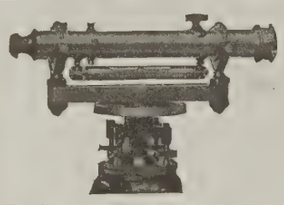
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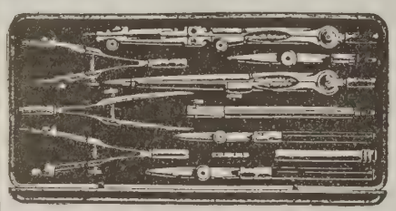
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$15 SAVED ON EVERY FRAME HOUSE YOU BUILD WITH

Wheeler Safety Scaffolds

No lumber or nails used—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

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AMERICAN STEEL SCAFFOLD CO., 60 McGraw Bldg., **Detroit, Mich.**

ART of PRACTICAL WOOD CARVING

By Fred T. Hodgson

PRICE: 12MO, CLOTH $1.50—HALF LEATHER $2.00

THE lessions given in this new book lead the young workman by easy steps until he is able to turn out work of a creditable character. The use and care of carvers' tools are given and explained and the tools described and shown by illustrations, with methods of sharpening and honing the tools. All kinds of appliances are shown, described, and illustrated, for holding the work, and for preparing the tools and finishing up the carvings. The various styles of carving are fully described, such as Flat Carving, Chip Carving, Incised Carving, Scratch Carving, Figure Carving, Carving in Relief, Round Carving and Jewelry Carving.

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How to Take Care of a Chamois Skin

Mostly they are not real chamois skins at all, but simply washleather, the product of a young goat or kid. Never leave the skin in water after using. Wring it out dry and spread out carefully, then hang it up to dry. Never put it in hot water, for that will make it tough and harsh. An old skin is better than a new one, if taken care of, for then it has no lint, as a new one has. When dirty wash out with clean water and white soap, and leave some of the soap in the skin when wrung out to dry. This will keep it soft.—Master Painter.

WATERPROOF CEMENT STAINS.

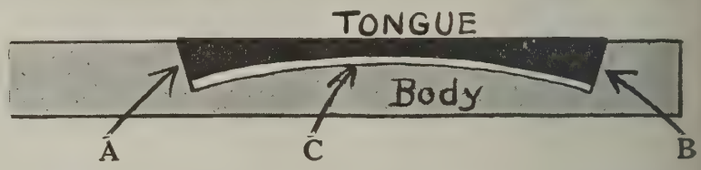
The two conspicuous defects of cement as a building material are its porous nature and its cold and cheerless monotony of color. From a structural point of view, the former is the more disastrous, as buildings of cement or plaster, unless waterproofed, are apt to be damp, the decorations will be discolored and metal lath or reinforcing bars rusted so as to be useless.

The importance of coloring the surface of the structure has been recognized since the earliest times. It is generally conceded that the ancient Greek and Roman buildings, though of marble, were painted and decorated. Even Solomon's Temple was overlaid with gold, showing that even in those remote times the value of color was important. At the present time one of the reasons why frame houses keep their hold on the people is their adaptability, not only to various forms of decoration, but to the variety of colors in which they may be finished.

The Samuel Cabot, Inc., Company, of Boston, Mass., have long been known as manufacturers of high-grade shingle stains, but not so generally for their cement, plaster and brick waterproof stains and preservatives. They have recently sent out a beautifully illustrated catalogue, describing these products and showing the great variety of buildings in and on which these materials have been used.

The catalogue contains color cards, showing the possible shades obtainable, and a great deal of very useful information for the contractor and builder. We understand that the mention of THE NATIONAL BUILDER will get your name on their mailing lists for this and future literature of similar value.

NICHOLLS TAKE-DOWN SQUARES.



This cut illustrates how the joint of their TAKE-DOWN SQUARES are machined. These joints, "A" and "B," are machined perfectly square with edge of tongue and body. The tongue of square does not touch the body at point "C" and only rests on the beveled portion of the body indicated by point "A" and "B." These bevels are so straight that it answers the same purpose as a straight shoulder and they will not slip. The clearance at point "C" allows the tongue to settle down as the bearings wear in taking square apart and putting together, thereby producing constant accuracy.

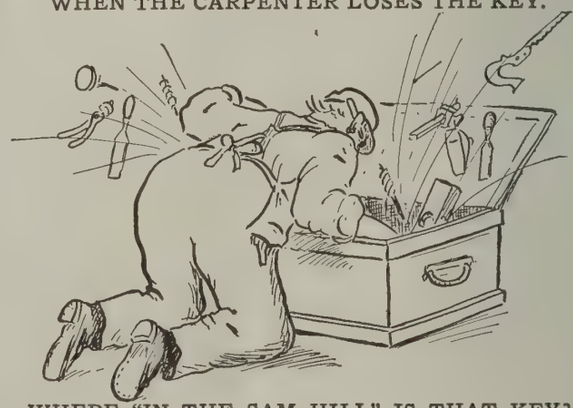
The end of tongue springs down under the button, as you will see in cut "2," and is held down at the other edge of body by a very rigid spring.

Rust-proof canvas case with each square.

If your dealer does not handle their squares and will not order one for you, write them. They have a special inducement to those who order first square in every town.

WHEN IS A TAKE-DOWN SQUARE NOT A TAKE-DOWN SQUARE?

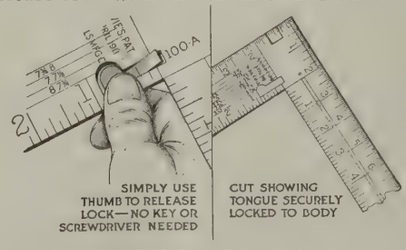
WHEN THE CARPENTER LOSES THE KEY.



WHERE "IN THE SAM HILL" IS THAT KEY?

He has not only lost the key, but he has lost his temper, and lost all respect for the English language.

Not so when he has a Nicholls Take-Down Square. No key to lose, simply release lock with the thumb. His thumb is his key.



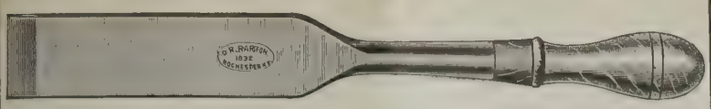
This is the only TAKE-DOWN SQUARE on the market containing this kind of a Locking Device.

GUARANTEED ACCURATE AND TO REMAIN SO.

The main feature of their new TAKE-DOWN SQUARE is that it will always stay true. It is so constructed that the tongue is held down into beveled bearings by a spring, and these bearings are made so as to take up the constant wear which comes in taking square apart and putting it together, thereby producing constant accuracy.

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Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

D. R. BARTON 1832. ROCHESTER, N.Y.

MACK & CO., Sole Makers
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$1.00 Good For $1.00
TO INTRODUCE
The SELF-SETTING PLANE

Any dome in this paper is good for $1.00 in payment for a **Self-Setting Plane,** if sent us with the balance of the list price of a Plane from where our Planes are not sold.

List price: Smoother $3.25, Jack $3.50, Fore $3.75, Jointer $4.50.

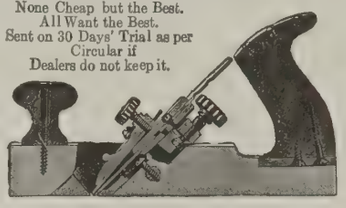
Do not think the price too high until you try it, then if the Plane is not worth to you twice its cost, return it at our expense and the TRIAL WILL COST YOU NOTHING.

Get one on trial now and let the Plane talk for itself. You run no risk, as this paper guarantees we will do as our advertisement says.

SPECIAL: Whoever sends for a plane as above before Dec. 15th, 1911, may deduct 25 cents more from the list price, if they send the addresses of 12 Carpenters no matter where they live.

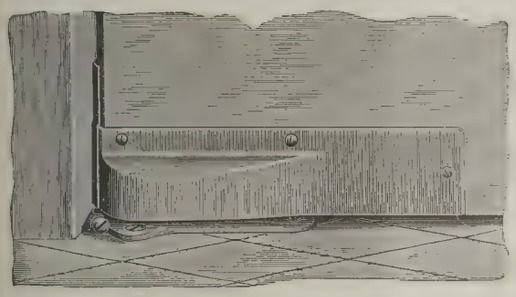
If only names and a dome are sent, you will get 2 carpenter pencils.

THE BEST IS THE CHEAPEST
None Cheap but the Best.
All Want the Best.
Sent on 30 Days' Trial as per Circular if Dealers do not keep it.



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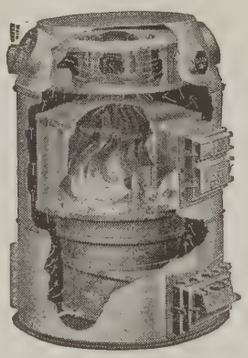
1910 "Standard" Floor Hinges



sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio

BOVEE FURNACES at MANUFACTURER'S PRICES
SAVES 50 PER CENT OF COST; 40 PER CENT OF FUEL



Most Durable, Most Economical Furnace Sold
Has a Perfect Ventilating System for Every Part of the Building

RESIDENCE HEATING PLANT

Hot air registers in five rooms; cold air return in two rooms; 40-in. Furnace, 20-in. Fire Pot, 28-in. Combustion Chamber, 10,000 cubic feet Heating Capacity.

Special Price, $65

CHURCH AND SCHOOL HEATING PLANT

One large hot air, two cold air registers, 54-in. Furnace, 32-in. Fire Pot, 40-in. Combustion Chamber, 40,000 cubic ft. Heating Capacity.

Special Price, $95

Horizontal Furnaces with large doors or larger furnaces and more piping at proportionately low prices.

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$38.95 BUYS COMPLETE BATHROOM OUTFIT



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Established 1876
4541-4549 Cottage Grove Avenue
CHICAGO



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You *can*—if you really want to. You can fit yourself to earn *more* than the other fellows. For they are not naturally any smarter than you. They haven't any more brains or ambition than you. They don't work any harder than you. They are simply *trained men*—that's the difference. They have *special knowledge* that you don't possess—*special knowledge* and *training* that makes them *worth more* to their employer than you can possibly be until *you* equip *yourself* with special knowledge and training.

The American School is training *hundreds* of men to become draftsmen, engineers and architects. It is training hundreds to fill executive positions, to earn *good* salaries, to play a man's part in the business game. *And what the American School of Correspondence is doing for others it can do for you.*

Mark the Coupon

and send back to us *on the next mail.* That's the first step towards getting your name higher up on the payroll—the first step towards getting the kind of position *you'd like to have,* the kind of a salary *you ought to have.*

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OPPORTUNITY COUPON

American School of Correspondence, Chicago, U. S. A.

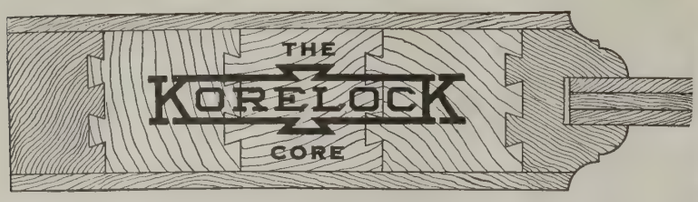
Please send me your Bulletin and advise me how I can qualify for the position marked "X." Nat'l Bldr., 12-11

....Automobile Operator	....Lawyer
....Draftsman	....Fire Ins. Engineer
....Architect	....Telephone Expert
....Building Contractor	....Moving Picture Op'r
....Structural Engineer	....Bookkeeper
....Civil Engineer	....Stenographer
....Electrical Engineer	....Accountant
....Elec. Light & Power Supt.	....Cost Accountant
....Master Mechanic	....Certified Public Acc'nt
....Sanitary Engineer	....Auditor
....Steam Engineer	....Business Manager
....Reclamation Engineer	....College Preparatory

NAME.....

ADDRESS.....

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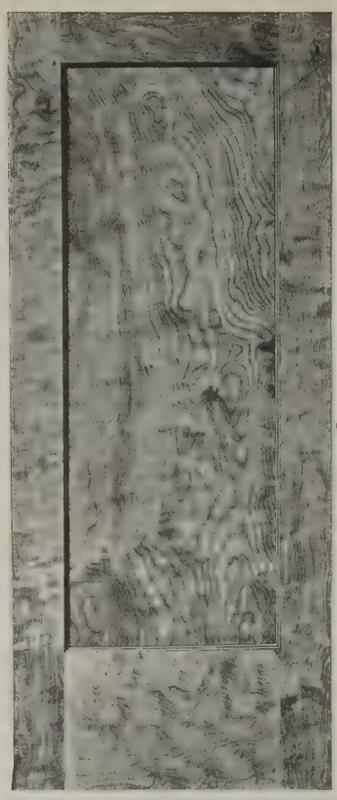
Primeval man, we believe, was thoroughly satisfied to close the entrance of his cave with a bear skin, but through the ages there has been a considerable advance in the methods of protection against the weather, wild animals and other enemies. It would be interesting to trace the door forms through the various phases of development. Many materials have been used for doors. Sometimes of stone, heavy and cumbersome and again of delicate screen of fretwork, depending on the degree of protection it was to afford. Metal and asbestos doors offered protection from fire, felt-covered doors deaden sounds, and glass doors are fair substitutes for windows.

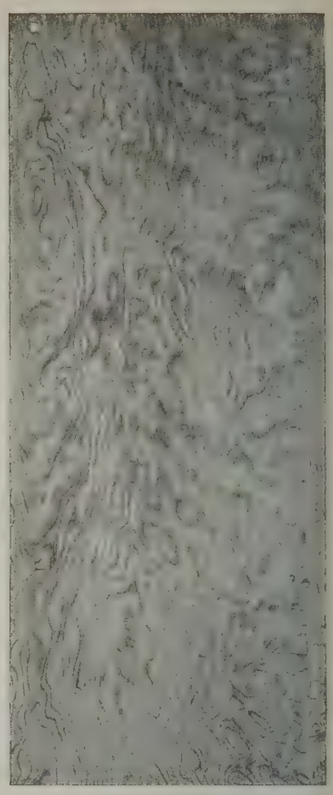
But the main material for doors is wood, and to certain degrees different varieties offer widely varying amounts of protection and efficiency. Heavy oak doors, iron bound, protected the medieval castle and today oak doors, of lighter construction, protect our homes; other woods, birch, pine, cypress, mahogany, etc., are used when their particular grain or figure add to the color scheme or design.

The advance in construction ideas has for some years been along the line of adapting various woods to decorative and constructive purposes. The improvement in the dry-kiln and methods of seasoning have produced lumber far more dependable in quality than formerly and methods of sawing and cutting veneers gives us the most beautiful figures and patterns at a minimum of labor and cost.

No item has contributed more to modern construction of doors than the methods of building a door by facing a light pine core with a veneer of harder, heavier and more expensive wood. The use of a light center decreases the weight appreciably, meaning less labor to swing them, with a saving in hinges and locking devices. Using only a thin veneer of expensive wood enables us all to enjoy the appearance of the finest woods, formerly only in houses of the wealthy, while the method of building up the core and applying the veneer insures the door against warping, twisting, sagging, etc., so common in doors of less careful manufacture.

In the manufacture of veneered doors the Paine Lumber Co., of Oshkosh, Wisconsin, use methods peculiar to their plant. The cores of all thin doors are not only built up of a number of narrow strips, but each strip is locked into the adjoining strips in such a manner that it is impossible to pull the core apart, even if no glue were used. THE KORELOCK core is plainly shown in the section of a door at the head of this page. It will be noticed that the tendency to warp is entirely overcome by the crossing of the grain of the wood in the core, as well as by the possibility of thoroughly drying the material. Any kind of wood can be used for the veneer, although the tendency at present is to use birch or oak. The former possesses a beautiful grain and figure, as may be seen in the door





panels shown here, and it can be finished in many styles or to match mahogany or other expensive woods. Oak, always the symbol of strength, makes an extremely durable and satisfying door in any of the standard finishes. It is to be hoped that on account of the thin veneer the best cuts can be used and a quarter-sawn veneer costs but little more than the plain. There is, therefore, every reason why a veneered door is preferable to the solid door and it is only occasionally that we see a solid door of the more expensive woods. Indeed we have seen a veneered door of clear white pine where it was especially desired to avoid warping, etc.

The standard oak or birch door is veneered with hard wood about one-eighth of an inch thick. In the fancy and figured woods, such as mahogany, rosewood, circassian walnut, etc., a thinner veneer is used, as it is not practicable to get the veneer in the standard thickness.

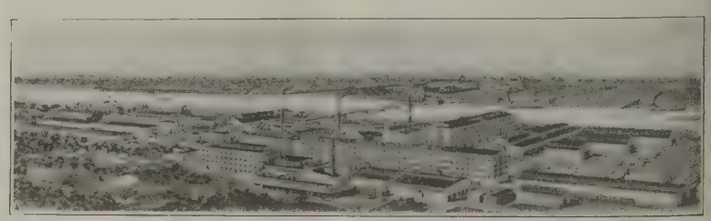
While some profess to not understand the recent interest in a better class of doors, we believe that it is perfectly reasonable in the light of progress made along all lines. The wood finishers, varnish makers, etc., have shown us the possibilities in hard wood. Prospective home-builders, searching for new ideas, have visited homes where hardwood has been used and nicely finished and insist on the same work in their more modest dwellings. Compared to a painted door, there is always a quick decision in favor of the veneered even at a slight advance in price.

For a time the carpenters objected somewhat to the veneered door, as they thought it required more work to hang them than fit them. This idea has largely disappeared on longer acquaintance with modern methods and tools; one style of door can be hung about as quickly as the other. A point sometimes lost sight of is the fact that veneered doors are almost always finished in natural colors, or to bring out the grain and figure, while with a painted door many defects in natural and workmanship can be covered up by unscrupulous manufacturers only to appear again after some time.

The PAINE LUMBER COMPANY are naturally gratified at the favorable impression their **Korelock** doors have been and are receiving and are making every effort to raise the standard of manufacture even above its present efficiency. In their catalogue "C," which is sent free on mention of the NATIONAL BUILDER, are shown many styles of veneered doors, forms of which we show on this page. Possibilities in the way of finishing color, etc., are also shown.

The PAINE LUMBER COMPANY also make the complete trim for buildings of all descriptions and of the finest workmanship and quality, and should be consulted when in need of any materials of this description.





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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

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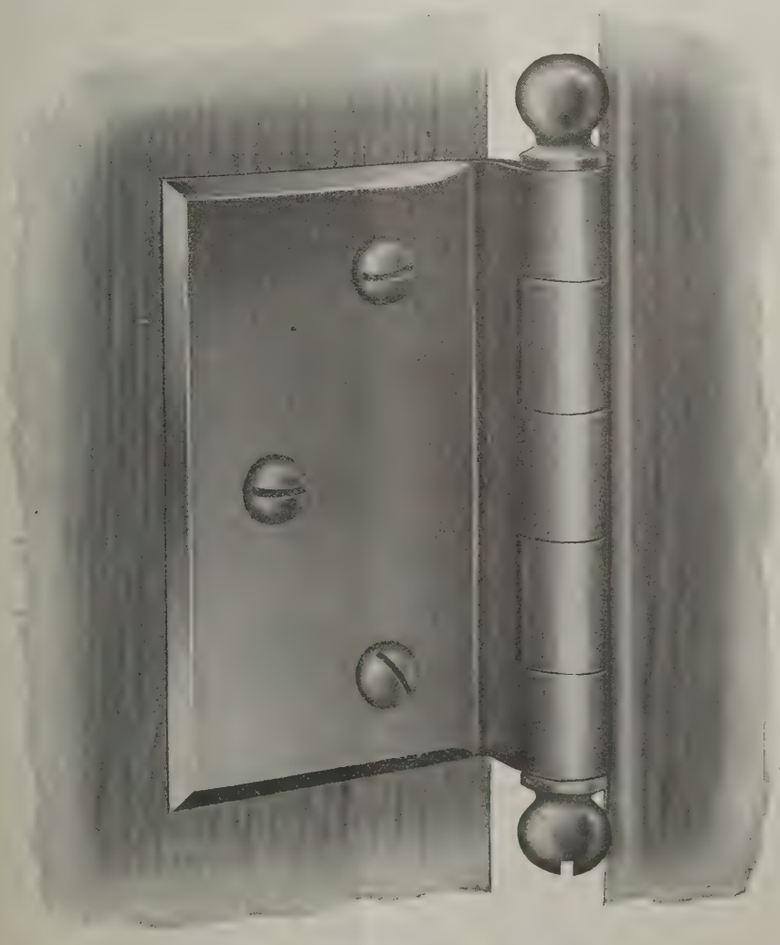
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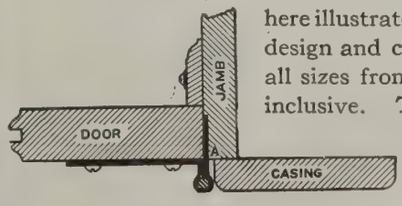
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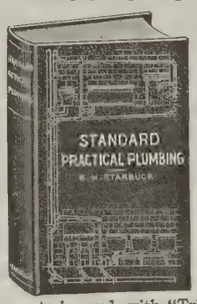
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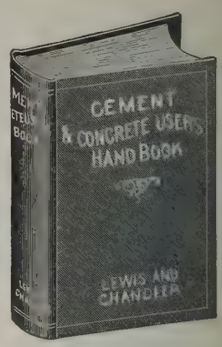
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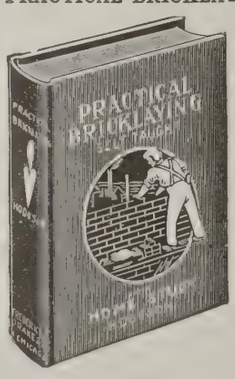
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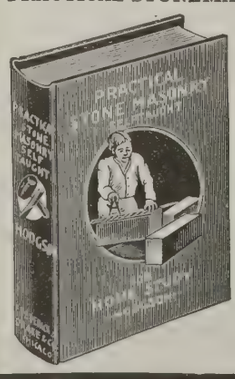
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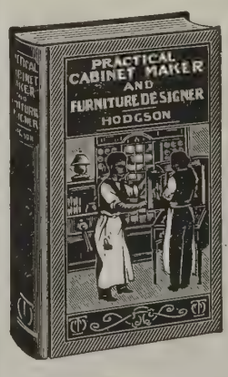
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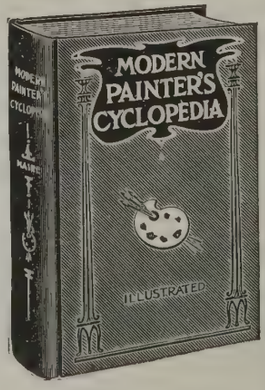
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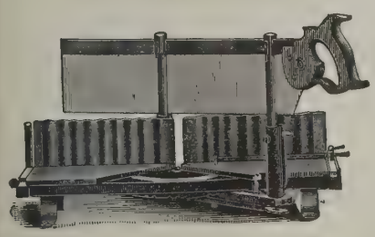
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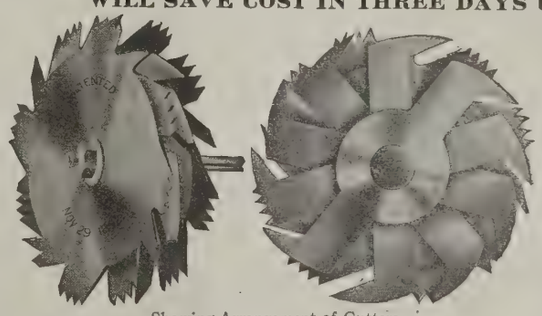
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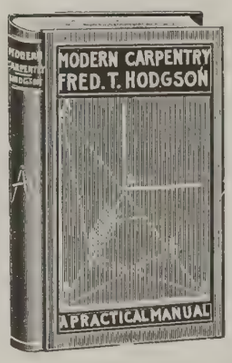
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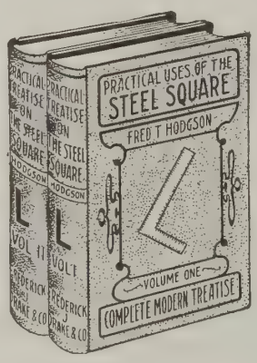
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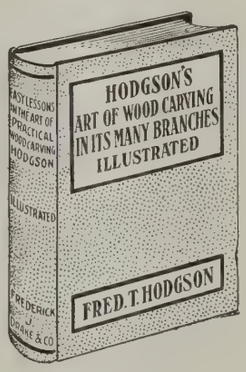


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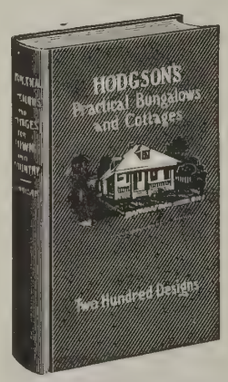


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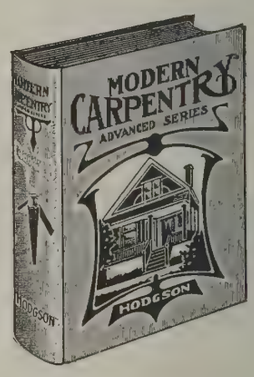
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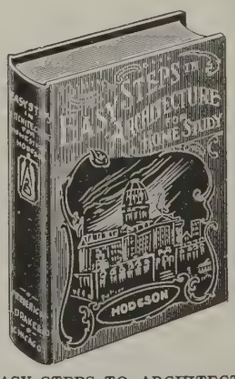
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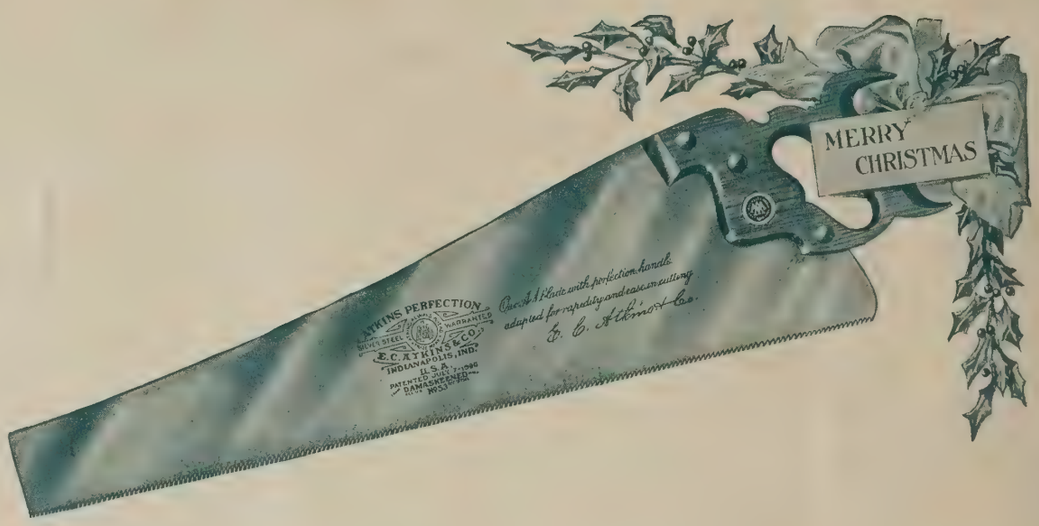
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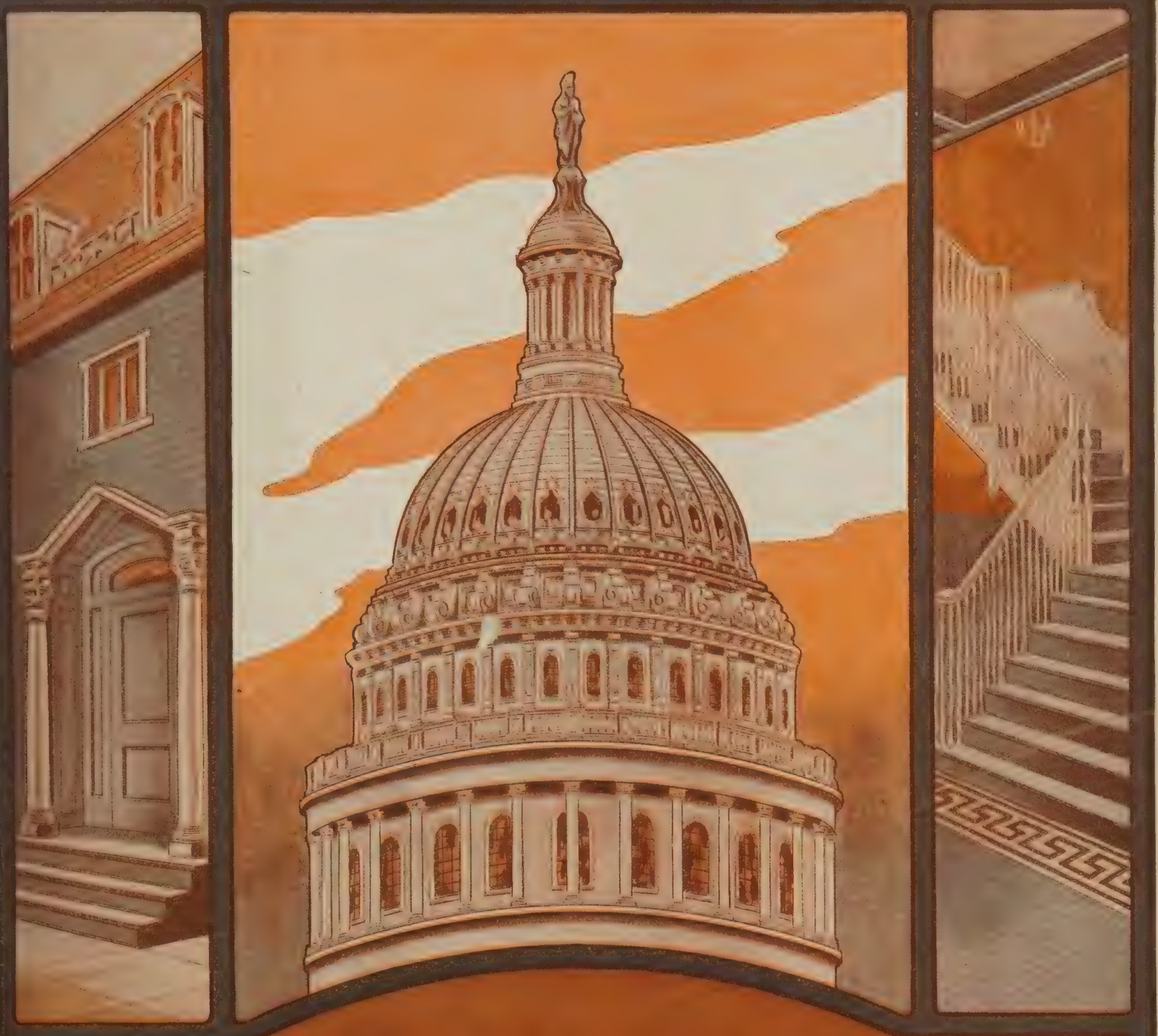
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Yours very truly,

HENRY DISSTON & SONS

Incorporated

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS

PHILADELPHIA

THE CUTTER CAN'T CREEP

If It's the New

RUSSELL JENNINGS



SOLID HEAD

PATENTED

EXPANSIVE BIT

The solid head insures ***maximum strength.***
The cutter and worm are held by a clamping screw, so that the cutter ***really can't creep.***
This bit is also made with the ordinary shank.

Russell Jennings Carpenters' Bits with ***turned shanks*** are now sold in sets of various combinations packed in serviceable basswood boxes, having clips and other devices for holding the tools.



These Sets include brace having either "Precision" chuck for turned shank bits, or "Universal Precision" for both ordinary and turned shank bits. Every tool is backed by the Russell Jennings guarantee.

These tools are made for long, hard service, and should form part of YOUR outfit. Ask your dealer to show you a set.

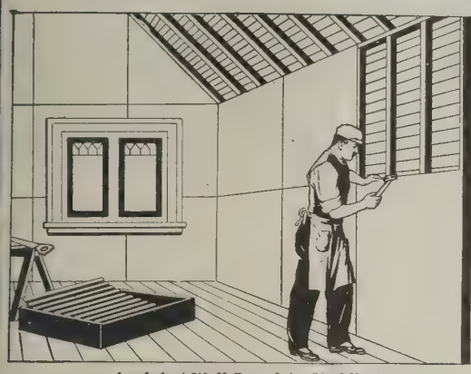
RUSSELL JENNINGS MFG. CO.

CHESTER, CONNECTICUT

21-61

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WHEN YOU WRITE ADVERTISERS

Better Than Plastering! Costs Only Half!



Applying Wall Board to Studding



Applying Wall Board to Ceiling



Applying Bishopric Sheathing

Send for Free Illustrated Book and Big Free Sample of Bishopric Wall Board

CONTRACTORS AND BUILDERS—This famous Wall Board and sheathing will run your busy season right through the winter. There are buildings in every community which could be remodeled **at once** if you only showed the owners how well and how low priced it can be done with Bishopric Wall Board. Look for these jobs. You don't have to wait for building weather. This is the Bishopric Wall Board weather—and remember—your Bishopric jobs will look just as handsome and last longer than the best lath and plaster ever put up. 12,685,500 square feet of Bishopric Wall Board and Sheathing sold in one year. This is going to be a greater year for these products than ever. "There's a reason."

CONTRACTORS' AND BUILDERS' COUPON

The Mastic Wall Board and Roofing Mfg. Co.
314 Este Ave., CINCINNATI, OHIO

Please send me your Wall Board and Sheathing Book—and big Sample of Bishopric Wall Board. Also your special proposition to Contractors and Builders.

Name .....

Address.....

City..... State.....

BISHOPRIC WALL BOARD AND SHEATHING

Made With Tough, Fire Resisting and Everlasting Asphalt-Mastic

This is asphalt toughened by a patented process and *it won't burn.* In hot Asphalt-Mastic kiln-dried dressed laths are imbedded at a pressure of 500 pounds to the square inch. The other side of the Asphalt-Mastic is surfaced with heavy, sized cardboard.

The non-burning Asphalt-Mastic protects the lath. Buildings have been saved because of this wall board.

Bishopric Wall Board comes in sheets 4x4 feet, ready to go on. It goes on *dry.* You don't have to wait for setting or drying as you do with plaster. Bishopric Wall Board does not freeze—has none of plaster's troubles—you can finish a building in the dead of winter and *save a month's time.* Use it for remodeling. Close up the attic and make a comfortable room with it. Make new partitions with Bishopric Wall Board. Finish the porch—ceil and wall the cellar with it.

Laths Keep This Wall Board Flat Forever

Bishopric Wall Board is the only wall board made with laths. Laths are positively necessary to back up a wall board—to make it rigid and substantial—and to keep a perfectly flat surface.

Without lath, wall board swells, warps, cracks, and pulls away from the joints.

Bishopric Wall Board never warps—never cracks—never pulls away from the joints. It keeps its flatness as long as your building lasts. It is sold to you on our binding, money-back guaranty that it will make good on every claim.

Save 75 Per Cent by Using Bishopric Sheathing

Bishopric Sheathing is made of precisely the same materials as Bishopric Wall Board, but finished surface is not so smooth. It saves, by actual figures, 75 per cent of the cost of applying lumber and building paper. It is far better. Binds cement or stucco to building as nothing else can. Proof against cold, heat, dampness and vermin. The family can move right into a comfortable building the day it is finished with Bishopric Wall Board and Sheathing.

Make Air-Tight, Rat-Proof Farm Buildings

Where it is not necessary to make a finely finished job, Bishopric Sheathing is used instead of wall board.

Use the Bishopric Wall Board and Sheathing in stores, garages, churches, schools, mills, warehouses, stations, moving picture houses, booths, lodge halls, city buildings, farm buildings.

Price of Bishopric Wall Board

Each crate contains sixteen sheets, 4x4 feet, making a total of 256 square feet. Price, $6.40 per crate of 256 square feet, or $2.50 per square of 100 square feet, f. o. b. Cincinnati.

Price of Bishopric Sheathing

Each crate contains sixteen sheets, 4x4 feet, making a total of 256 square feet. Price, $6.00 per crate of 256 square feet, or $2.35 per square of 100 square feet, f. o. b. Cincinnati.

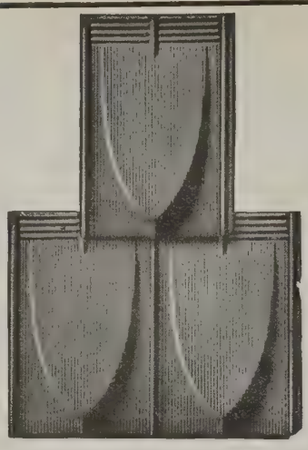
Get Our Special Proposition

We have a special and very attractive proposition for contractors and builders. Fill out the coupon in this advertisement, or drop us a letter or a postal today. You put yourself under no obligation to us whatever. All we want is an opportunity to show you how you can make Bishopric Wall Board and Bishopric Sheathing a big paying part of your business—a business that goes right on through your slack season as well as your busy season.

This is our great 1912 offer—specially made to meet building conditions for the coming year. There will be a big response. Don't be the last to get your inquiry in. Address

The Mastic Wall Board and Roofing Mfg. Co., 314 Este Ave., Cincinnati, O.

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STYLE B.
Showing Method of Laying

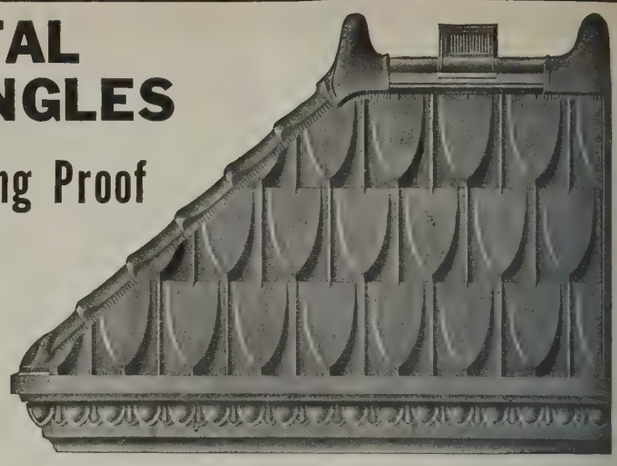
"TITELOCK" METAL SHINGLES

Fire, Water and Lightning Proof

ASK FOR SAMPLES AND CATALOG

Milwaukee Corrugating Co.

MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.

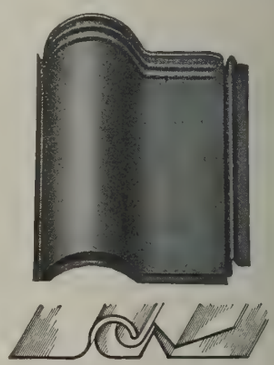


Don't Miss This Opportunity

We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing Others have made big profits **simply devoting part of their time to selling and laying our Metal Spanish Tile.**

Edwards Metal Spanish Tile



Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10 x 14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TO-DAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TO-DAY FOR OUR SPECIAL AGENTS' PROPOSITION.



Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

430-450 Eggleston Ave. CINCINNATI, OHIO

THE WORLD'S LARGEST METAL ROOFING, METAL SHINGLES AND METAL CEILING MANUFACTURERS.

THE WINTHROP **Solid Tapered Asphalt Shingles**

ARE OF A COOL, GRAY SLATE COLOR

And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

SPECIAL INDUCEMENTS TO THOSE WHO APPLY FIRST ROOF IN EACH TOWN

Catalogue on Request

WINTHROP ASPHALT SHINGLE CO. 1100 THE TEMPLE CHICAGO, ILLINOIS



Only Solid Tapered Asphalt Shingle Made

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



MF



32 POUNDS COATING

ROOFING TIN

"The Terne which turns the elements"

MF ROOFING TIN in the hands of a practical roofer assures both builder and property owner a roof that is light, clean, fireproof, lasting, and thoroughly satisfactory. MF is the original Old Style, and is the most popular terne plate manufactured. Each plate is stamped with the weight of coating —32 pounds, which is an assurance to the purchaser that he is getting exactly what he is paying for. This is important—insist upon your plates being stamped with the weight of coating. You hear complaints that Tin Roofs do not last as long as they did formerly. Why is it? Simply because there has been a tendency to buy cheap plates and then put them on the roof as cheaply as possible. You can buy as good or better plates to-day than ever before, one reason being that they are more uniformly coated. MF plates if properly applied will last a lifetime, and are the cheapest in the long run Write us for a free sample of MF, and note the softness, pliability and even coating. We also manufacture other brands of redipped plates carrying from 20 to 40 pounds of coating.

AMERICAN SHEET & TIN PLATE CO. APOLLO BEST BLOOM TRADE MARK REGISTERED PITTSBURGH

APOLLO BEST BLOOM GALVANIZED SHEETS

Highest quality galvanized sheets obtainable for construction purposes, cornices, gables, skylights, and all sheet metal work. Apollo Sheets are always uniform, easily worked, and satisfactory in service. Write nearest District Sales Office for full information and quotations on Black and Galvanized Sheets, Tin and Terne Plates, Formed Roofing and Siding Products, Cambridge Metal Lath, Etc.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



KANNEBERG'S NEW METAL TILE

High Lock Joint, No Possibility of a Leak. Easy to Apply.

DURABLE ORNAMENTAL FIRFPROOF

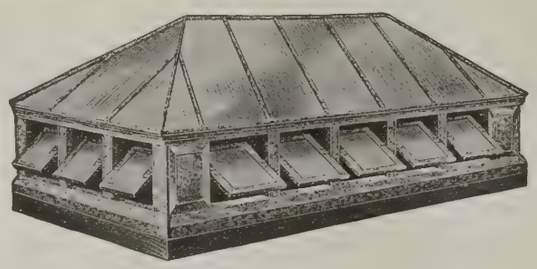
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ART
METAL CEILINGS AND SIDE WALLS
Ceiling Catalog DN

The Kanneberg Roofing and Ceiling Co.
Canton, Ohio



METAL TILE WITH RIDGE AND HIP FINISH



Willis Self-Installing Sky Lights

From Factory to Builder
No Other Labor Necessary

Willis Skylights are constructed so that any person handy with a hammer or screw driver can install them. It is not necessary to have a soldering outfit or tinners' tools.

They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

Catalogue No. 6 gives our large line of other Sheet Metal Building Material. Send for it.

WILLIS MFG. CO., Galesburg, Illinois

Carey's Flexible Cement Roofing

WHEN Carey's Roofing is specified and used, roof quality, durability and satisfaction are assured. Its standardized construction is recognized everywhere—proved by twenty-five year tests.

¶ Furnished and applied—under our direct supervision and guarantee—to any class of buildings, flat or steep surface.

Write for full particulars.

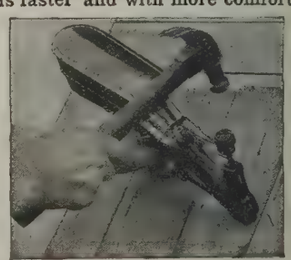
THE PHILIP CAREY MFG. COMPANY
50 Branches : : : Est. 1873
59 Wayne Ave., Lockland, Cincinnati, O.

PEARSON'S AUTOMATIC SHINGLE NAILER

PAYS FOR ITSELF ON ONE FAIR-SIZED SHINGLING JOB



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.



PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼-in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented.
Write for Circular "N."

PEARSON MFG. CO., ROBBINSDALE, MINN.

TRADE McK MARK



Antifriction Ball Tip Butts

(Patent Pending)

Strongest, Best and Cheapest Antifriction Butts Made

GUARANTEE OF QUALITY STAMPED ON EVERY BUTT

TRADE McK MARK

FURNISHED IN ALL STANDARD FINISHES

Makers of Strap and T Hinges, Barn Door Hangers and Track

McKINNEY MFG. COMPANY
Pittsburgh, Pa.

WRITE FOR NEW 1911 CATALOGUE

TRADE McK MARK

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

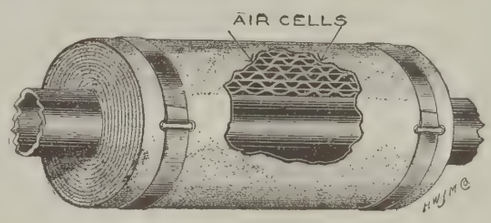
A Few Helpful Facts About Pipe and Boiler Insulation

As you of course know, insulation is based on the fact that heat cannot pass through dead or motionless air. Therefore, the more dead air a pipe covering confines, the greater its efficiency.

Now, J-M Asbestocel Pipe Covering is the only low-pressure covering we know of which confines air—and lots of it—in an absolutely *dead* state—the only one which permits no circulation whatever.

In other coverings the air channels run from end to end and the air is, of course, continually traveling back and forth.

But the air cells run *around* the pipe—each cell entirely separate in



J-M Asbestocel Pipe Covering

Thus the spaces are so small that the air has no chance to circulate.

Also, because of this arrangement of the air cells, J-M Asbestocel Pipe Covering is built on the arch principle and is therefore far *stronger* than other low-pressure coverings—doesn't crush down under weight—*lasts longer* than any other kind of low-pressure covering.

If you will investigate, we believe you will find that your client's interests will be best served by the installation of J-M Asbestocel.

Write our nearest branch for booklet giving the results of an engineering test (made by disinterested investigators) showing how much more coal J-M Asbestocel Pipe Covering saves as against ordinary coverings.

H. W. JOHNS-MANVILLE CO.

Manufacturers of Asbestos and Magnesia Products ASBESTOS Asbestos Roofings, Packings, Electrical Supplies, Etc.

Baltimore, Boston, Chicago, Cleveland, Dallas, Detroit, Kansas City, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Omaha, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis

For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C.

1300

The Standard Portable Combination Woodworker

Nine Machines in One Equipped with **6 H. P. Engine**

Send for Illustrated Catalogue

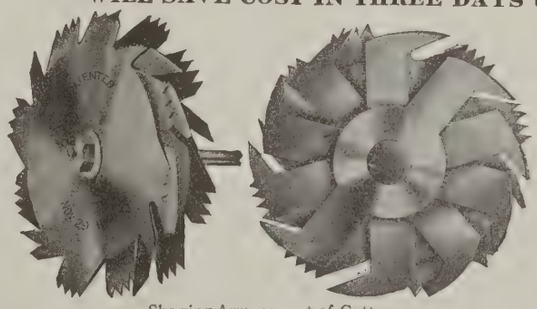
ATLANTIC ENGINE CO., Inc.

Mercer Street Meadville, Pa.

Canadian Office Bridgeburg, Ont.

HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



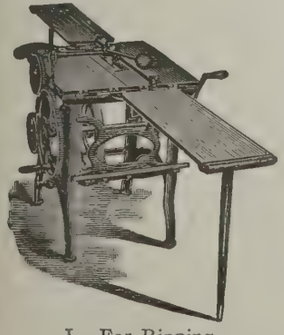
Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N.Y.**

Carpenters! Builders!



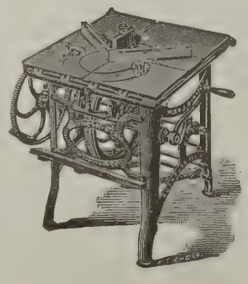
I. For Ripping.

Our new foot and hand power Circular Saw No. 4, the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

Solid Iron Table Planed Perfectly True.

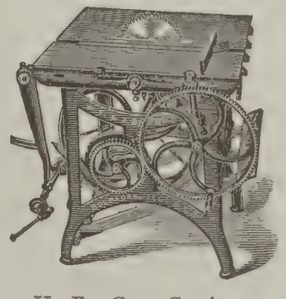
COUNTERSHAFT IF DESIRED.

Send for Our New Catalogue.



III. With Universal Mitre Gauge.

Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, etc.



II. For Cross Cutting.

W. F. & JOHN BARNES CO.

436 Ruby Street, ROCKFORD, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

HARRIS & COLE BROS.

Durabuilt
TRADE MARK

Red Gum and Oak—Trim and Mouldings
Red Gum and Oak—Finishing Lumber

We Can Furnish Red Gum Finishing Lumber and Oak Finishing Lumber in Any Width Desired and Ship Quick.

"Write for Circular on New Clear Cypress Porch Column"—the **finest porch column ever built.**

HARRIS & COLE BROS.
CEDAR FALLS, IOWA

PARKS' WOODWORKER

ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices.*



PARKS' BALL BEARING MACHINE CO., KNOWLTON AND FERGUS STREETS **CINCINNATI, O.**

Canadian Agts. BOURNIVAL & CO. 333 Notre-Dame, East Montreal, P.Q., Canada

The Advantages of a Portable Woodworker

Especially the "FAMOUS"

YOU WANT THE BEST

Several Woodworking Machines Combined in one

The machines embraced in the FAMOUS Portable Woodworker are:

- 8″ Jointer
- 20″ Band Saw
- Saw Table (carrying a 12″ saw blade) with raising and lowering arbor.
- Mitering Attachment
- Cut-off and Ripping Gauge
- Disc Sander
- Emery Grinder

3 H. P. Gasoline Engine, Batteries

All Necessary Belting

Stop hauling your millwork to the machine-shop—and hauling it back. Bring your machine-shop to your millwork! It's cheaper—and the saving goes into **your** pocket.

The FAMOUS Portable Woodworker is really a movable machine shop. When you've completed your contract on one job, move the machine to the next. Seven useful woodworking machines—practically all that a contractor requires—are combined into one. And a gasoline engine, complete with belting, is included in the outfit.

A Remarkable Machine

Combining all the remarkable features of the FAMOUS Universal Woodworker—over eight hundred, of which are in use—our Portable Woodworker is a real boon to contractors everywhere. Surfacing and edging, boring, band-saw work, ripping and cutting-off, sanding—all these, and more can be done on this machine **right at the place where your work is!** No planing-mill delays and **no unnecessary expense.**

The FAMOUS Portable Woodworker is mounted on skids and can be moved around without any trouble. A wheeled truck can also be furnished. The engine is three horse power, and batteries and belting come with it. This is by far the best proposition today in woodworking machinery. Write for full details.

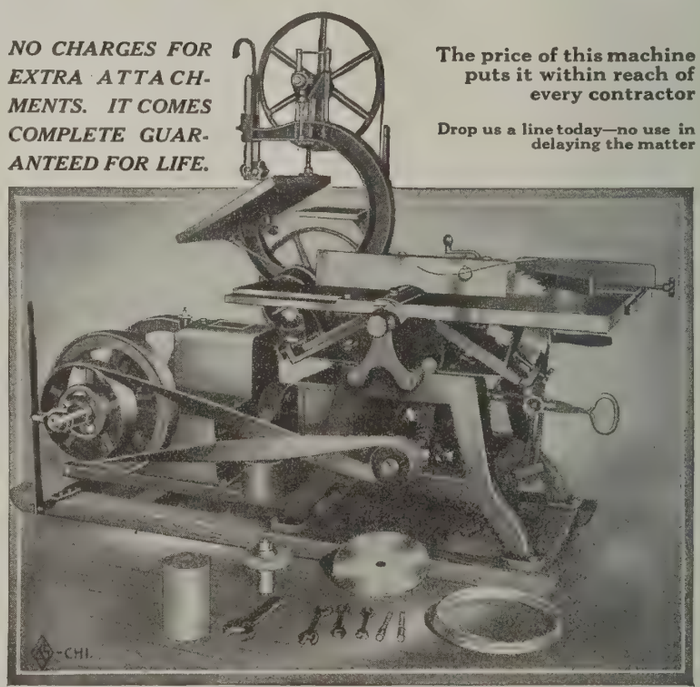
The Sidney Tool Co.

Sidney, Ohio

NO CHARGES FOR EXTRA ATTACHMENTS. IT COMES COMPLETE GUARANTEED FOR LIFE.

The price of this machine puts it within reach of every contractor

Drop us a line today—no use in delaying the matter



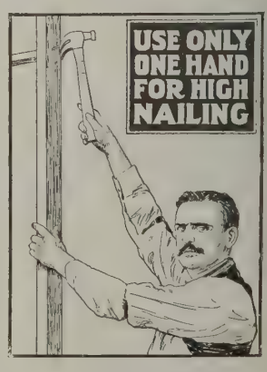
THE DOUBLE CLAW HAMMER



BETTER HANDLE, BETTER STEEL, BETTER FINISH
and we find the
BETTER MECHANIC USES IT FIRST
FREE DELIVERY TO YOUR ADDRESS ON RECEIPT OF $1.50

¶ Pulls the nail out straight without a block. ¶ Relieves the strain on your arm when doing scaffolding, siding and ceiling work. ¶ You hold on with your left hand while pulling with your right—this gives you more power and the nail is not rolled into a fish-hook as with the old hammer. ¶ You drive the nail right in again. For "finishing work" the Double Claw Hammer is a great aid, as 10% to 15% of all finishing nails start wrong and must be withdrawn.

Under strong competition you pay 75c for a good hammer. The high nailing feature of the Double Claw Hammer is worth 75c many times over. The straight and easy drawing of nails is worth another 75c. The ease and pleasure in using a tool like this cannot be measured by the slight additional cost.



The Double Claw has all the good features of the old hammer, and a lot more besides.

DOUBLE CLAW HAMMER COMPANY
453 Broadway - - - - - Brooklyn, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SAP GUM

The success of ***RED GUM*** in New York building operations—both large and small—has been most pronounced.

Any builder who wants to be up-to-date may find several hundred high class apartment buildings and residences in which ***RED GUM*** has been selected for the interior trim because of its beauty and value.

SAP GUM

(which comes from the same tree) is not yet so generally known, perhaps because it lacks the superb grain and color of ***RED GUM*** and because it is usually used where it does not show. (***SAP GUM*** is the ONE BEST WOOD known for WHITE ENAMEL TRIM, for instance.)

Builders who don't yet know about ***SAP GUM*** will find it is thoroughly reliable when properly manufactured, and will find, furthermore, that ***SAP GUM*** has all the good qualities of many of the woods hitherto used merely through force of habit.

Get any responsible trim manufacturer to make you a quotation on good ***SAP GUM*** in places where you would otherwise use other woods, and you will be glad to find

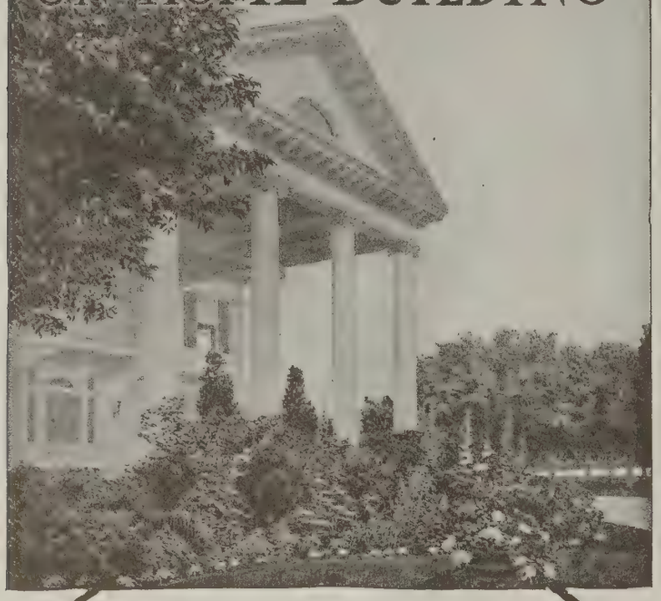
YOU WILL SAVE SOME MONEY

without any loss of value whatever, and with an increase of prestige.

HIMMELBERGER-HARRISON LUMBER COMPANY, - - - - - Cape Girardeau, Missouri
CARRIER LUMBER & MANUFACTURING COMPANY - - - - - Sardis, Mississippi
BAKER LUMBER COMPANY, - - - - - - - - - - - Turrell, Arkansas
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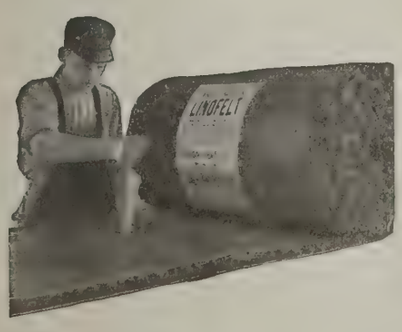
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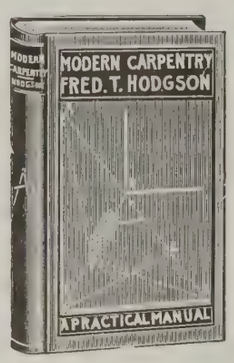
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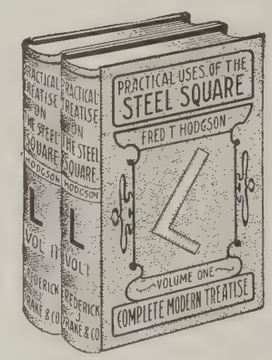
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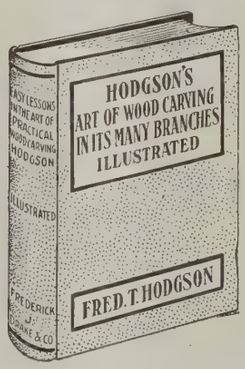


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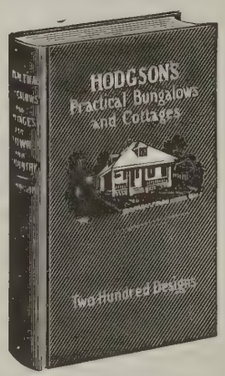


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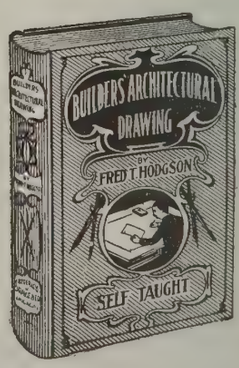
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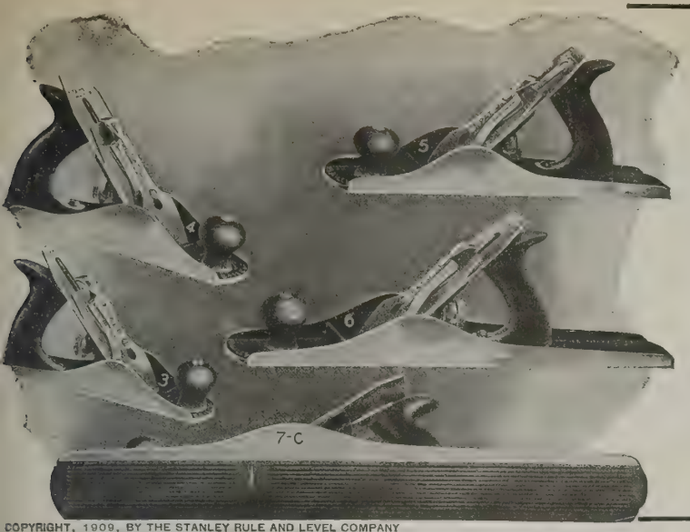
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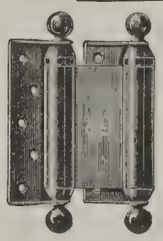
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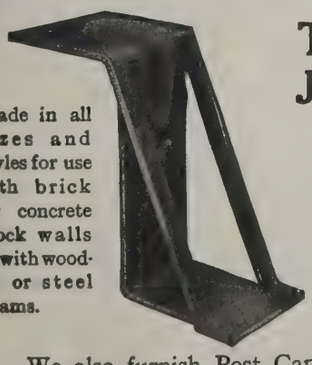
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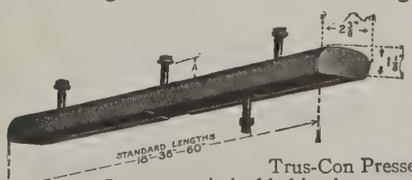
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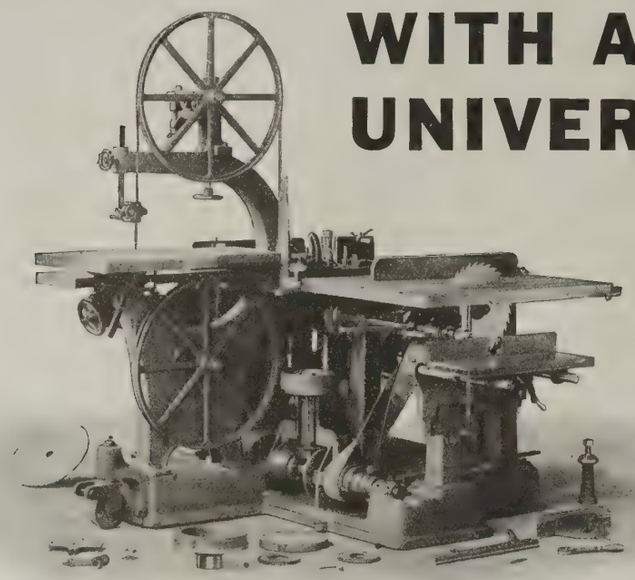
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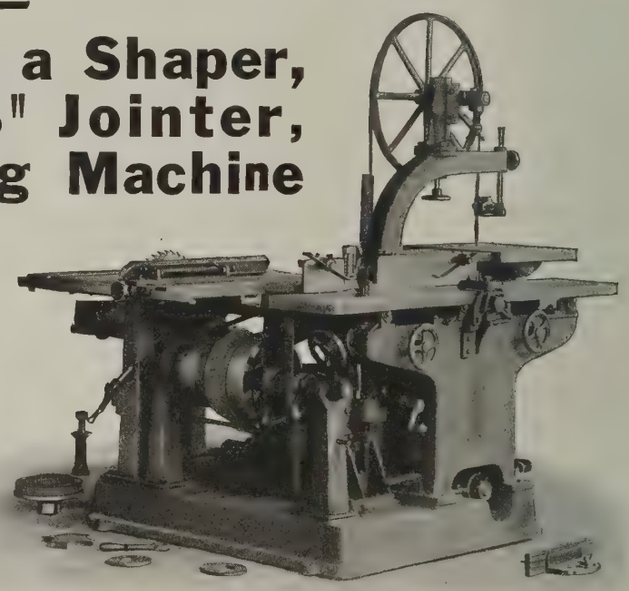
WITH A No. 51 CRESCENT UNIVERSAL WOODWORKER



Keep the Millman's Profit for Your Own

Equip your shop **now** with this No. 51 Crescent Universal Woodworker. It can be instantly available and operated at a very small cost.

This Outfit Combines a Shaper, a 26" Band Saw, an 8" Jointer, Saw Table and Boring Machine



The Special Equipment

consists of Re-Saw Attachment, Tenoning Attachment, Panel Raiser, Pole Rounder, Hollow Chisel Mortising Attachment, Disk Grinder, Knife Grinder and Emery Grinder.

If You are Rushed On the Job

you can operate the band saw, the jointer, saw table and borer all at one time. This means that four men can work on a No. 51 at one time without interfering with one another. Each machine can be operated independently of the other. It is not necessary to stop all the machines when you want to stop one.

The No. 51 Crescent Universal Woodworker is a Portable Machine

instantly adaptable for being moved from place to place without the aid of crowbars or rollers.

Let Us Get Together Now—You Will Find This Outfit the Easiest Operated and the Most Economical

We build besides this machine, an elegant line of Band Saws, Saw Tables, Jointers, Shapers, Planers and Matchers, Disk Grinders, Swing Saws and Borers. Our catalogue will tell you all about No. 51 and these separate machines.

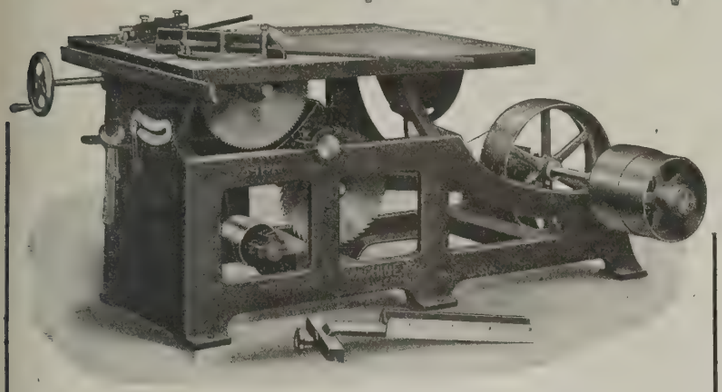
THE CRESCENT MACHINE CO.

10 Main Street, LEETONIA, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SMITH OF SMITHVILLE

Woodworking Machinery



No. 341–A NEW STYLE COMBINATION SAW BENCH.

THIS TOOL is fitted with two arbors and is most conveniently adapted for cross-cutting, ripping and grooving. Either saw can be brought into operation while machine is in motion. The table tilts easily for bevel sawing, and is equipped with cross-cutting, slitting and mitre gauges.

For detailed information about this saw bench, or any other modern wood-working tools apply to

H. B. Smith Machine Co.
Smithville, N. J., U. S. A.
New York Atlanta Chicago San Francisco



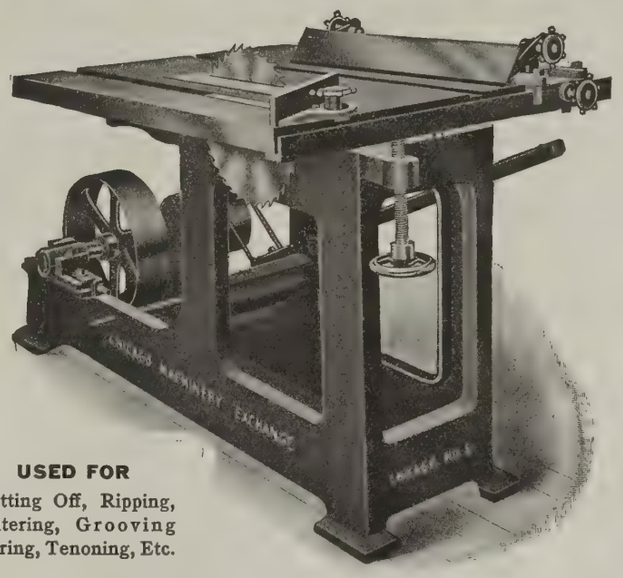
MARSTON'S Hand and Foot Power CIRCULAR **SAW**

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

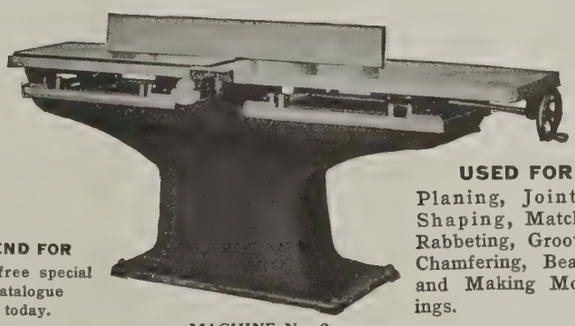
THESE TWO MACHINES FOR $170.00 WILL INCREASE THE PROFIT 25% TO 50% ON YOUR CONTRACTS



USED FOR
Cutting Off, Ripping, Mitering, Grooving Boring, Tenoning, Etc.

MACHINE No. 1
Chicago No. 5 Combination Saw Table

These two machines are always ready for work without any changing. They are a big bargain at $170.00. This price includes belt for saw arbor, countershafts, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼in., 5-16in., ⅜in., ½in ¾in.—and pair of jointer knives. Ask for price on one if you cannot use both.



SEND FOR
Our free special Catalogue today.

USED FOR
Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading and Making Mouldings.

MACHINE No. 2
Chicago 12-Inch Jointer and Planer

WE ISSUE A CATALOGUE OF MACHINES ESPECIALLY ADAPTED TO CONTRACTORS' AND BUILDERS' USE.

CHICAGO MACHINERY EXCHANGE

1217 TO 1225 W. WASHINGTON BLVD.
CHICAGO, ILL.

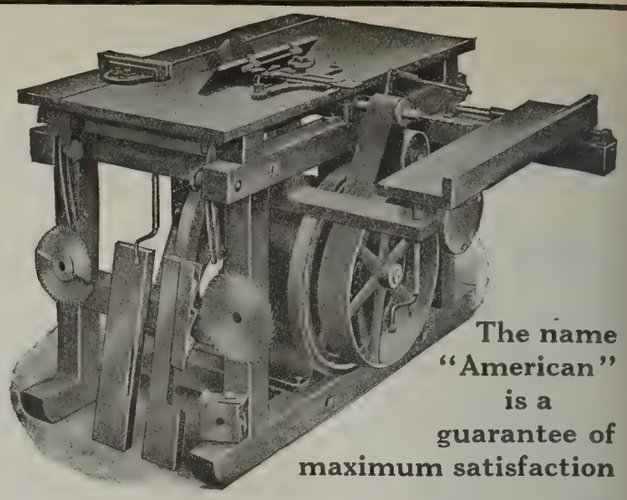
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"AMERICAN" CONTRACTORS' PORTABLE SAW BENCH

If it pays to use machine tools and methods in the mill, certainly you can expect equal savings when you use a machine tool right on the job, replacing hand labor.

With an "American" Bench, you have a miniature planing mill right at your work, capable of doing the work of a rip, cut-off, and mitre saw; dado, rabbeting, gaining and grooving machine; matcher, moulder and jointer; and a boring machine.

But be sure that your bench is an "American." For that name "American" stands for the best manufacturing methods, the highest quality, and the maximum earning power for you.



The name "American" is a guarantee of maximum satisfaction

See it at the New York and Chicago Cement Shows

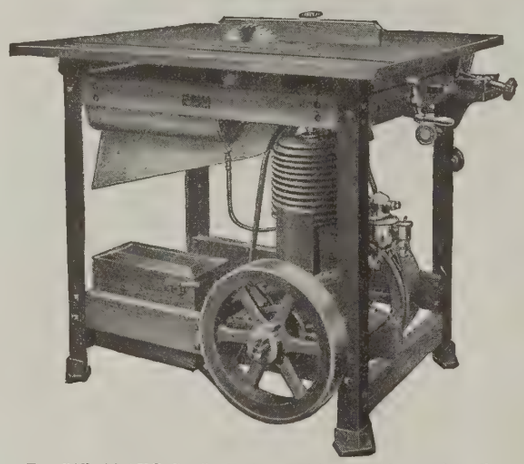
American Saw Mill Machinery Co.

80 Laight Street, HACKETTSTOWN, N. J.

1650 Hudson Terminal, NEW YORK CITY

Have You Investigated

The Grimm Woodworker



Type "A" with 4 H.P. Gasoline Engine. Weight equipped for work 350 lbs.

Nine Machines in One

8-inch Rip Saw	Boring Machine (3 bits)	4-inch Jointer
8-inch Cross Cut Saw	Moulder (8 prs. knives)	Jig Saw (3 blades)
6-inch Dado Head	10-inch Sander	Two Emery Wheels

Progressive building contractors are fast coming to realize the importance of substituting practical machines for hand labor. The **Grimm Woodworker,** furnished either with gasoline engine or electric motor and combining so many important attachments in one machine, is undoubtedly one of the greatest time, labor and material savers yet brought out.

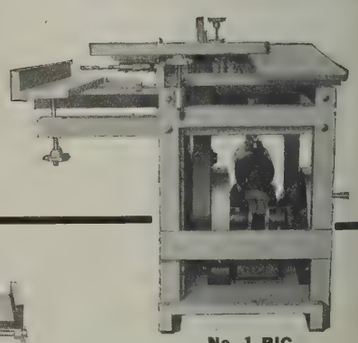
Write for descriptive booklet and our attractive selling plans.

Grimm Manufacturing Company

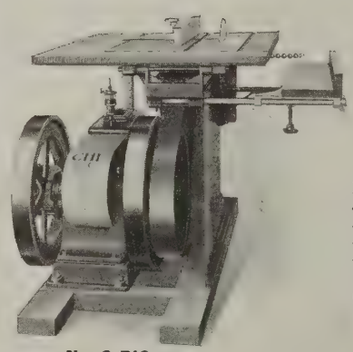
42 Erie Street, Buffalo, N. Y.

MORE

C. H. & E. PORTABLE SAW RIGS IN USE THAN ALL THE REST OF OUR IMITATORS COMBINED



No. 1 RIG



No. 2 RIG

We are the Pioneers in the manufacture of Portable Saw Rigs. We have them in four sizes.

WRITE US

For Descriptive Folder and Attractive Price.

C. H. & E. Manufacturing Co., Inc.

319 Mineral Street, Milwaukee, Wis.

No. 5 "UNION" SAW

Almost a Complete Work-Shop in One Machine

THIS MACHINE is a combination Self-Feed Rip and Cross-Cut Saw, suitable, for various kinds of work—ripping (up to 3½ inches thick), cross-cutting, mitering etc., and with attachments, rabbeting, grooving, dadoing, boring, scroll-sawing, edge-moulding, beading, etc.

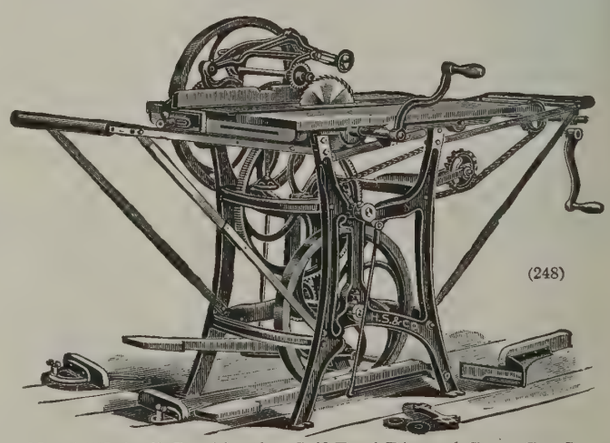
The heaviest, most substantial, accurate and easiest running machine of its kind on the market.

WE BUILD a line of Foot, Hand and Light Power Wood-working Machinery; guarantee each machine to be thoroughly practical and accurate. Machines sent on trial, and if not found entirely satisfactory may be returned.

Send for Catalog "A"

THE SENECA FALLS MFG. COMPANY

629 Water St., Seneca Falls, N. Y., U. S. A.



(248)

No. 5 "Union" Combination Self-Feed Rip and Cross Cut Saw.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Everybody Satisfied

Not a saw rig back, nor one unsatisfied user since the first one put out! That's because the Oshkosh is made on the correct principle, and saves the contractor big money on every job—from a five-room dwelling to a public school. If this were not a fact, we could not guarantee it for life.

TRADE OSHKOSH MARK *Eveready*

SAW RIG

Guaranteed for Life

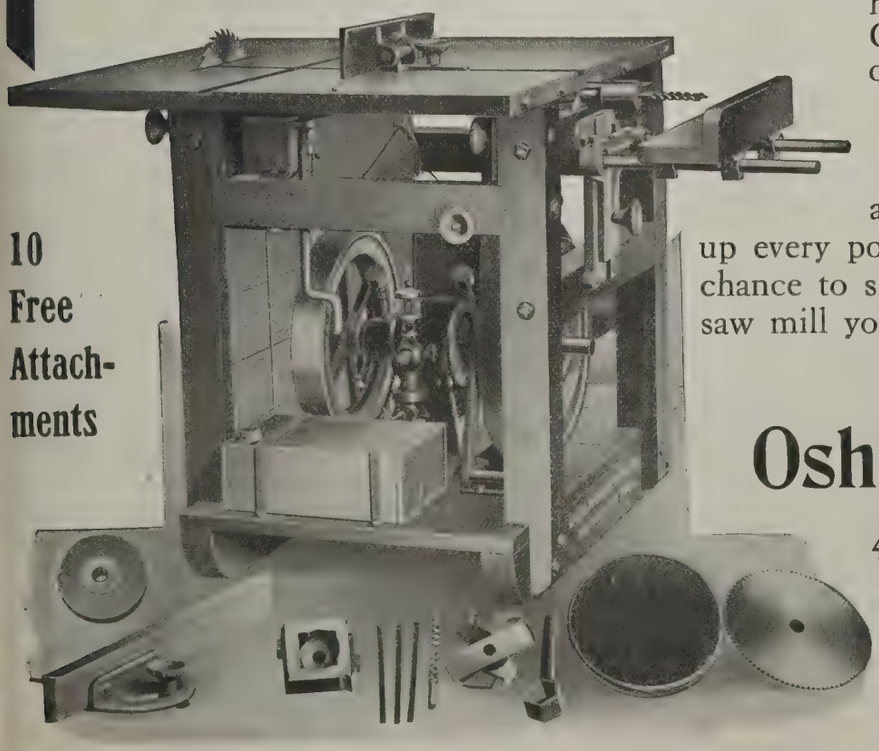
No matter how long you use the Oshkosh, if any part proves defective in material or workmanship, we will replace it free of charge.

Now don't think the Oshkosh is just for the "big contracts." You can use it on ***any*** job. It's on skids and can be easily pulled anywhere. It saws and rips not only straight lumber but also does a lot of so-called "hand-work," such as cutting stair joists, etc. Besides that, you can do innumerable other jobs with these **free attachments: 12" Jig Saw, Boring Device, 10" Pat. Sanding Disc, 2½" Pat. Jointer, 6½" Dado Head, 6" Emery Wheel, Mitre Device, and Pat. Rip and Bevel Gauge**—ten in all, with one rip and one cross-cut saw.

The Oshkosh is furnished with the best engine we could buy. It requires no experience to operate it and a gallon of gasoline will last **many** hours. The power is ample for any sawing purpose—in fact, it's a sturdy power plant you can't afford not to own.

If Not Satisfactory Return It at Our Expense

We mean exactly what we say. Any responsible contractor can send for this saw rig and try it out on his hardest contract. If it is not **just as we represent it**, he can return it at our expense. Can you possibly think of a fairer offer?



10 Free Attachments

Write for Price

and attractive folder which takes up every point in minute detail. Give us a chance to show up the merits of the handiest saw mill you could ever wish to see.

Oshkosh Mfg. Co.

414 S. Main Street

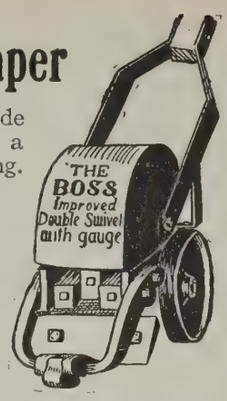
Oshkosh, Wis.

We will exhibit at Chicago and New York Cement Shows.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

It Works Like a Plane

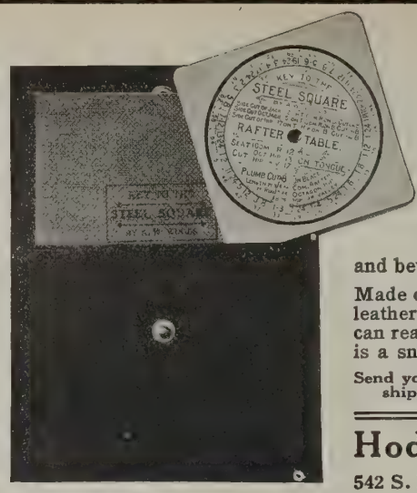
The Boss Floor Scraper



The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. **Why?** Because the Boss is made with a gage on front to which is attached a pear-shaped wheel which raises when the machine is pulled and lets the knife down gradually.

The Boss can be set for any thickness of shaving. It is guaranteed to give absolute satisfaction.

G. J. Kepplinger, MAIN OFFICE Dwight, Ill.
Manufactured also in Canada



Wood's Key
TO THE
Steel Square

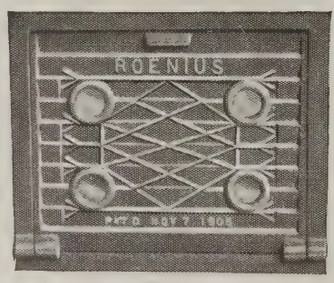
Has been tried by thousands of Builders and not found wanting. It is a wonderful instructor as to the uses of the square in obtaining cuts and bevels for all kinds of work.

Made of celluloid and put up in neat leather case of pocket size so that it can readily be carried on the job. It is a snap at our low price of $1.50.

Send your order at once and it will be shipped prepaid to your address

Hodgson Book Co.
542 S. Dearborn St. CHICAGO

Roenius Wood and Coal CHUTES

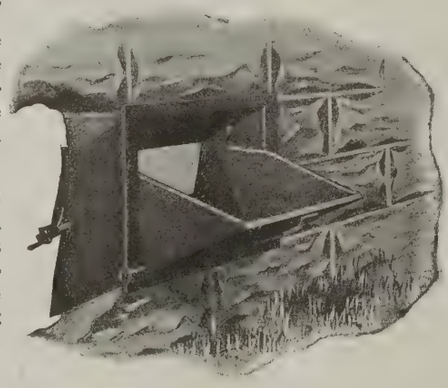


Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

ROENIUS CHUTES

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
Grand Rapids, Wisconsin

M ASHLAND M

Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers

I I



X X

The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry. A high-grade mixer at minimum cost. Our business has been built up on repeat orders. Correspondence invited.

E E

Send for Catalogue B

THE ASHLAND STEEL RANGE & MFG. CO.
ASHLAND, O.

R ASHLAND R



Complete Bath Room Outfits
$38.95 TO **$175**
Modern Plumbing at ½ ordinary cost

Water Pressure Systems, from $42.00 up. Hot Water and Steam Plants. Save $100 to $250 on a Heating System. Plans free with every plant. Pipe, Valves, Fittings at Lowest Prices. All high grade, strictly guaranteed goods.

Write for Catalogue N—It will aid you in getting the best and at prices which cannot be equaled considering quality of materials

JOHN HARDIN CO.
EUGENE A. HARDIN, Mgr.

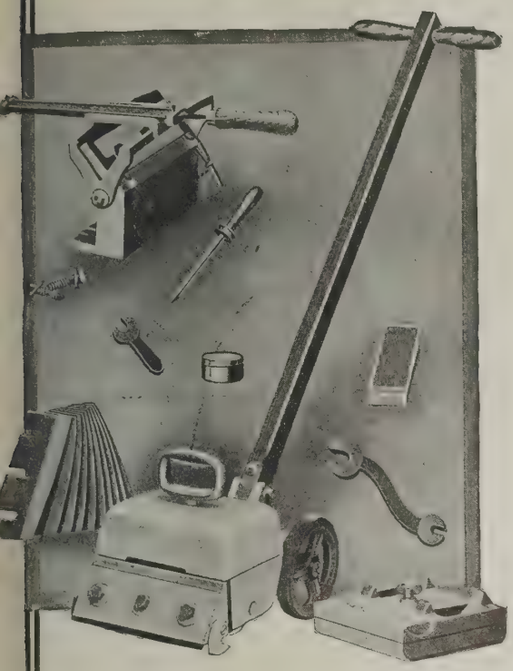
Doing Business for 25 Years at the Same Old Address and in the Same Square Old Way of Treating Our Customers

4541-4549 COTTAGE GROVE AVE., CHICAGO, ILL.



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OVER $100,000.00



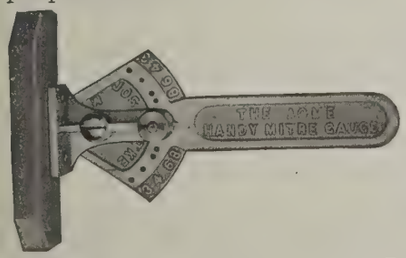
Has been SAVED by USERS of the

Acme Floor Scraping Outfit

during the past five years. Thousands of machines are now in daily operation, and every mail brings letters from users commenting upon the satisfactory work their outfits are doing and the vast amounts of labor expense they are saving.

Now, Mr. Contractor, you do not have to rely upon what I say regarding the merits of my machines, but I want you to let me send an outfit to you on **one week's free trial,** and you can then let the machines demonstrate on your own work just what they can do. If, after working with the equipment for one week, you are not convinced that the same will save you many dollars, and do your floor scraping better than it was ever done before, just pack up the machines, return them to me, and you will owe me nothing.

Write to-day for booklet and full details of my proposition.



The Acme Handy Mitre Gauge

is another labor saving tool. It is absolutely accurate, can be set at any angle and fits in the pocket where it is always ready for instant use. If your dealer does not carry them in stock, then write to me for circular describing this wonderful little tool.

JOSEPH MIOTKE

249 Lake Street : : Milwaukee, Wis.

Triple "A" Spring-Driven Floorsmoother

CUT DOWN EXPENSES

A DOLLAR SAVED is twice made. You can save a lot of money on your floor work by using up-to-date methods and machinery.



You can do much better work, and the houses you build will be worth more money, and draw bigger rent when the floors are properly surfaced.

Do it the Triple "A" way

and you will enjoy health, wealth and happiness—that's the only way.

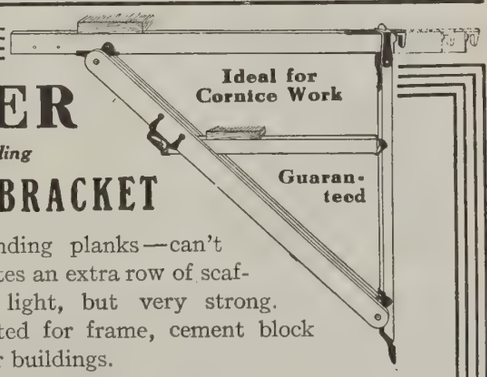
FOR TWO CENTS you can learn all about it—

DROP US A LINE

Triple "A" Machine Co.

30 North Clark Street CHICAGO

SENT ON FREE TRIAL



WEBER

Double-Folding

SCAFFOLD BRACKET

Has two standing planks—can't swing. Eliminates an extra row of scaffolding. Very light, but very strong. Especially adapted for frame, cement block and brick veneer buildings.

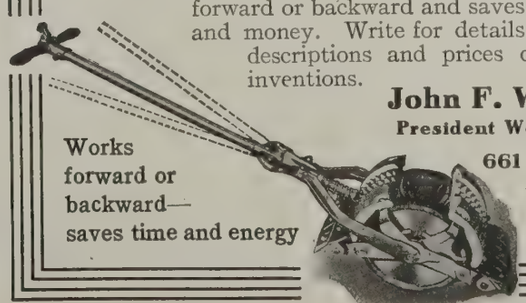
Read This Letter

"Your brackets gave great satisfaction—saved time and lumber—which means money. First thought price high, but now consider them cheapest, handiest brackets on the market. Would not be without them.—Louis A. Greulich, Bellevue, O."

The WEBER DOUBLE ACTING Floor Scraper

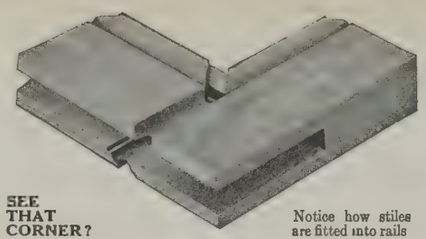
FIVE DAYS FREE TRIAL

Try it for five days on any flooring. If its work isn't the best you ever saw, return it—at our expense. Works forward or backward and saves time, energy and money. Write for details of offer and descriptions and prices of all Weber inventions.



John F. Weber
President Weber Mfg. Co.
661 71st Avenue,
West Allis, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



MADE TO ORDER FLY SCREENS and SCREEN DOORS

WE use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

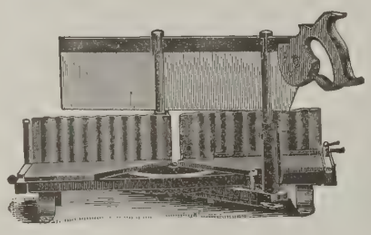
STANDARD SCREEN CO., 1848-50 W. 14th St., Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

GOODELL MITRE BOX

Made of STEEL - Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

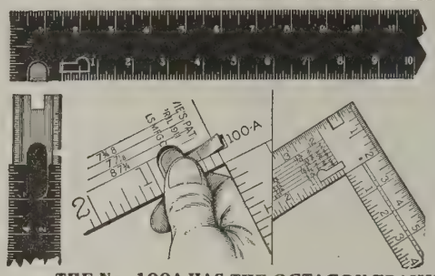
If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

Nicholls Take-Down Square—

It has a Thumb Lock. No Key to Lose.



GUARANTEED TO REMAIN TRUE

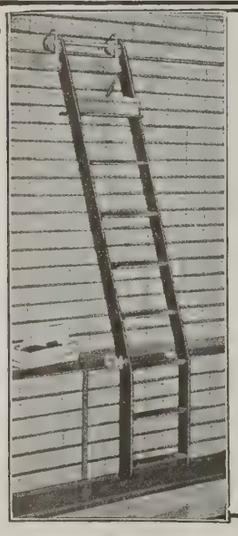
Beveled Bearings take up wear in taking square apart and putting it together, therefore it will remain true. Rust-proof canvas case with each square. If your dealer does not handle our goods and will not order them for you, write us. We have a special inducement to those who order first square in every town. We prepay express.

THE No. 100A HAS THE OCTAGON FRAMING RULE ON BACK

	Polish	Ox. Copper	N. Plated on Copper
No. 3 Standard	$2.50	$2.75	$3.00
No. 100 Standard	2.75	3.00	3.25
No. 100R Framing	3.00	3.25	3.50
No. 100A Framing	3.25	3.50	3.75

Add ten cents to the price of the No. 100R and 100A if 1¾ inch tongue is desired.

NICHOLLS MFG. CO. OTTUMWA, IOWA



Mr. Carpenter and Builder

Why Not Make Some Extra Money

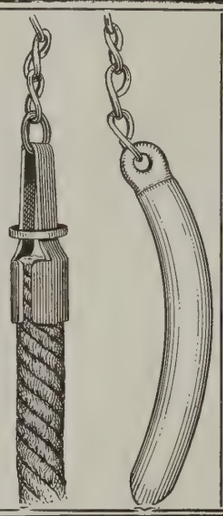
by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY

1442 N. Eighth St., ST. LOUIS, MO.



DO IT NOW

SEND FOR RHEM'S CARPENTER MOUSE CHAIN

63 in. long, fitted at one end with a patent sash cord fastener, at the other end with lead weight. It is the best ever and everyone likes it.

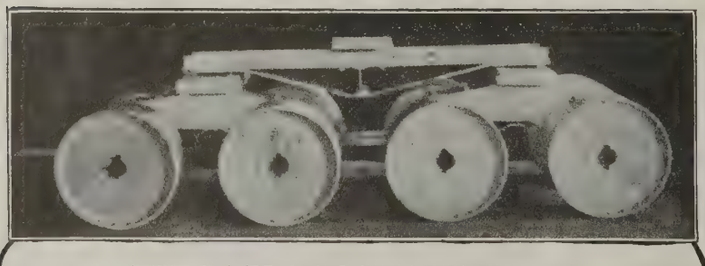
Price, Each, 30 cts. Postpaid

FREE—Our No. 5 Builders' Hardware Catalog and Net Price List.

Please state whether contractor, material man or builder. We do not sell to contractors and builders in Cook County.

REHM HARDWARE COMPANY

1503 Blue Island Avenue Chicago, Ill.



THE LA PLANT HEAVY HOUSE MOVING TRUCKS

When you get a job with an old building on the lot—move it with the La Plant Trucks to another place—itstead of wrecking it. There is more profit in it for you.

La Plant Heavy House Moving Trucks are made of steel—on scientific lines—are interchangeable so they can be worked singly, in pairs or in fours.

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A PRACTICAL up-to-date work on Sanitary Plumbing, comprising useful information, the wiping and soldering of lead pipe joints and the installation of hot and cold water and drainage systems into modern residences. Including the gravity, tank supply and cylinder and tank system of water heating and the pressure cylinder system of water heating. Connections for bath tub. Connections for wash-bowl or lavatory. A modern bath room. Bath tubs. Lavatories. Closets. Urinals. Laundry tubs. Shower bath. Toilet room in office buildings. Sinks. Faucets. Bibb-cocks. Soil-pipe fittings. Drainage fittings. Plumber's tool kit, etc.

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No. "77" STORM-PROOF HANGER

Here is a new combination and one that will please you.

Easy-running, anti-friction roller bearings.

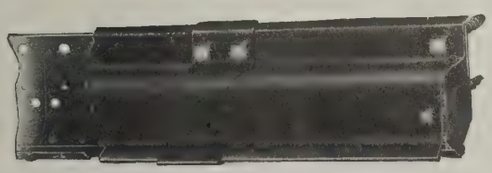
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Tite-Fit



A new departure in barn-door rail.

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Requires no housing, as it fits close against the building.

Perfect tread for hanger wheels.

Bird- and Storm-proof.

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Don't be caught by mere looks and mysterious terms. Find out what the roofing is made of.

And the time to find out is before you buy—it is often costly to find out afterward.

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is made of *natural* asphalt.

The difference between natural asphalt and manufactured or artificial "asphalts" is great. Natural Trinidad Lake asphalt contains natural oils which give it lasting life. They are sealed in Genasco and stay there to defend it permanently against rain, sun, wind, heat, and cold.

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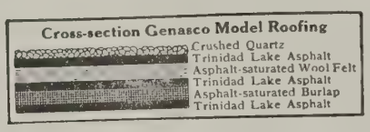
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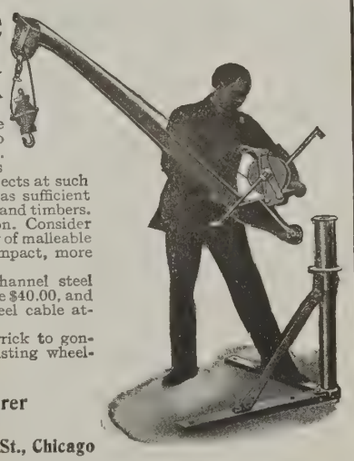
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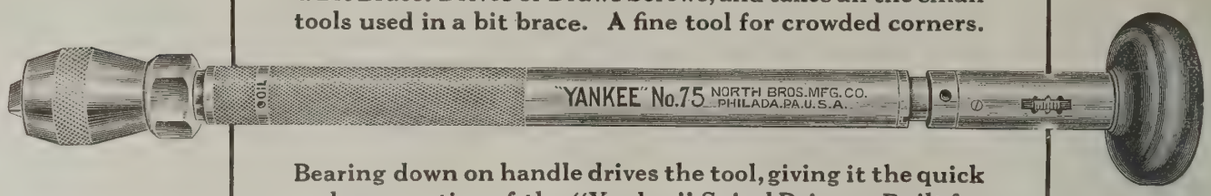
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Actual Use of Tool ½ Minute



Chisels the opening for Locks. Over 5000 Mortisers Sold Mean Something.

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THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

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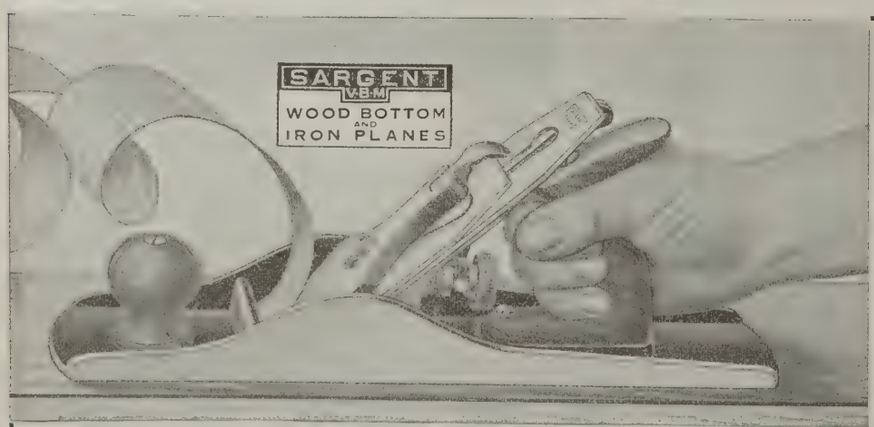
to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

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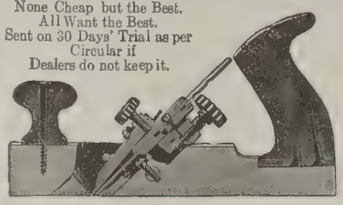
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Our screens are made from kiln dried lumber and have water-proof coped joints and the frames are weather-proofed before the finishing coats are applied.

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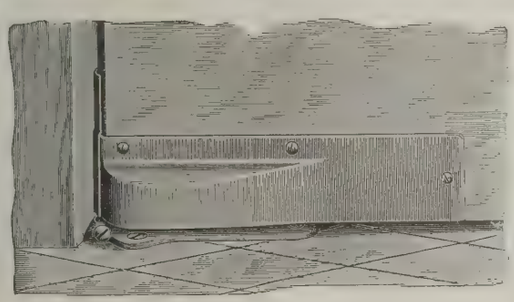
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Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

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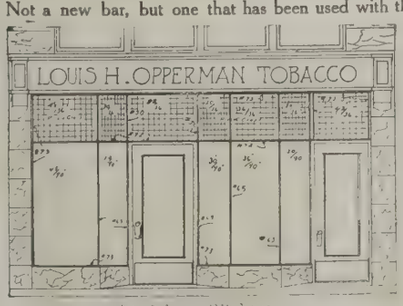


sell because they are the best type and latest improved, **Up-to-Date** kind. 1909 automobiles were the best last year, but now they are a "back number." "Ketch" on? Hardware dealers supply them. If yours don't, WRITE US.

The STANDARD MFG. CO., : Shelby, Ohio

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Not a new bar, but one that has been used with the greatest success by leading architects and contractors in every part of the country.



These men selected it because it combines strength, style and safety better than any bar made.

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Architects and contractors who know LINOFELT specify it regularly. Those who do not know LINOFELT are missing their best opportunity to win an extra degree of enthusiastic gratitude from their clients and customers. And this "extra degree" is what puts the money in your pockets. Turn to page 11 for further details and jot this down in your memory now:

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Will eliminate all delays, making your blue prints at a moment's notice regardless of weather conditions. So simply and thoroughly constructed that a boy or girl can operate it, producing perfect prints at a cost of ½ cent per sq. ft. It is the most efficient and lowest priced machine on the market.

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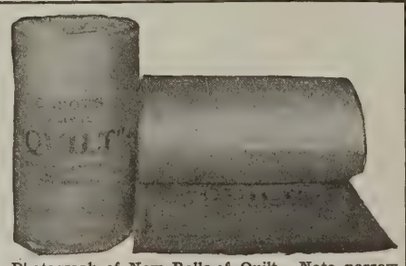
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It has been compiled by experts and will show you the one best way to get the best results from every kind of a saw. There is nothing of greater importance than a correct knowledge of the proper care and use of tools, among which the saw, to give the best results, demands the most expert attention. You should write for your free copy today. It will give you a better knowledge of the diseases and proper treatment of saws. Send postal for Saw Points Booklet No. 7.

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The Original Scientific Insulator and Deadener
50% Better than Ever Before



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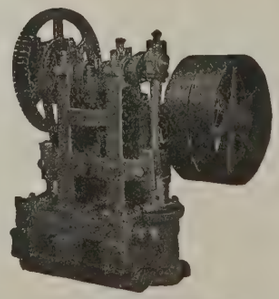
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Made in 250 foot rolls.
Wonderfully strong, untearable paper.
Fastened stitching that cannot rip.
No creases or lumps.
18-inch strips to go between studs.

One layer is warmer than forty layers of common building paper. The only perfect sound-deadener.

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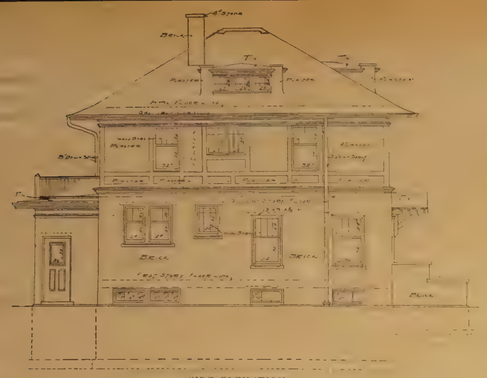
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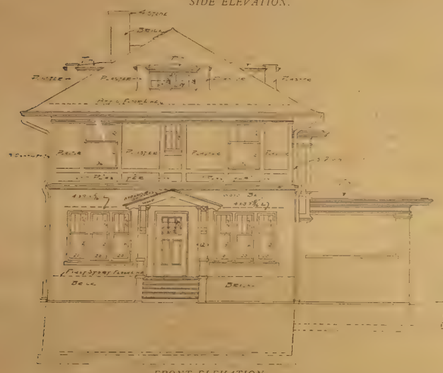
NATIONAL BUILDER DESIGN No. 349, THE WEATHERPROOF HOUSE

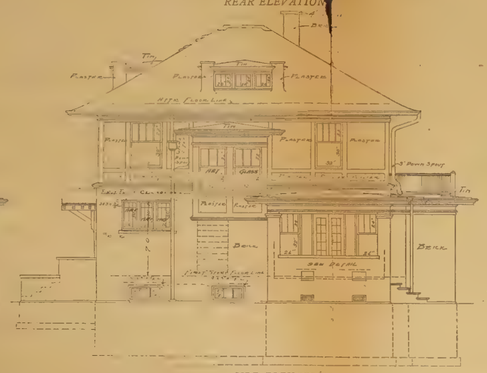
SCALE FOR FLOOR PLANS, 1 INCH EQUALS 4 FEET. SCALE FOR ELEVATIONS, 1 INCH EQUALS 8 FEET.

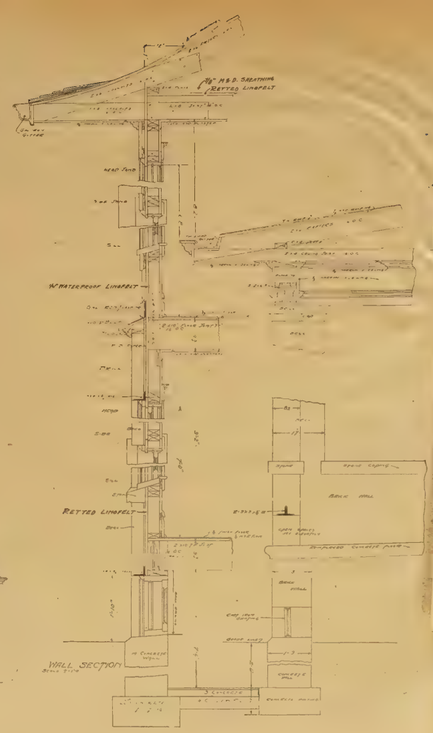
FOR ESTIMATE, SEE PAGE 29

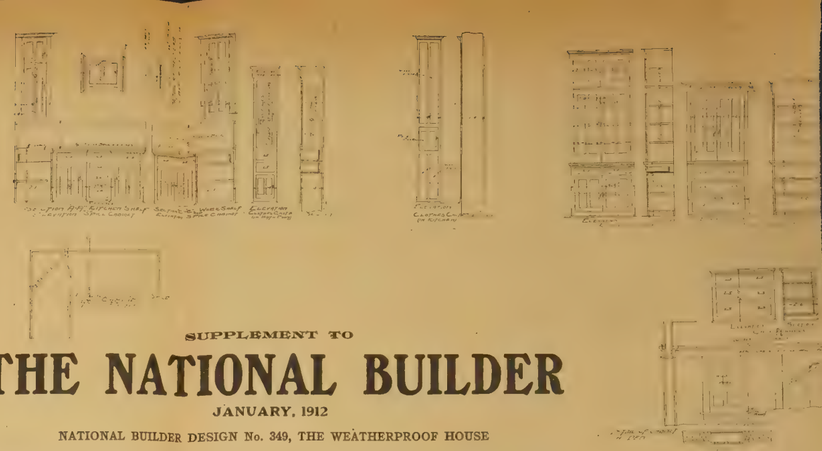

SIDE ELEVATION.

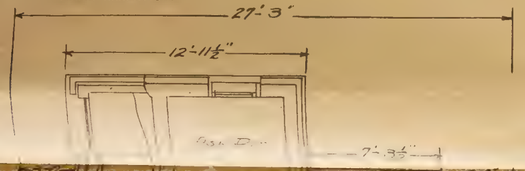

REAR ELEVATION.

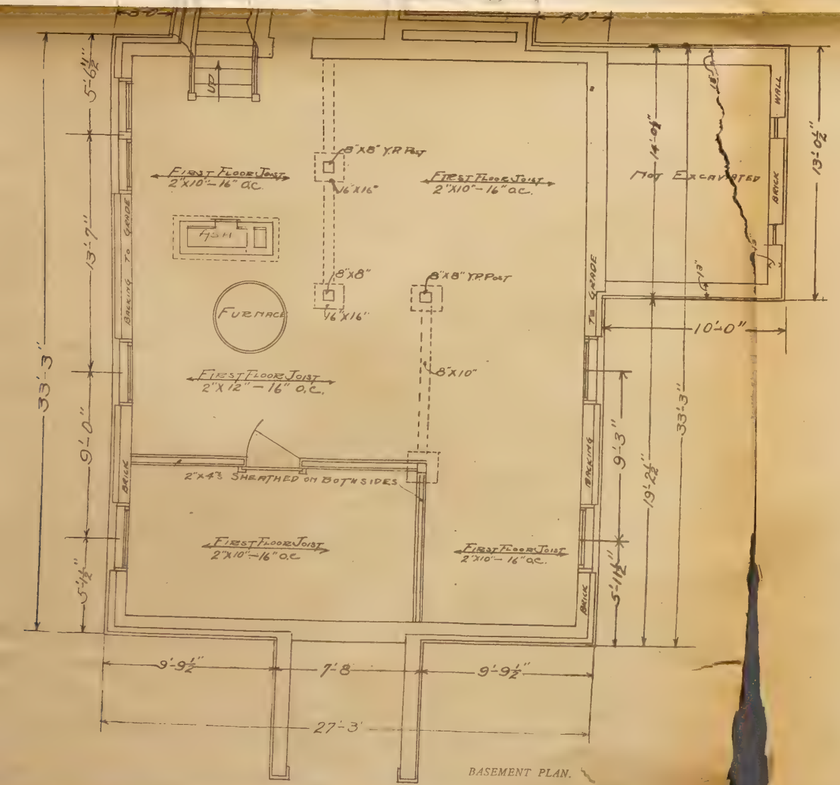

FRONT ELEVATION.


SIDE ELEVATION.

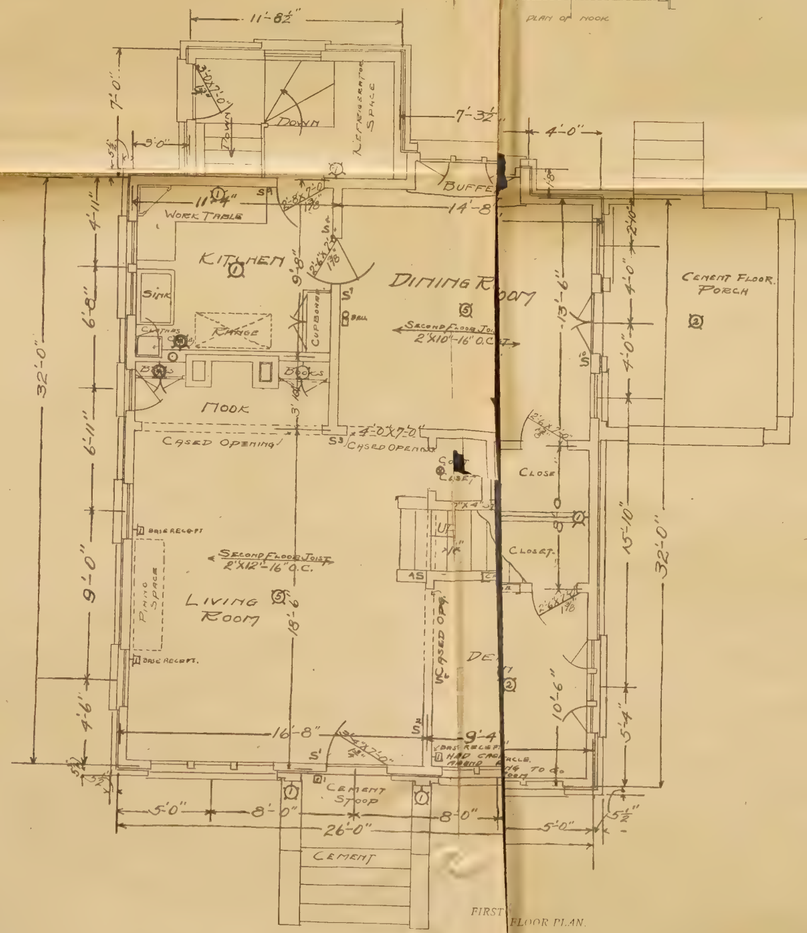




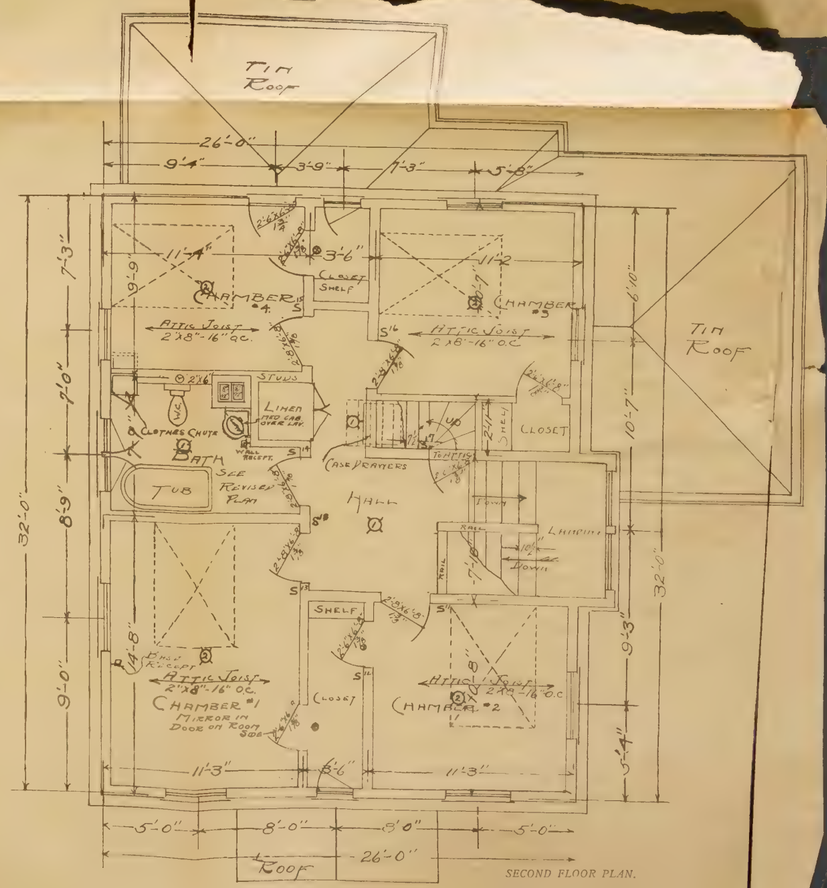




BASEMENT PLAN.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

THE NATIONAL BUILDER

Vol. 53 CHICAGO, JANUARY, 1912 No. 1



THE WEATHERPROOF HOUSE, built at Aurora, Ill.

NATIONAL BUILDER DESIGN No. 349

Worst & Shepardson, Architects, Aurora

For Floor Plans, Elevations and Details, See Supplement Sheet of this number. Estimated Cost, $4,607.75

THE WEATHERPROOF HOUSE

We have here a typical residence of moderate cost, with brick veneer on first story and stucco on the second. A building of this type, protected by Linofelt or similar weatherproofing, is both warm in winter and cool in summer. The plans show many other conveniences frequently not found in houses costing considerably more.

ESTIMATE OF WEATHERPROOF HOUSE

By I. P. HICKS

EXCAVATING.

240 yards at 35c	$ 84.00

MASONRY.

160 cubic ft. concrete footing, 25c	$ 65.00
1,200 cubic ft. concrete wall, 25c	400.00
250 square ft. reinforced concrete floor, 20c	50.00
103 yards cement cellar floor, 70c	72.10
200 lineal ft. stone coping, 40c	80.00
1 stone cap for chimneys	6.00
4 cement steps	8.00
7 stone sills, 4 ft. 0 in., $1.60	11.20
2 stone sills, 3 ft. 6 in., $1.40	2.80
3 stone sills, 7 ft. 8 in., $3.00	9.00
2 stone sills, 6 ft. 6 in., $2.60	5.20
1 stone sill, 11 ft. 0 in	5.00
1 stone sill, 6 ft. 0 in	2.40
1 stone sill, 3 ft. 8 in	1.50
100 yards outside plaster, 75c	75.00
18 lineal ft. chimney breast, $2.25	31.50
25 lineal ft. chimney, above breast, $1.75	43.75
11,650 face brick laid in wall, $24.00	279.60
3,500 common brick laid in wall, $12.00	42.00
Total masonry	$1,190.05

LUMBER BILL.

	Feet.
4, 8x8x7 ft. posts	150
1, 8x10x10 ft. girder	67
1, 8x10x14 ft. girder	93
12, 2x4x16 ft. basement partitions	132
8, 2x10x18 ft. first floor joists	240
8, 2x12x18 ft. first floor joists	288
12, 2x10x12 ft. first floor joists	240
12, 2x10x16 ft. first floor joists	324
16, 2x10x10 ft. first floor joists	264
8, 2x10x18 ft. second floor joists	240
8, 2x12x18 ft. second floor joists	288
14, 2x10x12 ft. second floor joists	280
14, 2x10x16 ft. second floor joists	294
18, 2x10x10 ft. second floor joists	297
28, 2x8x20 ft. attic floor joists	756
28, 2x8x16 ft. attic floor joists	588
10, 2x4x18 ft. porch joists	120
10, 2x4x20 ft. porch joists	130



6, 2x6x18 ft. for porch	108
6, 2x6x20 ft. for porch	120
6, 2x6x12 ft. for porch	72
24, 2x4x16 ft. for dormers	264
20, 2x6x14 ft. porch rafters	280
6, 2x6x18 ft. porch rafters	108
14, 2x6x18 ft rafters	252
50, 2x6x16 ft. rafters	800
4, 2x6x26 ft. hip rafters	104
8, 2x6x18 ft. bath partition	144
140, 2x4x18 ft. outside studs	1,680
40, 2x4x18 ft. first story part	480
60, 2x4x16 ft. second story part	660
50, 2x4x16 ft. plates	550
30, 2x4x12 ft. plates	240
30, 1x4x12 ft. bridging	120
30, 1x6x12 ft. braces	180
20, 2x2x18 ft. furring	120
Total feet framing lumber	11,073
11,073 ft. framing lumber, $26.00	$ 287.89
3,000 ft. 1x10 No. 2 sheathing, outside walls, $26.00	78.00
500 ft. 8 inch lap coal bin, $27.00	13.50
1,800 ft. 1x8 sheathing, rough floors, $26.00	48.60
950 ft. 6 in. fence flg., attic, $30.00	28.50
940 ft. 3/8x2¼ face oak flg., $80.00	75.20
330 ft. 3/8x2¼ face maple flg., $60.00	19.20
950 ft. 3/8x2¼ face beech flg., $60.00	57.00
850 ft. 5/8x4 in. x 12 to 16 ft. ceiling, for cornice, $30.00	25.50
200 ft. 5/8x4x10 ft. ceiling, for porches, $30.00	6.00
250 lineal ft. 1x8 finish, $45.00	7.50
90 lineal ft. 1x6 finish, $45.00	2.02
200 lineal ft. 1x12 finish, $45.00	9.00
300 lineal ft. 1x10 finish, $45.00	11.25
150 lineal ft. 1x4 finish, $45.00	2.25
48 lineal ft. 1⅛x12x12 ft. finish, $45.00	2.70
24 lineal ft. 1⅛x8x12 ft. finish, $45.00	.90
300 lineal ft. 1⅛x6x12 ft. finish, $45.00	8.10
1,700 ft. 6-inch, No. 2 sheathing, for roofs, $26.00	44.20
12,000 clear cypress shingles, $4.50	54.00
6, 2x10x12 ft. cellar steps	3.50
60 ft. 1x4x12 ft. fir flg., $45.00	2.70
Total lumber bill	$ 787.51

WEATHERPROOFING.

2212 sq. ft. Retted Linofelt at $0.017	$ 36.60
920 sq. ft. Waterproof Linofelt at $0.024	22.08
Weatherproofing	$ 58.68

MILL WORK.

5 cellar window frames, 12x12, 3 lt., $1.75	$ 8.75
1 twin frame, 10x12, 3 lt.	3.50
1 plank door frame, 2 ft. 8 in. x 6 ft. 8 in.	2.25
5 cellar sash, 12x12, 3 lt., 1⅜, $1.50	7.50
2 cellar sash, 10x12, 3 lt., 1⅜, $1.40	2.80
1 cellar door, 2 ft. 8 in. x 6 ft. 8 in., 1⅜	2.40
90 ft. 4½ in. crown mold, 2½c	2.70
200 ft. 3½ in. crown mold, 2c	4.00
200 ft. 2 in. band mold, 1½c	3.00
160 ft. 1½ in. band mold, 1c	1.60
100 ft. ⅞ in. cove mold	.75
200 ft. 1½ in. bed mold, 1c	2.00
300 ft. 3 in. bed mold, 2c	6.00
2 porch newels, 50c	1.00
1 piece porch rail, bottom, 14 ft., 6c	.84
1 piece porch rail, bottom, 12 ft., 6c	.72
1 piece porch rail, top, 14 ft.	.84
1 piece porch rail, top, 12 ft.	.72
78 balusters, 1¾x1¾x20 in., 4c	3.12
2 brackets	1.50
10 corbel brackets, 30c	3.00
1 triple sash frame, 16x26	6.00
1 window frame, 32x30x24, T. S. D.	2.25
5 window frames, 32x30x22, T. S. D., $2.25	11.25
2 sash frames, 20x30, $1.50	3.00
1 sash frame, 18x24	1.25
2 frames, 36x30x22, $2.50	5.00
2 triple frames, 20x32x20, $4.50	9.00
1 twin frame, 32x30x22	4.50
2 frames, 26x32x22, $4.50	9.00
1 frame, 32x30x24	2.25
1 frame, 24x20x20	2.25
2 frames, 32x32x24, $2.50	5.00
1 triple sash frame, 16x30	4.50
1 twin sash frame, 20x30	4.00
1 twin sash frame, 20x30	2.00
1 sash door frame, 3 ft. 0 in. x 7 ft. 0 in.	3.00
1 twin dormer, 24x20	4.00
2 triple dormer frames, 20x20	12.00
1 O. S. door frame, 3 ft. 0 in. x 7 ft. 0 in., 1¾	3.00



1 O. S. door frame, 3 ft. 4 in. x 7 ft. 0 in., 1¾	3.25
3 sash, 16x26, art, $2.50	7.50
2 sash, 20x30, div., $2.00	4.00
1 sash, 18x24, div.	1.80
3 sash, 16x30, div., $1.70	5.10
3 sash, 20x30, div., $1.90	5.70
2 sash, 24x20, div., $1.90	3.80
6 sash, 20x20, div., $1.80	10.80
2 sash, 1 ft. 6 in., x 7 ft. 0 in., div., $3.00	6.00
2 windows, 36x30x22, div., $2.50	5.00
6 windows, 20x32x20, div., $2.25	13.50
2 windows, 32x30x22, div., $2.40	4.80
2 windows, 26x32x22, div., $2.30	4.60
1 window, 32x30x24, div.	2.50
1 window, 24x20x20, div.	2.00
2 windows, 32x32x24, div., $2.40	4.80
1 O. S. door frame, 3 ft. 0 in. x 7 ft. 0 in., 1¾ in	2.50
1 O. S. door frame, 3 ft. 4 in. x 7 ft. 0 in., 1¾	2.75
1 O. S. door, 3 ft. 0 in. x 7 ft. 0 in. x 1¾	5.50
1 O. S. door, 3 ft. 4 in. x 7 ft. 0 in. x 1¾	12.00
1 O. S. door, 2 ft. 8 in. x 6 ft. 8 in. x 1¾	4.00
1 O. S. door frame, 2 ft. 8 in x 6 ft. 8 in. x 1¾	2.25
1 door, 2 ft. 8 in. x 7 ft. 0 in. x 1⅜	6.00
3 doors, 2 ft. 6 in. x 7 ft. 0 in. x 1⅜, $6.00	18.00
5 doors, 2 ft. 8 in. x 6 ft. 8 in. x 1⅜, $4.00	20.00
5 doors, 2 ft. 6 in. x 6 ft. 8 in. x 1⅜, $4.00	20.00
140 door casings, 10 ft. wds., 2½c	3.50
168 door casings, 12 ft. wds., 2½c	4.20
224 door casings, 14 ft. drs., 2½c	5.60
288 door casings, 12 ft. drs., 2½c	7.20
300 door head casing, 2½c	7.00
320 door cap mold, 3c	9.60
320 door cap filler, ½c	1.60
120 door window stool, 2½c	3.00
120 door apron, 2c	2.40
252 door stops, 14 ft., 1½c	3.78
260 door window stops, 14 ft., 1c	2.60
320 door picture mold, 1½c	4.80
520 door base, 3c	15.60
520 door base mold, 1c	5.20
520 door floor mold, ½c	2.60
50 door chair rail, 5c	2.50
Front stairs	55.00
Attic stairs	15.00
Rear steps	8.00
2 bookcases, $8.00	16.00
Medicine case	5.50
Buffet	50.00
Corner closet and kitchen table	30.00
Linen closet	10.00
Case of drawers	6.00
Mantel	50.00
5 closets, $1.50	7.50
Clothes chute	12.00
Kitchen cupboard	10.00
Den cabinet	7.00
Total mill work	$ 703.52

CARPENTER LABOR.

11,073 ft. framing lumber, at $10.00	$ 110.73
7,000 ft. sheathing, $1.00	70.00
950 ft. 6 in. flooring	11.87
2,220 ft. finish floor, $20.00	44.40
136 lineal ft. cornice, 18c	24.48
Porch ceiling	3.00
200 lineal ft. porch and dormer cornice, 15c	30.00
Setting frames	14.40
Outside steps and cellar stairs	10.00
12,000 shingles, $2.25	27.00
2,000 ft. smoothing floors, $15.00	30.00
40% cost of mill work for finishing same in building	281.40
Total	$ 657.28

RECAPITULATION.

Excavating	$ 84.00
Masonry	1,190.05
Lumber bill	787.51
Mill work	703.52
Weatherproofing	58.68
Carpenter labor	657.28
Hardware	68.00
Tin work	108.00
Plastering, 790 yds., 27c	213.30
Plumbing	260.00
Electric wiring	60.00
Painting	198.00
Incidentals, 5%	219.41
Total estimate	$4,607.75

The approximate number of cubic feet in this building is 28,240, making the cost of construction just a fraction over sixteen and one-half cents per cubic foot.

EDITORIAL NOTES AND COMMENTS

AND NOW WE WRITE IT 1912.

Let us hope all our readers made good resolutions on the first of the year, and that they will not fail to live up to their resolutions. So mote it be!

Noise proves nothing. Often a hen who has merely laid an egg cackles as if she had laid a star of the first magnitude. Silence, it is said, is golden, simply, we believe, because it gives opportunity for thought and meditation. Nothing of consequence ever was, or ever will be, achieved without forethought and brainy preparation.

Modesty is one of the sweetest and most desirable of qualities and yet too much modesty hinders advancement. When this quality is over-developed it antagonizes aggressiveness, without which no great success can be attained. Habit is habit, and not to be flung out of the window by any man, but coaxed downstairs a step at a time.

The limbs and lives of workmen are worth as much to the owners and their families as are the limbs and lives of the soldier to himself and his wife and family. The one builds and improves his country, the other, at times, and often unnecessarily, pulls down and destroys. Yet the destroyer secures a lifelong pension for himself and often for others, but the poor fellow who falls from a scaffold or gets ground to mincemeat while in the performance of his duty, in assisting in the making of the country, gets but little sympathy and less substantial aid. His wife and family are left to battle with all kinds of adverse circumstances, without help or aid from any source but their own efforts. It may well be asked why such conditions exist. Of late a more humane wave of thought —after much fighting—seems to be taking the place of the old order of things on questions of this kind. The insurance act recently passed by the British House of Commons is a far reaching one in the direction of making some fair arrangement towards providing for disabled, or sick workmen, and will lead up to even better conditions in favor of compensation to the injured.

President Taft recognizes the necessity of doing something for the worker in the way of providing some sort of compensation for those who become injured or disabled by accident or otherwise, and indeed the whole country is awakening to the fact that something ought to be done on the lines foreshadowed in the recent message of the president. The following, which is taken from "The Chicago Tribune," indicates the hold the question is taking among the employers of labor, as well as other thinking people. The big business interests of the country have accepted the inevitable and voluntarily shouldered the burden of general liability insurance, according to G. A. Ranney of the International Harvester Company, who appeared some days ago as representative of the National Civic Federation and before the Congressional Committee on Employers' Liability and Workmen's Compensation.

The commission seemed particularly interested in Mr. Ranney's testimony owing to the fact that he told of the actual operations of the system inaugurated several years ago by the Harvester Company.

Mr. Ranney, who is a Chicago man, said the year before the system went into effect the company paid out $20,000 on account of damages for injuries to employees and the litigation connected therewith. The next year, which was just two years ago, the company paid out $60,000 merely for administration expenses of the liability system, the total cost of which was $125,000.

"Do you mean to say," asked Representative Brantley of Georgia, "that you put in a $60,000 administration system to take care of a condition that the year before had cost you only $25,000?"

"Yes," Mr. Ranney replied. "But we didn't do it just to meet that condition. We saw the handwriting on the wall. We believed legislation on the subject would soon be enacted, and we also believed the voluntary adoption of this workman's compensation plan was the best for our employees and the best for ourselves."

Living conditions in Germany, as in the world generally, are seriously affected by the continued rise of food-products, many having advanced far above all previous records. The imperial and state government, as well as municipalities, chambers of commerce, and workmen's associations, have been actively discussing means to alleviate the distressing conditions. But wherever such conditions become galling they mean war against all artificial forms of dearness, and the German people resent the fact that so far the Imperial Government has not granted the petition to reduce the customs' tariff on bread, cereals, potatoes, etc., to open the frontiers more widely for the importation of foreign meat; and to restrict the large exports of German grain. Several of the States having no say with regard to customs duties have taken what measure they could to alleviate the situation. The Bundesrath, or Federal Council, is now discussing remedial measures to be proposed to the Imperial Government. What they can be short of a reduction of imposts on foodstuffs and of bonuses on exported foodstuffs it is not easy to see. The situation is a grave one, and requires prompt and generous handling, apart from the fact that the elections are near.

THE INFLUENCE OF MATERIALS ON DESIGN IN WOODWORK

MR. F. W. TROUP, F. R. I. B. A., delivered an interesting lecture at Carpenters' Hall on February 10 on the above subject. After lucidly describing timber houses—those in our own country in what is called "half timber" construction, those in Norway, Switzerland, and other northern countries in pine and, of course, usually "whole timber," i. e., built of solid logs—the lecturer went on to say that when in doubt the designer cannot do better than refer to the old examples in our museums and unrestored buildings, and if you are wise you will take the craftsman into your confidence and you may be able to learn something of him, and at the least you will know what he is equal to, and perhaps find it advisable to modify the designs to suit his capabilities, or, better still, leave something for him to modify as the work proceeds. Young architects are told to get to the bench and work with their hands. Now it may seem to them impossible and impracticable to give up the time to acquire even a smattering of half the crafts that go to house-building, but if the young architect does but learn the rudiments of one craft or trade he will find that it gives him an unexpected insight, a kind of instructive knowledge of the others, that will surprise him and reward him for his labor. In designing, above all things avoid being clever merely for the sake of effect. Cleverness is not an art—more often it is mere license and a want of restraint. Be certain of this, that your best work is not that part in it which you most admire yourself, and you will be safe ruthlessly to cut out that part from the design. Choose to be what critics call commonplace, rather than attempt the clever, the smart, the up-to-date. As a last resource, if in doubt, do what you believe to be right, constructively right and true to the nature of your material, and the result will look right, or at any rate it will be the best that you are capable of.

In conclusion, the lecturer said the design is so completely governed by the material that it is really little more than the resultant of two main forces, the inert material with all its possibilities on the one hand, and on the other the aggressive tools of the craftsman with his infinite capabilities for good or evil—these two forces, the one passive, the other active, brought together by the craftsman and guided partly by his knowledge and experience of what is possible and what is best, and partly by his skill and practice in the use of the tools themselves. These produce the main lines, they affect the assembly or bringing together, the building-up of the whole. That which remains for fancy and imagination to play with is comparatively unimportant. There is indeed a right and a wrong way of letting loose the fancy in carving, painting, or whatever form of gaiety the craftsman allows himself to indulge in, and the right way is always subservient. As soon as indulgence in the fantastic, the tour-de-force or attempt to imitate other materials, begin to get the upper hand, so surely does "debased art" become the true and only description of the work. The theatrical, the inessential, the superficial, rules and leads on to the same end that has been described by a great writer as the vile torrent of the Renaissance.

THE CONTRACTOR AND THE AUTO By STUART STEVENS SCOTT

THE question whether the auto truck is a paying proposition has always, and always will be, paramount among those who consider utilizing the power wagon instead of the horse-drawn vehicle.

Labor and transportation are commodities and a saving in either means dollars and cents in the pocket. It is true of a motor car none the less of a horse that to get fair returns upon the investment one must have work to be performed. The first cost of a motor car exceeds the cost of two span of the most expensive draught horses and wagons, yet, not only must the animals be fed all the time but they have their limits, physically. In winter one must double the team to overcome the icy pavements, or the muddy roads. In summer the animals must be carefully driven lest they be killed by the fierce heat.



On the other hand the motor truck knows neither heat nor cold, it stops not at the steepest hill, be it dry or wet, and as long as it is supplied with oil it will run. Its physical endurance may be said to be that of its driver. It not only does this, but at the same time it will carry three to four times the weight that two span of horses can draw.

The ills of a motor depend largely upon the man who drives it, and just as an experienced horseman can get better results with equines so can an experienced man get better results with a motor. Many owners of motor trucks make the mistake of employing inexperienced men because they can be hired cheap. It is a mistake, the greatness of which can better be shown on the cost card at the end of the year.

The most important question, after all, is that of service, of amount of delivery you have to do, the distance you have to haul and the number of teams you use. It has been contended, as I will endeavor to show, that the motor truck is best for long hauls and short stops. By users of machines in several lines of business it has been found that the machine can cover a far greater distance in a day and can deliver three to six times the quantity of material but to get the maximum results with a minimum of expenditure all of the hauls must be lengthy.

That this is so is all the greater reason why the motor truck should be welcomed, particularly by contractors. It gives to them the advantage of entering into districts which were previously barred on account of cost of transportation by horse-drawn vehicles. When distance is eliminated one has accomplished a great deal. For instance, a constractor might be barred from competing in another town, say 15 or 20 miles away, because the man on the ground would be able to deliver more cheaply. With a motor truck 15 or 20 miles is nothing.

To illustrate this more forcibly, take the National Building & Supply Company, as an example. This concern employs three motor trucks, two of them of 5 tons and one of 4 tons capacity. These machines have been in service long enough to enable Mr. Harry P. Boyd, the secretary and treasurer, to get a good "line" on them. He says that for long hauls and short stops they are far less expensive per mile than horse vehicles. On occasions he makes deliveries at places 20 miles from the city. With a truck he can make four round trips a day, delivering 20 tons. It would require six teams to perform this same service within the same time.

Mr. Boyd has kept a most accurate cost card on his company's machines and is therefore able to give a most intelligent report as to expense for mileage. In the first place each driver is supplied with a printed card prepared to bring out minute data. At the end of the month it is only necessary to refer to these cards, to make the additions and the result is at hand.

Taking a month at random Mr. Boyd's results read:
Material delivered, 650 tons.

Days, 27; mileage, average, 42½; total, 1,140 miles.

Oil, repairs and wages of driver and helper	$157.64
Wear on tires, 6c per mile	68.40
Depreciation on $4,000 investment at 20 per cent	67.50
Insurance against accident, fire, etc	20.25
Total	$313.79

From these figures it will be seen that there is something convincive about them, but there is one feature in Mr. Boyd's handling that does not appear on the surface and that is his method of operating his machines. Each of the machines is what is known as the dump type, the dumper being a great time saver. For instance, a load of cement, lime or other bagged material, if handled piece by piece, would require two men at least 30 minutes to unload 100 sacks. By dumping the 100 sacks can be deposited in 3½ to 4 minutes and, as the men are familiar with that method, none of the sacks are injured. At the warehouse, in anticipation of the arrival of the trucks, all of the material to be hauled is arranged as closely as possible and the minute the trucks are in position the entire force of the company is put to work. In this manner the trucks are loaded in about 10 minutes.

"The saving of time is most important," said Mr. Boyd to the writer. "I estimate that it costs about $1.50 an hour to operate a truck, and this is about 2½ cents a minute. If, therefore, I can save, in loading and unloading, 45 minutes on each load I have made $1.12, an item that will make itself felt at the end of a year."

There is one thing certain and that is that if this concern can use a motor truck in its business, machines may be used anywhere for the steep hills, cobble-paved streets and wretched suburban roads on which it operates offers to the work an example of how power may overcome even the worst topographical disadvantages.

SOME WELL-DESIGNED FLOWER GARDENS

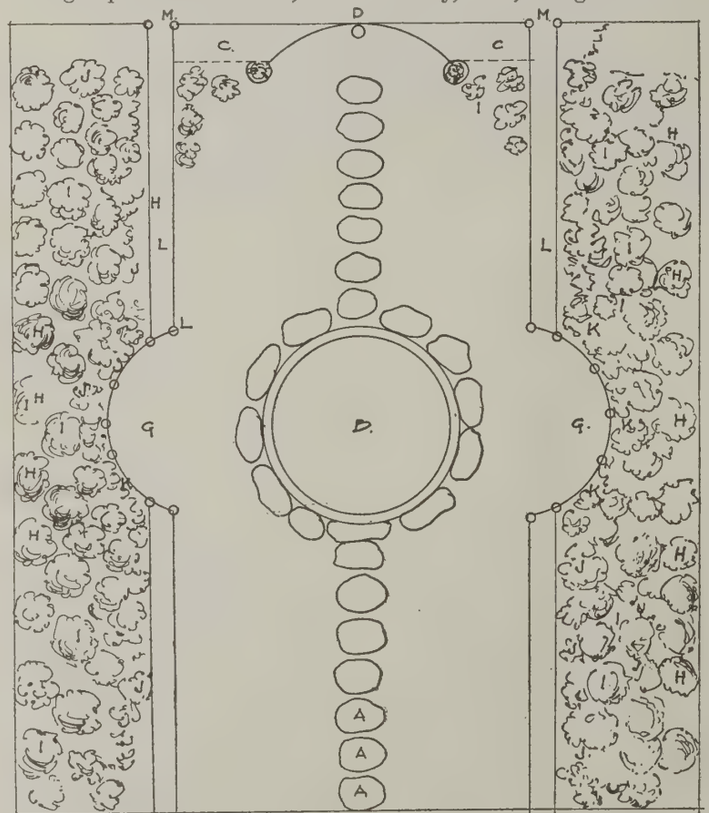
By IDA D. BENNETT

THERE is no better foundation for a successful flower garden than a well thought out and executed plan. Given a definite plot of ground in a favorable situation, preferably at the side or rear of the house, but where an unrestricted view may be had of its extent from one or more of the living rooms of the house, and it only remains to select a design which will be in harmony with the shape and extent of the plot and not incongruous to the surroundings.

A well laid out garden, with its well constructed walks and orderly beds, protecting walls and other accessories has a certain beauty independent of its enrichment of flowers. The garden constructed without any definite plan—a bed here, another there, a mass of foliage or vines in out-of-the-way corners used to mask an unsightly object or view is a very different affair from the garden which is laid out with a definite purpose and made to conform strictly to a carefully thought out plan.

The accompanying plans are especially suited for development along with or following the construction of the residence itself, and its architectural features should, as far as possible, conform to those of the house. For illustration: a brick house should have for its garden, walks and walls of brick, while cement construction would naturally follow the house of stucco or concrete. A frame house will be more in harmony with ornamental board fences, timber pergolas and seats and tables of wood, painted to harmonize with the color or trim of the house, though there is nothing so attractive in a garden as white.

In the accompanying diagram "A" a long, narrow garden, suitable for the rear of a village or suburban lot, or for the side of a larger place is indicated, the shrubbery, here, being massed at


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to be avoided. It is even better to dispense with walks altogether, than to mar a small lawn by them.

Plan "B" features another oblong garden in which some charming effects of broken vistas are achieved by bringing the side border of shrubbery to a point midway of the length of the garden. In achieving this effect a half circle of turf half the diameter of the yard is outlined directly in the rear of the house. This is surrounded with a brick, gravel or cement walk and two rods of broken ground planted to shrubbery and perennial intervenes between this and the main lawn, the shrubbery nearly meeting at its intersection with the central walk of the garden. The shrubbery should be rather tall and heavy in the rear of this point, growing gradually lower and less dense as it recedes towards the house and towards the rear of the lot.

The rear of the lot is confined by a high wall of stone, or brick, or wood in front of which a rockery of large boulders is constructed as a background for a lily pool of cement bordered with rough stones. If sufficient effective, large stones are available to raise the rockery to a sufficient height just back of the pool it will add much to its beauty to pipe water to the topmost point and let it fall in a feathery cascade from rock to rock into the pool below. One or two stones hollowed out into shallow receptacles will furnish bathing places for birds too small or timid to venture into the pool itself, and the rocks, near the water, may be planted with moisture loving ferns and plants, those requiring less humidity being relegated to the dryer portions.

In selecting shrubbery for the borders it is best to use a number of plants of the same kind rather than a great variety of single plants; also, it is well to plan to have something in bloom all the time. Commencing with the various Deutzias, which commence to bloom in May and continue well into June, one may plant the new hydrangea arborescense, which blooms from June to August; Hydrangea Panniculata, from mid-August to September; Cochorus, which blooms all summer; Altheas, from August last through September; the new Wiegelia Eva Rathke, practically an all summer bloomer, and the Tamarix, some variety of which is in bloom from early May to September. And, of course, one will plant liberally of the flowering trees as, although these bloom at practically the same season, they make an excellent background for the shrubs when these are in bloom.

In front of the shrubbery one should grow such effective perennials as foxgloves, sweet Williams, shasta daisies, hibiscus, delphiniums, larkspurs, aquilegias and the like, and interspersed among these should be lilies and lilies and lilies, and as an edging, tulips and hyacinths galore. Star the lawn with crocus against the coming of the March winds and the blue bird's note, and make it bright with the gold of daffodills and white of narcissus, and your garden will be a thing of beauty from frost to frost.

BINDING EFFECT OF ARCHITECTS' CERTIFICATES

By W. J. STANTON

IT HAS been generally held that an agreement in a building contract that there shall be no liability to pay for the work done, except upon an architect's certificate, is valid, and when such a certificate is inserted in the contract, the certificate must be substantially such as the contract calls for, or it will not authorize a recovery.

When provision is made in a building contract for the payment of the price, or a portion or portions of such price, upon the certificate of the architect in charge of the construction of such building, the obtaining certificate is a condition precedent to the right to require payment, and such condition must be strictly complied with or a good and sufficient excuse shown. No action can be maintained upon the contract in the absence of such certificate, unless it has been demanded of the architect and fraudulently or arbitrarily withheld, or has been withheld by a clear mistake.

If, after the work has been substantially completed, the architect refuses to give a certificate, and such refusal is based on unreasonable requirements, the failure to obtain the certificate does not bar a recovery by the contractor, although its procurement by the contractor is made a condition to recovery. If the contract between the parties for the erection of a building provides that payment is to be made upon the presentation of a certificate signed by the architect, his arbitrary refusal to act upon matters left to his decision under the contract dispenses with the necessity for procuring a certificate before an action is brought to recover payment.

If the certificate required is arbitrarily and dishonestly withheld, the builder may recover on showing this fact, and that he has performed the contract according to its terms. If a party contracts to furnish stone to erect a building, with reference to stone from a particular quarry to be used and the superintendent selected by the parties, and upon whose certificate payment is to be made, recommends it, and the contractor uses it, and receives certificates after using it on part of the building, such superintendent cannot, by fraudulently refusing to furnish the contractor with a certificate that he has completed his contract, on the pretext that the stone used is not the proper kind, deprive the contractor of the price he was to receive for furnishing the stone.

Where the contract provides that payments shall be made only upon certificates of the architect that the work has been done in a good and workmanlike manner, the fact that payments have been made from time to time, without requiring strict performance of such condition, is not a waiver thereof. If there remains any material part of the work which can be reasonably done in accordance with the contract, the architect may rightly withhold his certificate until the contractor has completed such work, and, so long as he can rightfully withhold his certificate, there can be no recovery.

If the contract stipulates for payment by the owner, in consideration of performance by the contractor, in installments, provided that in each case an architect's certificate shall be obtained that the respective payments have been reached and that the work has been done, such certificate is not requisite to entitle a subcontractor to enforce a mechanic's lien for material furnished for the building, in a case where the owner has completed the work, according to the contract, upon the contractor's failure to perform.

An architect is liable in damages for negligent and erroneous statements to his employer as to the value of the work done by the builder under which the latter is overpaid, if such statements are independent of the certificate called for by the contract between the employer and the builder.

A provision in a construction contract that the engineer or architect of the owner shall finally determine, as between the contractor and the owner, what work has been done, and the amount to be paid for it, it is valid and will be enforced in the absence of mistake or fraud. A provision in a construction contract that, when the work is completed there shall be a final estimate made by the engineer of the quantity, quality and value of the work, and the balance after deducting monthly payments, and on the contractor's giving a release, shall be paid in full, is not an agreement that the engineer's estimate shall be conclusive.

If the facts and circumstances surrounding the case and directly proved are such as would lead a reasonable man to the conclusion that fraud in fact existed, that is all the proof the law requires.

A NEW AND IMPROVED WOOD SCREW

EVERY carpenter knows how difficult it is at times to find the slit in a screw head, if there is not plenty of light at hand to enable the workmen to see the slit. To overcome this difficulty, Mr. Reuben Houghton has invented and patented an improved screw.

The improvement consists in forming the heads of wood screws so that they slope inwardly towards the saw cut 1/16 inch to 1/32 inch (see illustration) for the purpose of guiding the screwdriver into the slot. If the point of the screwdriver is across the slot, a slight turn enables it to slip into place easily.



The advantages will be further demonstrated where a worker is in simi-darkness. It should prove a boon to users of small screws and to electricians.

COPPER ROOFING

By H. M. SANDERS

IN the preceding chapter we have shown the nature, general character and texture of sheet copper as compared with the other sheet metals used for roofing purposes, and presented the reasons why we believe it supersedes all other sheet metals in meeting fully the requirements of an ideal metal roof for the future.

In this chapter it will be our object to speak of and illustrate what has proved to be some of the best methods of constructing a roof of this character.

But before entering directly upon this branch of our subject, of how it shall be applied and constructed, let us first consider some of the essential points as a preparatory step in securing an ideal

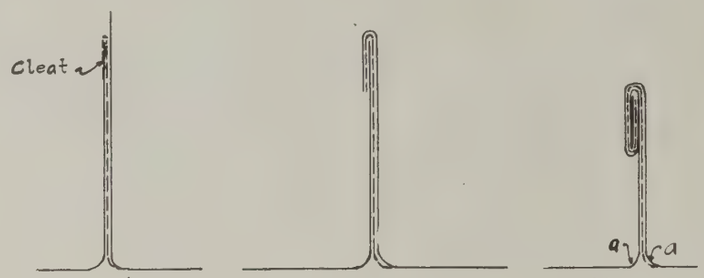


Fig. 1. Fig. 2. Fig. 3.

roof of so durable a sheet metal as copper. For besides its lasting qualities as a sheet metal, its final assurance as a success as a roof covering, much depends upon its method of construction, the workmanship and the character of the surface of the roof on which it rests. For in securing a good, serviceable metal roof, of whatever nature and character of the metal, it must have a smooth roof to lay on. The boards should be laid lengthwise with the pitch of the roof, and not crosswise of the roof from side to side, with the seams all smooth and evenly jointed. Over this should be laid a felt covering. While this felt covering may not be absolutely essential in prolonging the life of a copper roof, it is claimed to be of great benefit in keeping living rooms directly under the roof warm in winter and cool in summer. It also prevents the heat of the metal on a hot day from penetrating through and warping the boards. Then, again, a layer of felt covering on the roof boards before laying the metal roof, in case of a heavy rain or hail storm on the roof, deadens the sound. Annoyances of this kind will often occur if the felt covering is omitted. The annoyance has proved so great in some cases that the roofs had to be taken off and relaid

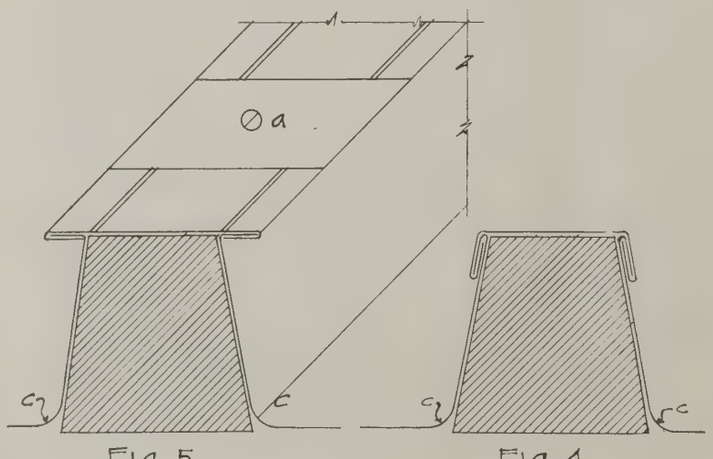


Fig. 5 Fig. 4.

with the felt covering put under it, which proved effectual in removing the annoyance.

It is generally conceded, we believe, that in the construction of the copper roof, it should be so constructed as to require the use of as little solder as possible. Of course, where there are openings in the roof to be flashed, and angles against chimneys and walls, there will be more or less solder required to make the roof tight. But on the body of the roof, practically speaking, no solder should appear. This would mean as few seams in the roof as possible to be soldered, and this requires the sheets of copper to be as large as possible to secure the best and most reliable roof covering. In no other way can the expanding and contracting nature and character of the sheet metal be properly met and cared for. The laying of a copper roof in small sheets for flat roofs, with flat soldered seams, does not seem conceivable to this writer's mind as the ideal of perfection in a copper roof, however necessary they may seem at times owing to conditions and environment.

This inconceivability is based on the fact that the best roofs are those which have the fewest soldered seams to give out and leak, which are sure to be more or less affected by the expansion and contraction of the metal under atmospheric conditions and pressure.

We have in the following illustrations given the methods of copper roof construction, which, it is believed, makes the best and most secure roof covering. Neither of these roof constructions are new ideas. One or two of them, at least, have been in use in the old country for many years.

They are of two classes; one for flat and the other for steep roofs. Both require practically the use of no solder; both have the fewest seams in their construction of almost any other form of construction, as both require the largest sheets of copper in commercial use for its purpose.

The sheets of copper used for the flat roofs require to be the smooth flat sheets, bent up at intervals to form a finish on the roof. Those used for the steep or inclined roofs are corrugated lengthwise over its whole surface.

In Figs. 1, 2 and 3, we have shown the old English method of making the seam for a copper roof. This is called the "stand up welt system," which is practically the same in method as the one we use in our standing seam tin roofs in this country today, and

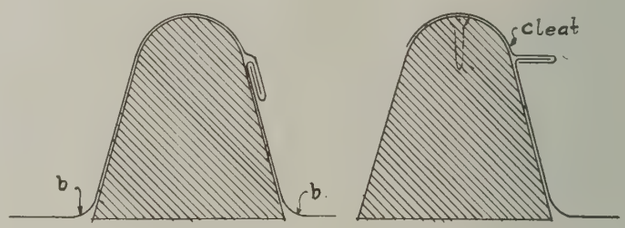


Fig. 6. Fig. 7

also from which the idea of making the vertical or standing seam in our tin roofs originated, with this difference: Under the old English method the vertical seam when finished, as shown in Fig. 3, was 1½ inches high from the roof, while the finished standing seam of our tin roof is only ¾ inches high, or one-half the height of the English roof.

This method, we understand, has been the longest in use, but of late years it has been superseded to some extent by a newer method, using the wood roll or rib. The objection to the former, it is claimed, that, although a cheaper construction, there is not sufficient allowance made for expansion and contraction on account of which there is a tendency on the part of the copper to tear away from the cleat which holds it to the roof.

While we are inclined to the belief that such a result is apt to follow with too sharp bends at the point at the angle of the upturn where it joins the level part of the roof, we are inclined to question our English cousins who have been disposed to discard this stand up welt seam, because of these sharp corners and have tried the process of relieving the strain occasioned at this point by introducing the curved surface, as we have shown at points *aa* in Fig. 3, *bb* in Fig. 6, and *cc* in Figs. 4 and 5. Such curved surfaces in metals of all kinds, under such conditions of strain and tension, become a source of relief.

Without considering this point further we will take up the wood roll method or system, as shown in Fig. 4. This, as will be observed, is a wood roll with tapering sides, measuring 1¾ inches across its base 1⅛ inches across the top, and 1¾ inches high, covered with copper as shown, with cap double-seamed to the upturn of the sides of the roof sheets.

These wood rolls, of course, run lengthwise with the pitch of

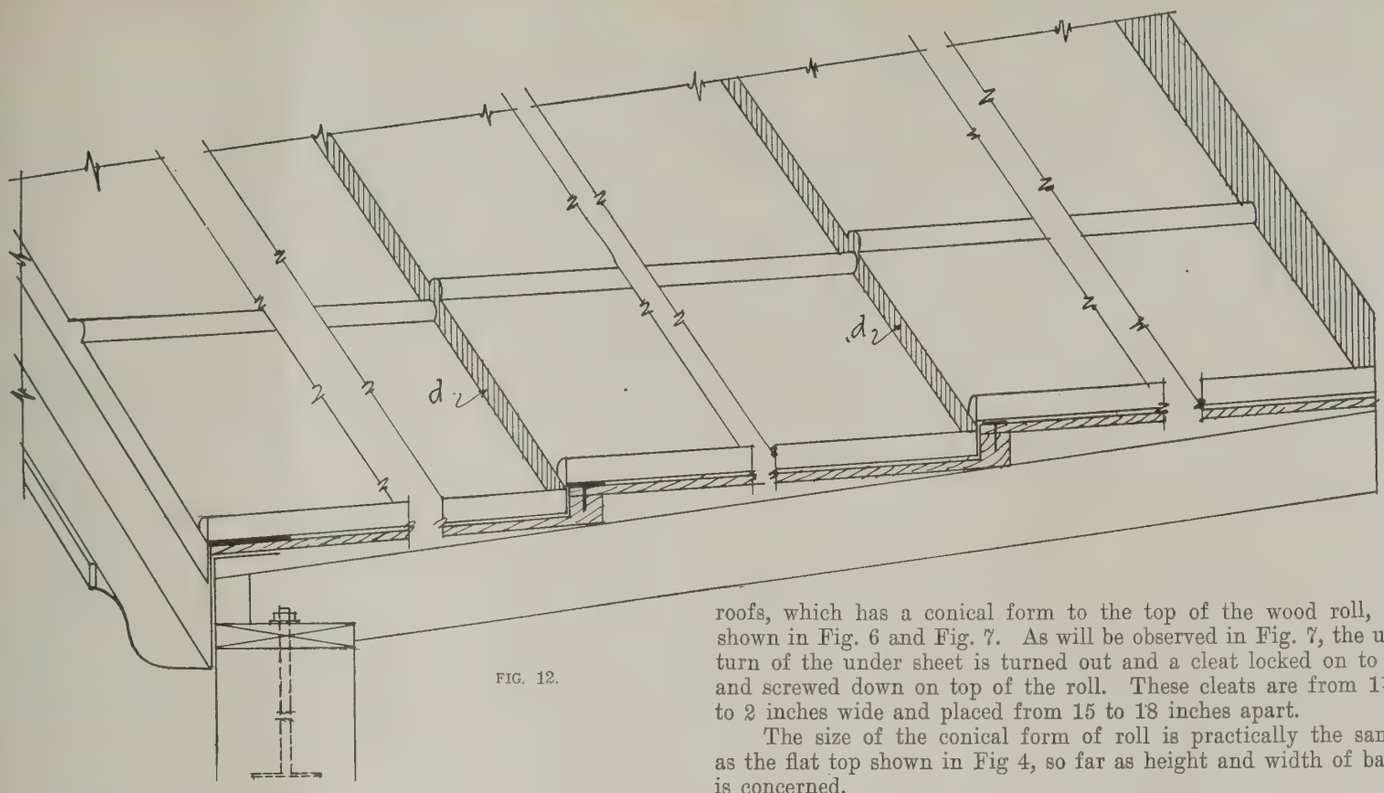


FIG. 12.

the roof, and are placed distances apart on centers to suit the requirements of the width of the copper used for the roof.

For copper 24 inches wide, it would require the wood rolls set 20¼ inches on centers, or 3¾ inches less than the width of copper used.

This kind of roof is held down on these wood rolls, as shown in Fig. 5, by means of cleats locked on to the side upturn of the roof sheets, and screwed down to the top of the roll at point *a*, before the top or covering is placed in position, and the edges turned down to a finish on each side of the roll, as shown in Fig 4.

There is still another method of constructing these ribbed roofs, which has a conical form to the top of the wood roll, as shown in Fig. 6 and Fig. 7. As will be observed in Fig. 7, the upturn of the under sheet is turned out and a cleat locked on to it and screwed down on top of the roll. These cleats are from 1½ to 2 inches wide and placed from 15 to 18 inches apart.

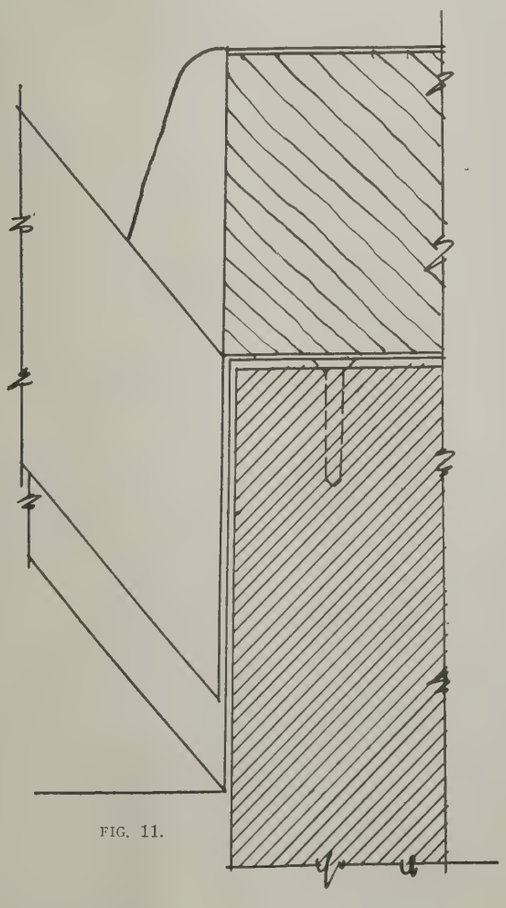


FIG. 11.

The size of the conical form of roll is practically the same as the flat top shown in Fig 4, so far as height and width of base is concerned.

All three of these systems of roof construction have their valuable points in securing practically a seamless, solderless roof. By eliminating the sharp angle at the intersection point between the upturn and the main roof, and by using the round corner as we have shown at those points, we have a roof construction as nearly complete and perfect as possible.

As to the comparative cost of these three methods for a roof covering, there is claimed to be but little difference, with a slight advantage in favor of the stand up welt system, which, requiring no wood roll, takes a little less copper than the flat-top wood roll and a little more copper than the conical shape top.

While these three systems are especially adapted for very flat roofs, they all require what is termed the roof-drip, as shown on roof plan, Fig. 12, and as also shown in full size section in Fig. 11. These roof-drips run crossways of the pitch of the roof from top to bottom a sufficient distance apart to meet the requirements of the length of the sheets of copper used for that purpose, which will vary in length from 8 to 10 feet, making the distance between the drips six inches less than the sheet itself, in order to make proper connections at each end with the adjoining roof sheets, so that if the sheet of copper used is 10 feet long, the distance between drips would be 9 feet, 6 inches.

These methods of construction of the metal roof are not confined to flat surface roofs, but apply equally as well to an inclined or pitched roof, and where the roof has an incline of more than three inches to the foot they may be safely applied without the use of the roof-drips, by having the roof one continuous level surface, joining the ends of the two connecting sheets with a cross seam one inch wide.

Corrugated roofing is a form of metal roof covering that may be safely applied on all roofs when the pitch of the roof is more than 3 inches to one foot. In some respects this kind of metal roof in corrugated form is better adapted for mills, foundry, pier sheets, etc., where the roof construction is all iron, and where no wood-sheeting is required on the roof as a support for the sheet metal.

Such a metal roof is more easily applied and less expensive, as no sheathing is required—the deep and continuous corrugates in the sheet making it strong and stiff enough to hold it firmly in position upon the purlins, which are usually placed from 3½ to 4 feet apart.

Where the sheets are riveted together at the sides and end of the sheets, they should be riveted through the top curve of the corrugation of the sheet. Also, all cleats that are used as clamps to hold the roof to the iron frame should always be riveted to the top curve of the corrugation in like manner, and never on the lower or bottom curve.

OUR JANUARY COMPETITION

In our November number appeared a small notice offering a prize of ten dollars for the best article on either of the following subjects:

1. Brick Veneer Houses. Their advantages and disadvantages from a construction standpoint.

2. The Personal Appearance of the Small Contractor.

From the many answers it would appear that the latter was the more important question, for that subject was taken by twice the number who looked on the construction problems.

From the many excellent articles we have selected the one written by Aug. C. Schnake as being the very best of all submitted, and have sent a check for $10 to Mr. Schnake.

We also print several others presenting other points not mentioned in the prize articles. Several others are so good that they will appear from time to time.

THE PERSONAL APPEARANCE OF THE SMALL CONTRACTOR

By AUGUST C. SCHNAKE

The term, "Small Contractor," as I understand it, in this instance, is applied to the contractor who superintends his own work, irrespective of size or number of men employed. Should he go well dressed? He should! For various reasons. "Clothes make people," is the old saw, or in other words, people are judged by their dress. The neat-appearing, well-dressed man is always estimated many per cent above the person dressed in a slovenly, "I don't care" fashion. Of course, "well-dressed" doesn't necessarily mean an expensive, tailor-made outfit, but should be clean, neat and tidy, indicating the person to be careful and painstaking.

The contractor should present, as well as be, the boss. The word "boss" indicates an article a trifle better than the average and people seem to be imbued with the idea that a "boss" can be recognized by his appearance. Take it on the job: A spectator or salesman desiring to see the boss will accost the best-dressed man in the bunch, then when he is pointed out to them, seeing he is dressed like the others, they are disappointed and put him down as a second-rate article. People in general, and those building or contemplating to build in special, nearly always desire to put up a stiff front or keep up appearance, and other things being equal, will prefer the best dressed man.

While at times, in the course of his duties in superintending his work, it may become necessary for the small contractor to don the overalls, he should discard them when he leaves the job, or when not necessary to wear them, as his own employes will respect and honor him more if he presents the boss, than if he wears the same garb with them. They will be willing to do more work and do it better, and consequently not only increase his profits, but improve upon his reputation, which means an increased business. As a rule, when people try to borrow money, or buy on credit, they wear their finest togs and try to look their best. Why? They try to inspire confidence; they know their personal appearance influences the party approached more or less. The same rule applies to the small contractor. He will find it a great deal easier to establish a credit in the commercial work, if he keeps up a nice front, than if he looks the slouchy and unreliable.

Look around in other lines of business—the merchant, the banker, the lawyer, the doctor, yes, even the preacher, if he is successful in his line, you will find him a person who lays great stress upon his personal appearance. What is true in these lines certainly applies to the small contractor. While it doesn't necessarily follow that because a person wears good clothes he possesses all the good qualities that are desirable in a successful contractor, yet, the opposite is certainly the case of the untidy and careless looking individual.

When the well-dressed contractor goes along the street, people say: "He seems to be doing well; looks successful; guess I'll have to see him about that job of mine." When they see the unkempt, slovenly-looking contractor, they say: "He appears to be down and out. Nothing doing."

We find it to be a fact that even intelligent and experienced business men will give a half hour of their time to a well-dressed person, whom they would not give five minutes if he were wearing workingmen's clothes; which goes to show that the well-dressed contractor can reach business where the other fellow could not get a look in.

Numerous other reasons could be argued, but the above are amply sufficient to prove that where ability is not lacking, the neat and well-dressed small contractor is a great success over the careless and slovenly fellow, and every small contractor should make it a point to always look his best, and with the necessary push and perseverance, he may some day be a large contractor, which he can never be if he doesn't take a sufficient amount of personal pride in his personal appearance.

Here is to the well-dressed "Small Contractor!" He will prosper.

BRICK VENEER HOUSES AND THEIR CONSTRUCTION

By P. K. RAMSEY

There are several reasons why we should build veneer houses. The first one is, I think they are the most enconomical houses to build and while we find the first cost to build a little more than a wood house throughout, we find in a few years that we have more than saved the difference in paint bills, and at the same time the repairs are reduced. The veneer house can be built to suit any climate if properly constructed. In the first place, we should have a good stone foundation not less than 18 inches thick to accommodate frame wall and the 4-inch brick wall. There should also be a one-inch air space left between the two walls. This will allow the brick work to be built plumb and true, and also acts as a dead air space, which no dampness is likely to pass. I would recommend all framing to be seasoned and walls to be built plumb and true, and storm sided with 7/8 T. &. G. or shiplap stock, and walls to be covered with a good grade of builders' paper. All brick work in veneered walls should be laid in good strong mortar, well tempered with Portland cement. There should also be galvanized iron wall tile used on about every six courses of brick, well nailed to sheathing. We should provide stone sills for all doors and windows and I think we will get a nicer job if we use cut stone lintels, as they will prove a more artistic effect than angle irons or arches. Another reason why we should build veneer houses is that it affords greater protection from fire if we use metal roofs and decreasing insurance rates so far as the exterior is concerned. I find in my experience that a veneer house affords greater comfort than most any other kind of construction, being cooler in summer and warmer in winter.

The most important thing about house construction is the heating and ventilation. All windows should be of the proper size and placed where they will give the best ventilation. I think the hot water system is the best heating system for residences, if properly installed. All chimneys and flues should have terra cotta flue linings, built in them, and should extend to top of flue. The most disadvantage I find here of veneer houses is the first cost which I think will not exceed 10 per cent over wooden construction.

For artistic beauty and economy the brick veneer house excels them all.

THE PERSONAL APPEARANCE OF THE SMALL CONTRACTOR

By CHARLES E. KNEEN

This is a question which no doubt is a very interesting one to the small contractor who is just embarking into the contracting business, and also to the average person who is looking ahead into the future.

Of course, he has in mind his idea of doing a day's work with the rest of the men, at first, but then there arises so many little things which have to be given attention and looked after, such as the laying out of the work, visiting the mill and lumber people with regard to material and going to the bank, etc., at least once a week.

These, of course, take up a good part of the day sometimes and brings the small contractor in touch with people he would not otherwise meet while working at the trade.

So it appears to me that the small contractor should make some sort of a distinction to the average working man and dress a little better. His work as a rule, is new, clean work; then, again, he has the privilege of selecting his particular work even with the use of overalls.

It has been said that "Clothes make the man." While this is not exactly true, it is like looking at a frame house freshly painted and one in need of it.

Things that look good sometimes make a better impression.

PAINTING ON METALS By A. ASHMUN KELLY

THE metals commonly in use for structural purposes, and requiring to be protected with paint, are iron or steel, tin roofing, galvanized iron, and copper. Structural iron framing requires an enormous amount of paint, and demands a paint that will protect it from the action of those agencies that cause rust, dampness being the worst.

Where structural work is to be covered completely with cement or concrete, as it usually is, the paint must be proof against both moisture and alkali. The alkali of the cement will do no harm as long as moisture is absent, but the combination of the two would seem capable of causing the disintegration of any ordinary oil paint. Happily, moisture is not likely to occur once the concrete is dry. Where old structural iron work has been uncovered, after the lapse of some time, as in case of a fire, the protective coating of paint has been found intact. It is probable that the cement prevents access of air to the metal, and so prevents rust. If so, one might ask why paint it at all?

It is generally conceded by experts in painting that red lead is the best coating for iron work, for the first coat at least, after which any desired paint of good character may be applied. Some believe that a good form of graphite paint is better still than red lead, and a great deal of steel or iron structural work is coated with this material, mixed with boiled linseed oil. For exposed work, as on railway bridges, oxide of iron paint is often added to the graphite, forming a more pleasing color than the graphite alone. So, too, lampblack is added to red lead for a finishing coat, to form a more agreeable looking coating for the finish.

The preparation of iron work for painting is an important factor in the durability of the paint. The iron should be freed from any grease and dirt, scale, etc. The sand blast is useful on bridge work, to free the metal from all foreign matter and make the surface clean and smooth for the reception of the paint. This is very important, for deterioration of paint on such work is sure to occur from want of careful preparation. Railroads recognize this fact, and their painters are doing better work than once obtained in this direction.

In mixing red lead and lampblack paint the following proportions may be observed for bridge work: To 100 lbs. dry red lead, add 3 lbs. 6 oz. lampblack ground in oil, 8 1-3 gals. boiled linseed oil, 6 2-3 pints japan driers, and 5½ pints of turpentine.

The lampblack serves as a coloring agent only, when used in this proportion, 1-16 of an ounce of the black being capable of making one pound of red lead a chocolate color. This is indeed the formula used by one railroad company for its bridges. This makes a very agreeable color, not inferior to that of a fine oxide of iron paint. And where lampblack is so used the proportion of oil is to be greater than where all red lead is used, as the black takes up much more oil than lead. The following table will be found useful in this connection:

Formula: Twenty lbs. red lead, 5½ lbs. raw linseed oil, 1¼ oz. lampblack, making 1 gallon of paint, that will cover 1,200 square feet. The proportion of lampblack in this formula is 1-16 oz. to 1 lb. red lead.

Formula: Fourteen lbs. red lead, 6 lbs. raw linseed oil, and 7 ozs. lampblack, making 1 gallon of paint, that will cover 1,200 square feet. Proportion of lampblack is 1½ ozs. to 1 lb. of red lead.

Formula: Ten lbs. red lead, 6¼ lbs. raw linseed oil, and 10 ozs. lampblack. Proportion of lampblack is 1 oz. to 1 lb. red lead.

Now, as red lead and lampblack both dry rather slowly in raw oil, the use of japan drier is necessary, and even in the case of boiled oil it will be found well to add some japan. The black being the slower drier of the two, the more lampblack the more oil, is the rule. Another important feature of the boiled oil is that it helps keep the red lead and lampblack from separating from each other, the lead being very heavy and the black very light. The oil serves as a binder. In the proportions given in the above table the paint should dry in from 16 to 24 hours, according to the amount of lampblack in the paint. Where japan is added the drying may occur in about 8 hours, while without the japan, but with boiled oil, it will dry in about 12 hours.

Where it is desired to mix dry red lead and dry lampblack together the two may be placed in a barrel, which should then be headed up, and the barrel rolled around a few times, which will cause a thorough admixture of the two pigments. Then it may be used as needed by mixing with oil, etc.

On no account should oxide of iron be used in connection with red lead as a paint; the same holds good with white lead and zinc oxide. Any pigment with an iron base will, when mixed with lead or zinc paint, cause a mottling of the paint, making a very unsightly surface. Never use any but the pure linseed oil.

Galvanized Iron: Ignorance of the proper way to paint on new galvanized iron sheeting or other galvanized objects results in considerable trouble and expense, and yet it is easily avoided. If the metal is allowed to stand to the weather for several months, preferably a year, the surface will be in a condition to take paint and hold it. But if the paint is applied as soon as the metal is in position, or if done within a few weeks of that time, the paint will in time scale off in small flakes. Then the trouble is to correct the evil. It may be scraped off with wire brushes, but should not be re-painted until every particle of the original paint has come off, for otherwise it would scale beneath the new paint, and thus take all off. The better way is to treat the new galvanizing with this wash, which has been in use for many years, and with the surest results.

Take two ounces each of copper chloride, copper nitrate, and sal ammoniac, dissolving same in one gallon of soft water, then add two ounces of muriatic acid. This mixture must be made in a glass or earthen vessel. With a broad bristle brush apply a coat of this to the galvanized iron, and let it stand until perfectly dry, when it will be ready for paint. At first the color of the coating is black, but this soon changes to gray. Upon this coating paint or varnish will adhere perfectly, and there will be no scaling. A gallon of this coating will cover about 25 or 30 squares of 100 feet each. It is inexpensive and easily made and applied. The ingredients may be bought from any large dealer in drugs and chemicals.

Painting on Zinc: Paint acts the same on new zinc as on galvanized iron, the metals being identical. Zinc and galvanized iron have what is called a greasy surface, to which paint adheres only imperfectly. Exposed to the weather for some time the surface oxidizes and then takes paint well enough. New zinc should be treated with the wash indicated for galvanized iron, if it is to be painted.

Painting on Lead: Sheet or other form of lead is very difficult to paint as far as durability is concerned, and some paints that take to tin and lead do not take so well to zinc. As a general thing, the iron oxide paints take to these metals better than talc, ochre, or other earthy pigment. Lead water pipes, when full of cold water, will not take paint, owing to moisture, but if the water is left out of them and a coat of shellac applied, followed by any desired shade of paint, it will last well. Warm water lead pipes may be painted or varnished or bronzed at any time. The bronzing on hot water pipes will remain bright, while on cold water pipes it will soon become dull, and continue thus.

Painting Tin: The metal tin does not rust, and if it were alone used for roofing there would be no need for paint. As it is, the paint cannot be applied too soon after the tin is laid. The main trouble with tin roofs is that the sheet plate under the tin coating (this coating consisting of a combination of lead and tin, the cheaper sorts containing very little tin, if any), is made so that it is impossible for it to do otherwise than rust. And no paint will prevent this rusting, for it will go on under the tin or spelter coating and paint just the same. But some paints are better than some other paints for tin roofs. Thus, it is certain that a good oxide of iron paint, properly prepared, will protect the roofing well, if the coating is renewed at intervals of a few years. Then the paint must be properly applied, and the roof be in the proper condition for receiving paint. It is necessary also to coat the under side of the roofing, and thus protect it against possible dampness or moisture arising from the interior of the building. Also, never place tarred paper under tin roofing, for it will surely rot it. Plain sheathing or building paper is all right, or just the plain boards.

In repainting a tin roof, all old paint that is not fast, or that is too thick on the seams, should be removed. It has been suggested that breaks in the tin might be patched with muslin and pasted down with thick paint, but the oil in paint will rot muslin, hence it is better to use linen, which is not affected by the linseed oil. Gutters and flashings around chimneys and adjoining roofs may be painted with a special mixture of paint, or with the regular roofing paint. Gutters and valleys should be kept well painted,

particularly where soft coal is used, and more particularly where locomotives burning soft coal, and running near by, spit forth sulphur and vapor to eat out the life of tin roofing. Paint the valleys and gutters once a year, and the roof once every three to five years.

On new or old tin roofing one coat of iron paint will be found sufficient, it being better to apply a coat when first laid, and another a year following, then not for two or more years, according to circumstances. Properly cared for, no other form of roofing will outlast tin, in case the tin is of the best quality. And such a roof, though costly to begin with, will prove economical in the long run. But, of course, it all depends; if one is not interested in its wearing well, not expecting to retain ownership long—then that is something else.

UNIFORM MILL-WORK LISTS

By CHARLES CLOUKEY

THE above caption is intended to refer to the uniform listing of mill-work from sets of plans as furnished by architects, and not to uniform details of different jobs.

One might think it an easy matter for any number of mills to make lists just alike from the same plans and specifications, and considering the high class of workmanship employed in listing and estimating, it would seem that if the estimators are not able to get the same items, on their respective lists, there must be something the matter with the work of the architect.

A long experience with the work of architects in different parts of the country leads me to believe that a good share of the uncertainties encountered in making lists result from a peculiar attitude of the architect toward the work to be done by the contractor and his subs. We find in many cases the architect is indifferent about certain details and materials, and will not go to the trouble of minute specification. For instance, he may say that certain parts are to be made of pine and does not specify the quality, and perhaps the only clue to it may be found in the specification for painting and finishing which says that certain rooms are to be painted, certain rooms stained and certain others to be finished in the natural wood. One mill may figure a No. 1 common finish for the paint, clear sap for the stained work and clear for the oil, and then for fear he should be forced to furnish better stuff for the paint, he adds a small per cent in the way of insurance.

It is a common specification with an architect to say that "all materials must be the best of their respective kinds." Now, if the finish for paint had been specified No. 1 common, or D stock, every estimator and mill foreman would be free from doubt as to just what was wanted.

It is a common occurrence to find that the thickness of doors is not mentioned in a set of plans and specifications, and this leaves the estimator in much uncertainty; perhaps he will list all the outside doors 1¾ and all the inside doors 1⅜; perhaps another mill will call all of the inside doors 3 feet wide and over 1¾. In case an architect specifies doors of 2 inches in thickness, one mill may list them as 1¾, while another will list them 2 inches and price them as 2¼ thick.

Now, it is not expedient to multiply the record of a thousand and one instances where the estimators and listers come to a parting of the ways, for we who are interested in this matter know pretty well what they are. To place the responsibility for the trouble is another thing, and to bring about its practical abolition is decidedly still another.

It is a fact that the mill men are not always blameless in the matter of modified lists, for some of them have been known to bill short in order to make a cheaper total and then agree to furnish only the stuff they had listed. This is a very old trick, and has been practiced by retail lumbermen and mill-work men to such an extent that the live contractors now ask only for blanket bids, according to the plans and specifications.

It has been suggested that the architect furnish a complete list of mill work with his set of plans and specifications, and so eliminate part of the expense of estimating. If it is a fact that 5 per cent of the cost of mill work is represented in the making of estimates, it would cut it down considerably if the work of listing could be side stepped. Then, again, if the list furnished could be considered as absolutely reliable, the items added for uncertain "miscellaneous" which sometimes are as high as 5 per cent, could be eliminated entirely.

The logical inference is that this would be a material saving for the builder, as the competition among mills would keep the price down in relation to cost. But let us see how it would work out in practice. In the first place, the architect would not do the extra work without an extra charge, and this would consume at least a part of the saving contemplated, if the professional services of the architect did not take it all up. Also, it is not reasonable to suppose that any assistant in the architect's office would be more liable to make a list of mill work free from error than would an estimator in the factory office. And while such errors would not necessarily cost the mill man anything, they would cost the contractor or owner something unless the loss could be recovered from the architect. In case the architect was held for the mistakes in listing, he would add a percentage to his charges to cover the same just as the mill man does. If the contractor had to stand the loss of error he would also figure higher, and if the owner had to supply the shortages and make the changes, why it would cost him as much as it would if one of those already mentioned had included the extra percentage in their charge for material and service.

It stands to reason that if a specification is so lax that a man of experience cannot tell what it means, a mill-work list made by the same office would be liable to lack in particulars of quality and detail even if it was absolutely correct in sizes and quantity. This would mean delay or adding the extra per cent to cover a possible and more expensive interpretation of the items in question.

Considering the fact that mill-work concerns find it necessary to make a charge for error in spite of the fact that they employ the most expert help to be had for the purpose of listing, it is good logic to presume that no other branch of the building business can do better. And arguing further from the fact that every party concerned will add a percentage for error where he is held to the correction of mistakes, we are led to believe that the owner is the man who ultimately has to pay for the mistakes of the various individuals who do his work. There are specific instances where gross error falls upon some division of the work in such a manner that it cannot be shifted, but put in the general term of per cent, and the owner is the man who is forced to pay.

Now what do we learn or how can we benefit from the above analysis of this subject? Is there any way by which some of the work of estimating may be eliminated? We can say, yes, to this, but we are not so certain when asked if any of the cost can be cut out.

If the mill work lists were made in the architects' offices and sent out with the plans for blanket bids, the mill would have to verify the list and that would save little if any time. If the list was considered correct and only the details were sent along to enable the mill man to price the articles listed, the responsibility as well as the work would be thrown back on the architect's office, and the only possible question of saving would lie between the architect's charge for this service and risk, and the listing of the material by half a dozen more or less of mill-work estimators.

If the average cost of estimating mill work amounts to 5 per cent of the business secured in that way, it arises from the fact that the mills figure on four or more plans to every contract they land. There seems to be no remedy for this as long as the mills are in open competition, and the only saving to them would be the work of taking off the quantities from the plans.

As far as the contractor is concerned, it is practically useless to expect him to make lists of mill work, and if they all did it, there would be about as much work involved as now, and we are forced back upon the alternative of the mill and the architect. Perhaps some ambitious as well as able architect will set the good example of furnishing complete and guaranteed lists of mill work with his plans, and others thereby forced to do likewise! However, if he ever does put out a list of mill work we will see this note in some conspicuous place on the printed heads: "Any discrepancy occurring between this list and the plans and specifications covering the same, must be reported to the architect for correction before proceeding with the work!" And would a list like that be a help to any party concerned?

Perhaps more can be done in the mill office to cut down the cost of estimating than at any other point, if the architect will but do his part in making his plans, specifications and details of such a character as may be read and interpreted without doubt and delay.

THE SMALL FIRE-PROOF HOME

By H. LEONARD LANE

THE architect and builder have solved most of the problems on the subject of fireproofing, but in the matter of the small fireproof home little progress has been made.

The primary difficulty of the small home builder is the problem of making the home both fireproof and inexpensive. The construction of an office building, factory or warehouse has small interest for the man whose personal problem is "How can I build a fireproof house for $5,000 and get an even return for my money?" But experience teaches that any building, whether it be an office building, store, apartment or residence can be built absolutely fireproof at a cost of less than twelve per cent greater than ordinary wooden construction. This additional expense, however, is more than compensated for by the durable, fireproof, sanitary and economical advantages of fireproof construction.

The days have passed when timber and brick were the standard materials for home building, and it is unfortunate that more careful study has not been made of the materials on the market today. The man who builds a fireproof house is safeguarding himself, and is a benefactor in his neighborhood, not only by protecting the adjacent buildings, but by the force of example.

As to the beauty of design of houses built of fireproof materials, little need be said. The recent work of our leading architects demonstrates the fact that no other materials are so well adapted to produce the charm and beauty of the type of homes characteristically American.

The houses shown on these pages should cost, exclusive of heating and plumbing, approximately $4,000, depending on the locality. Much of the first floor has been given over to the large living room, which, with its large open fireplace, and French doors leading to the trellis covered piazza, should be entirely satisfactory. The hall, while small, is conveniently arranged. For lack of space the pantry has been sacrificed. The passage from kitchen to dining room is arranged so that the cooking odor will not pervade the dining room. The flight of stairs leading to the second floor is placed in a way to be used to the best possible advantage, being convenient both from hall and kitchen.

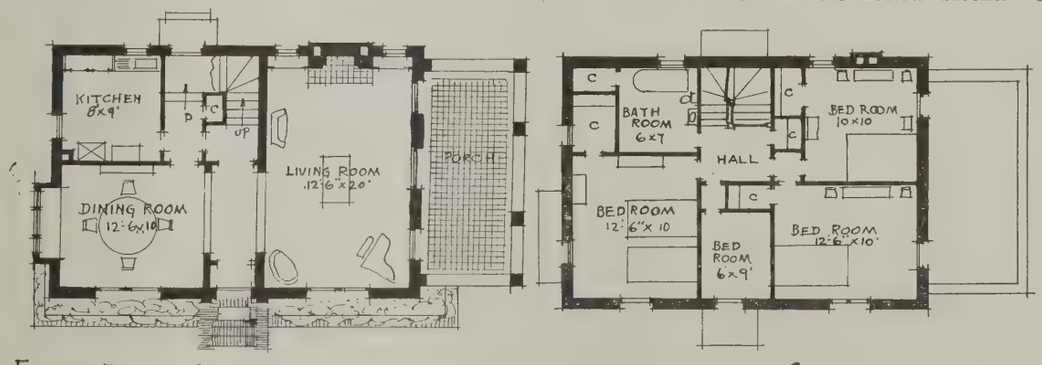
The second floor contains four bedrooms. The bath room is placed over the kitchen in order to concentrate the plumbing.

The construction of this house is of the simplest type. The cellar walls may be of solid concrete or concrete hollow blocks, with a concrete cellar floor. The superstructure walls to the second floor



window sills are built of eight-inch concrete hollow blocks with four-inch brick facing. The walls from second story window sills to the under side of roof are built of eight-inch concrete hollow blocks, with cement finish. The interior partitions are built of four-inch hollow blocks. The facing brick should be of a dull reddish brown, with wide joints of the same color, the cement finish being stained a soft pale brown. The floors and roof are built of four-inch reinforced concrete hollow blocks. The roof covering may be of shingles, slate or tile. Tile or slate would be more expensive, but also an additional protection against fire arising from external sources. The exterior trim should be painted white. The interior trim may be cypress, stained a soft brown. Poplar finished with white enamel would look well, but would not be as cheap. This house to be architecturally successful will depend on its environment. The lot should be large and the house placed well back with an eastern exposure to the dining room.

As stated above, the house should cost approximately $4,000, but the only accurate way of ascertaining the cost of this building is to obtain bids from reliable builders. There should be accurate plans and specifications describing the house, in order that the owner may have a definite basis to work on, and enabling him to make a contract with which to bind the builder to the proper fulfillment of the work.



BUILDERS' REFERENCE TABLES

By J. GRANT ROBINSON, Architect

The tables forming the basis of this work were originally compiled by, and for the use of, the writer only, and during thirty-five years of use have proved of valuable assistance both in the office and in the field.

The tables are revised and up-to-date, and are based on United States tests, when such were obtainable, and on approved modern methods of construction.

The explanation of the tables and formulas are given in plain and simple language, avoiding all technical expressions possible, making the work clear and easily understood.

In this age of sharp competition, the untrained man is at a disadvantage, but by the use of the tables will be able to compete with more highly trained men, and in a very short time become thoroughly familiar with, and able to design, any structure.

Every builder, superintendent, foreman, draughtsman and journeyman mechanic should acquire a full and complete knowledge of construction and be able to design the structures he is called upon to build. It is useless to describe the tables here, as no better explanation can be given than the perusal of the tables themselves, but will give one illustration:

First: The floor of an apartment house is designed to support a total live and dead load of 80 pounds per square foot of floor area, and it is desired to use 2″ spruce joist (beam) spaced 16″ center to center and 22′0″ span in clear; look in Table 4 in Plate 1 in column of length for 22′ 0,″ then to the left along that line to the nearest figure to the known load, which is 85 pounds; look up to the top of the column and you will find 14″—therefore the joist used should be a 2″x14.″ Or if a joist of less depth is desired, choose from one, two or three.

In the same manner, by reference to the proper table, you can find the size of a girder or column, of any kind of wood, a cast iron, steel or stone shoe (base plate); also a concrete footing for any load, on soil bearing from one to four tons per square foot of surface, giving the number and sizes of rods for each footing.

Full details are given of the different parts of the work, including the column caps in cast iron and steel; also steel and cast iron pintles.

The method of computing the footings under walls is set forth in a clear and comprehensive manner.

EXPLANATION OF DEAD AND LIVE LOADS IN CONNECTION WITH THE USE OF THE SEVERAL TABLES.

Dead loads: The dead load consists of walls, floors, roofs, partitions, and any and all parts of material that enter into, and form part of, any building or structure.

Live loads: A live load is all movable or variable load other than a dead load.

Floor loads: The dead and live loads of buildings are considered and estimated at so many pounds per square foot of floor, and this unit is used in designing the strength of the floor joist (beam). The dead load of floor consists of joist, flooring, plaster on ceiling under joist, the partition and plastering on same. The live load consists of people, animals, furniture, portable goods of any kind, machinery and vibration from machinery.

Roof loads: The dead load consists of rafters, roofing material, hanging ceiling under and plastering of same. The live load is for snow and wind of about forty pounds per square foot of roof, if flat, and about seventy-five for pitch of 12″ to the foot.

The following table will give the weights of the different woods per square foot, board measure, commercially dry:

Southern or long leaf yellow pine	4½	pounds
Short leaf and Texas yellow pine	2¾	″
Oregon pine and Norway pine	2¾	″
Spruce and hemlock	2¼	″
Redwood	2	″

Note: Desired the weight of a 2x12 Oregon pine joist per square foot of floor, when said joist is spaced 16″ center. A 2x12 = 2 feet board measure, times 2¾ pounds = 5½ pounds divided by 1⅓ = 4⅛ pounds per square foot of floor. This method applies to any kind of wood.

Lath and plaster: Wood lath and plastering should be estimated at 6 to 8 pounds per square foot of surface; 6 pounds is for two-coat work. Plastering three coats on wire lath should be estimated at 10 to 12 pounds per square foot of surface. Note: Plastered partitions of wood lath run about 17 pounds per square foot of floor in any building used for living purposes or office building.

Note: Where building laws are in force the loads prescribed by such laws should be used.

The following table will give the live load to be used in a given class of buildings, and when taken in connection with the values of safe strength of joist (beams) as given in the tables, will provide absolute safety with proper allowance for economy. The number of pounds per square foot of floor are:

No. 2. For dwellings, sleeping apartments, tenements, apartment houses and lodging houses	40
For school houses	50
For office buildings (upper floors)	60
For office buildings (first floors)	80
For stables and carriage houses	45
For banking houses, churches and theaters	80
For assembly halls, dance halls and corridors of public buildings	120
For drill halls	150
For stores, light storage and light manufacturing	120
For warehouses, mills and heavy manufacturing	250 and up

Note: Desired a spruce joist (beam) 2″ thick, 20′0″ long between supports, to carry a live load of 40 pounds and a dead load of 28 pounds, making a combined load of 68 pounds, we will look down the column of length in Table 4 in Plate 1 until we come to 20, which is the length we require; the nearest we find to 68 pounds is 75 pounds and is in the column of 2″x12,″ which is the proper joist to use. This method applies to any wood given in the tables. Note: The weight of the joist is included in the formula, so it need not be considered in the dead load.

NOTES ON THE USE OF PLATE 1.

These tables are based on full size timbers. If a beam is ¼-inch thinner and ½-inch less in depth than specified, the rating of the next smaller beam should be used. Thus, if a 2-inch by 10-inch measures 1¾ × 9½, it will only carry about two pounds more weight per square foot than a 2 × 9.

The strongest timber for a given amount of material is in the proportion of 6 wide to 10 deep. This proportion should be used wherever possible as the further one gets from it the more lumber is wasted. A beam thinner than this proportion loses on account of the tendency to bend sideways. While one less in depth receives no benefit from the increased width over this proportion.

Suppose we have a span of 16 feet with a load of 16,000 pounds and want to use an Oregon pine beam 12 inches in depth. In table 7, we find that a beam 12 inches deep and 1 inch thick will carry 1,620 (the safe load for 1 inch). We find a 10-inch wide beam is the one to use. This rule applies to all woods and all cases where the load is movable or changing from time to time, but if the beam supports a set load such as a brick wall or heavy running machinery, the upper figure should be used. In this case, we would require 16,000 + 1,188 = 14″, which would make a beam wider than deep. A 14″ deep beam would mean 16,000 + 1,887 = a 9 × 14″ beam.

Tables six, seven and eight are figured for both strength and stiffness. Where two sets of figures are given the top shows the loading for stiffness and the lower for strength. That is, a beam loaded between the two figures would carry the load safely but the deflection would be more than is allowed in the best engineering practice. When the length of a beam is less in feet than the depth in inches, such as 6 × 12, 8 feet long, the beam will not deflect as much as the limitations prescribe, and so should not be figured for stiffness.

The rule for stiffness is: The safe uniform load equals eight times the width multiplied by the product of the cube of the depth and the factor "e" divided by five times the square span in feet. The factor "e" should be taken at 137 for long leaf yellow pine, 110 for short leaf yellow, Oregon and Texas pine, and 100 for spruce.

In the form of a formula this would be $S = \frac{8\,bd^3\,e}{5 \times L}$ in which

S = Safe uniform load.
b = width of beam.
d = depth of beam.
e = factor taken as noted above.
L = span in feet.

(To be Continued.)

Plate №1 - Safe Carrying Capacity in Pounds for Wood Joists or Beams Spaced 16" on Centers, for each Square Foot of Floor

Compiled by J.G. Robinson, Architect.

1. Long Leaf Yellow Pine

Depth of Joist in inches

Length in Feet	6	7	8	9	10	11	12	14	16	18	20
6	350	406									
7	264	360	470								
8	202	275	360	455							
9	160	217	284	360	444						
10	129	176	230	291	360						
11	107	145	190	240	297	360					
12	90	122	160	202	250	302	360				
13	76	104	136	172	213	257	307	417			
14	64	90	117	148	183	222	264	360			
15	57	78	102	127	160	193	230	313	409		
16	50	68	90	113	140	170	202	275	360		
17		61	79	99	130	150	197	244	318	403	
18		54	71	90	112	134	160	217	284	360	
19		48	63	81	99	120	143	195	255	323	
20			57	72	90	108	128	176	230	291	
21			52	66	81	98	117	160	209	264	326
22			48	62	74	90	107	145	190	240	297
23				56	68	82	98	133	174	220	272
24				50	62	75	90	122	160	202	250
25					57	69	83	112	147	186	230
26					53	64	77	104	136	176	213
27					49	59	71	97	126	156	197
28					42	55	66	90	117	148	183
29							61	84	109	138	171
30							57	78	102	129	160
31							53	73	96	121	150
32								68	90	114	140
33								64	84	107	132
34								61	79	101	124
35								58	74	95	117
36								54	70	90	111
37								51	67	84	105
38								48	63	81	99
39									60	76	94
40									57	72	90

Formula -

Safe load in Pounds = $\frac{26 d^2 c\ (120)}{\text{Span in feet}}$

Safe load per Sq. ft. = $\frac{\text{total safe load}}{1/3}$

If 1" thick, take ½ load.
" 3" " " 1½ " .
" 4" " " 2 " .
" 5" " " 2½ " .
If spaced 12" onc. add ⅓ load.
" " 20" take ⅔ load.
" " 24" " ⅚ " .
For tables 1 to 5.

2. Long Leaf Yellow Pine

Depth of Joist in inches

Length in Feet	6	7	8	9	10	11	12	14	16	18	20
6	300	408	533	675							
7	220	300	391	495							
8	168	229	300	379							
9	133	181	236	300	370						
10	108	147	192	243	300						
11	89	121	158	200	260	300					
12	75	101	133	168	208	251	300				
13	63	81	113	143	177	214	253	333			
14	55	75	88	124	151	185	220	300	391		
15	48	65	85	108	133	161	192	261	341	433	
16	41	57	75	94	117	141	168	229	300	379	
17			66	84	103	125	149	202	265	345	
18			59	75	92	111	133	181	259	300	370
19			50	67	80	100	119	162	212	269	332
20				60	75	90	108	147	192	243	300
21				55	68	82	97	134	172	220	272
22				50	61	75	89	121	157	200	243
23					56	68	81	111	143	183	226
24					52	63	75	102	134	168	208
25					48	58	69	94	123	155	192
26						54	64	87	113	143	177
27						49	59	80	107	133	164
28						46	55	75	97	122	153
29							51	69	91	113	143
30							48	65	85	108	133
31							45	58	79	101	125
32								54	75	94	117
33								51	70	89	110
34								48	65	84	103
35									60	81	95
36									57	75	92
37										70	87
38										67	83
39											78
40											75

Explanation of Tables 1 to 5.
To find what Oregon pine joist will carry a total dead and live load of 120 pounds per sq. foot of floor on 20' span.
In table 3 you will find that a 2×14 is the right size.
This applies to all cases.

3. Short leaf Y.P., Texas Y.P., Oregon Pine

Depth of Joist in inches

Length in Feet	6	7	8	9	10	11	12	14	16	18	20
6	270	367									
7	193	270	352								
8	151	206	220	341							
9	120	163	213	270	300						
10	97	132	172	218	270	336					
11	80	109	133	180	223	251	312				
12	68	91	120	151	187	226	270				
13	59	78	102	129	159	193	230	313			
14	49	66	88	111	137	166	198	270			
15	43	58	76	97	120	145	172	235	307		
16	37	51	67	85	105	127	151	206	269		
17			59	75	93	113	134	183	239	302	
18			53	67	83	100	120	165	213	270	333
19				60	74	90	107	146	191	242	299
20				54	67	82	97	131	172	218	270
21				49	62	74	88	120	166	198	245
22					56	67	80	109	142	180	225
23					51	61	73	100	130	165	204
24						56	67	92	120	151	187
25						52	62	84	110	140	172
26							57	79	102	129	159
27							53	72	94	120	148
28							49	67	89	111	137
29								62	82	104	124
30								58	76	97	120
31								55	71	91	112
32								52	67	85	105
33									63	80	99
34									60	75	93
35									56	71	88
36									53	68	83
37									50	65	80
38										62	76
39										58	71
40										55	69

Explanation of Formula for Strength
b is thickness in inches
d is depth " "
Span is the distance in feet between supports.

4. California and Eastern Spruce

Depth of Joist in inches.

Length in Feet	6	7	8	9	10	11	12	14	16	18	20
6	210	285									
7	154	210	274								
8	118	160	210	265							
9	93	127	165	210	259						
10	75	102	134	170	210	254					
11	62	85	111	140	173	210	249				
12	52	70	93	118	145	176	210	285			
13	44	60	79	100	128	150	178	243	318		
14	38	52	68	86	107	129	154	210	274		
15	33	45	59	75	93	112	134	182	238	302	
16	29	40	52	66	83	99	118	160	210	265	328
17		35	46	58	74	87	104	142	186	235	290
18		31	41	52	64	78	93	127	165	210	259
19			37	47	58	70	83	114	148	188	233
20			33	42	52	63	75	102	134	170	210
21				37	47	57	68	93	121	155	190
22					42	52	62	85	111	140	173
23					39	48	57	77	101	128	158
24					36	44	52	71	93	118	145
25						40	48	65	86	108	134
26						37	44	60	79	100	122
27							41	56	73	93	115
28							38	52	68	86	107
29								48	63	80	96
30								45	59	75	93
31								42	55	70	87
32								40	52	66	82
33									49	62	77
34									46	58	72
35										52	68
36										50	64
37										48	61
38											58
39											55
40											52

Values of C & C'.
in table 1, C' = 120.
" " 2, C = 100.
" " 3, C = 90.
" " 4, C = 70.
" " 5, C = 60.
C = Factor of Safety of 6.
C' = " " " " 5.

5- Hemlock, White Pine and Redwood

Depth of Joist in inches.

Length in Feet	6	7	8	9	10	11	12	14	16	18	20
6	180	245	320	405	500						
7	132	190	234	297	367	400					
8	101	137	180	227	281	340					
9	80	108	142	180	222	268	320				
10	64	88	115	145	180	217	259	350			
11	53	72	95	120	148	180	214	291	380		
12	45	61	80	101	125	151	180	245	320	405	
13	38	52	68	86	106	128	153	208	272	345	425
14	33	45	58	74	91	111	132	180	235	300	367
15		39	51	64	80	96	115	156	204	259	320
16		34	45	56	70	85	101	137	180	227	281
17		30	39	50	62	75	89	122	159	201	249
18		27	35	45	55	67	80	108	142	180	222
19			31	40	49	60	71	97	127	161	199
20			28	36	45	54	64	88	113	145	180
21				33	40	49	58	80	104	132	168
22					37	45	53	72	95	120	147
23					34	41	48	66	87	110	136
24					32	37	45	61	80	101	125
25						34	41	56	73	93	115
26						31	38	52	68	86	106
27							35	48	63	80	98
28							33	44	58	74	91
29							30	41	54	69	85
30							28	39	51	64	80
31								36	47	60	75
32								34	44	56	70
33									41	53	66
34										50	62
35										47	59
36											56
37											54
38											
39											
40											

If a joist is ¼" thin and ½" less in depth, take the load of the next regular size smaller.
A joist 1¾" × 9½" will carry only about 2 pounds more per square foot of floor space than a 2" × 9"

Safe Carrying Capacity of Wood Joists, Beams and Girders 1 inch thick, figured for both Strength and Stiffness. Deflection less than 1/360 inch per lineal foot.

Table №6. Long Leaf Yellow Pine.

Depth of Joist in inches.

Length in Feet	10	11	12	13	14	15	16	17	18	19	20
6	3333	4033	4800								
7	2887	3457	4114								
8	2590	3025	3600								
9	2222	2688	3200	3755	4055	5000	5688				
10	2000	2420	2880	3380	3920	4500	5120	5780			
11	1772 1818	2200	2618	3072	3563	4099	4654	5254	5890	6690	7272
12	1488 1666	2016	2400	2816	3266	3750	4266	4800	5400	6133	6666
13	1269 1538	1726 1861	2215	2600	3015	3461	3938	4446	4984	5661	6153
14	1094 1444	1489 1728	1933 2057	2414	2800	3214	3657	4128	4628	5257	5716
15	953 1333	1201 1613	1591 1920	2140 2255	2613	3000	3413	3853	4320	4906	5333
16	838 1250	1140 1512	1479 1800	1881 2112	2272 2450	2872	3200	3612	4050	5850	5000
17	742 1176	1010 1423	1311 1694	1666 1988	2019 2305	2560 2647	3011	3400	3811	4329	4705
18	662 1111	900 1344	1170 1600	1486 1879	1795 2122	2284 2500	2771 2844	3211	3555	4088	4444
19			1050 1515	1334 1778	1611 2063	2049 2368	2487 2694	2933 3042	3410	3879	4210
20				1200 1690	1454 1960	1850 2250	2245 2560	2693 2990	3196 3240	3680	4000
21					1319 1866	1678 2142	2036 2438	2442 2752	2879 3085	3410 3504	3809
22						1530 2045	1856 2327	2226 2627	2648 2945	3107 3345	3623 3636
23							1696 2226	2036 2513	2417 2817	2843 3200	3315 3478
24								1870 2408	2220 2700	2614 3066	3045 3333

Formula - Safe load in pounds = $\frac{25 d^2 c\ (100)}{\text{Span in feet}}$ or $\frac{2 a d c}{\text{Span}}$

7. Short Leaf and Texas Y.P. and Oregon Pine.

Depth of Joist in inches.

Length in Feet	10	11	12	13	14	15	16	17	18	19	20
6	3000	3630	4320								
7	2591	3111	3702								
8	2222	2722	3257	3927							
9	2000	2420	2880	3480	3920	4500					
10	1806	2178	2592	3142	3528	4050	4680	5202			
11	1636	1980	2356	2856	3207	3681	4189	4729	5301	5907	6545
12	1223 1500	1815	2160	2618	2940	3375	3840	4335	4860	5415	6000
13	1042 1384	1387 1675	1993	2416	2713	3115	3544	4000	4481	4888	5538
14	898 1285	1196 1556	1552 1851	2244	2520	2892	3291	3715	4165	4641	5142
15	783 1200	1042 1462	1352 1789	1719 2094	2362	2800	3072	3468	3888	4332	4800
16	690 1125	916 1361	1189 1620	1511 1963	1887 2205	2531	2880	3251	3645	4060	4500
17	610 1058	811 1281	1053 1524	1338 1848	1671 2075	2056 2382	2710	3060	3430	3822	4235
18	544 1000	723 1210	939 1440	1194 1745	1429 1957	1834 2250	2232 2560	2890	3240	3610	4000
19			837 1364	1072 1653	1338 1856	1644 2131	2003 2425	2396 2737	3069	3262	3789
20				961 1571	1208 1764	1486 2025	1808 2304	2162 2600	2566 2916	3244	3600
21					1600 1680	1347 1928	1680 2174	1961 2477	2328 2777	2738 3094	3428
22					998 1603	1228 1840	1453 2094	1783 2364	2121 2741	2453 2953	2910 3272
23							1363 2003	1631 2261	1938 2535	2282 2825	2662 3130
24								1502 2167	1782 2430	2096 2706	2441 3000

Formula - same as table 1, except that C = 90.

8. California and Eastern Spruce.

Depth of Joist in inches.

Length in Feet	10	11	12	13	14	15	16	17	18	19	20
6	2333	2823	3360								
7	2000	2420	2880								
8	1750	2117	2520	2957							
9	1555	1882	2240	2628							
10	1400	1694	2016	2366	2744	3150	5584				
11	1272	1540	1832	2150	2494	2863	3258	3678			
12	1166	1411	1680	1971	2286	2625	2986	3371	3780		
13	947 1076	1261 1303	1550	1820	2110	2423	2756	3112	3489	3837	
14	817 1000	1088 1210	1311 1440	1690	1960	2250	2560	2890	3240	3610	4000
15	712 933	947 1122	1230 1344	1563 1577	1829	2100	2389	2687	3024	3369	3733
16	626 875	832 1059	1080 1260	1388 1478	1715	1968	2240	2522	2855	9133	3500
17	554 823	737 996	957 1183	1217 1391	1520 1614	1855	2108	2380	2668	2914	3294
18	494 777	658 948	853 1120	1085 1314	1356 1524	1667 1750	1991	2247	2520	2807	3111
19			766 1061	963 1245	1217 1444	1496 1657	1816 1880	2124	2387	2660	2942
20				879 1183	1096 1372	1300 1575	1634 1782	1916 2023	2268	2527	2800
21					996 1306	1225 1500	1487 1706	1774 1926	2116 2160	2407	2666
22					908 1247	1112 1431	1354 1629	1624 1839	1928 2060	2268 2299	2590
23						1021 1369	1239 1558	1486 1759	1764 1972	2078 2198	2410 2435
24							1138 1493	1365 1685	1655 1890	1906 2106	2225 2333

Formula - same as table except that C = 70.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

PLATE XXVI. EXTERIOR DETAILS.

Details are drawn to supplement the floor plans and elevations, and are made to show any peculiarities of construction or finish which are to go into the make-up of the building planned. They are always made to a larger scale than the plans, and preferably full size. The trim is nearly always drawn full size.

Plate XXVI illustrates a few exterior details of the house given in former lessons. These are merely illustrative of a large number which could have been included, but a brief course of this kind must necessarily give examples and not all of the possible ones which could be shown.

The scale given on this plate and the next is the one for the student to follow and not the scale as here reproduced. The dimensions shown are to help the student get his sizes, and are not necessary when he has drawn them out full size, though they are often given as a help to rapid reading of the drawing.

It will be noticed that full size drawings of the trim are given in section. This is customary practice, as in this way the mill man can get a quicker idea of the shape of the pieces than he could if they were given in plan and elevation, which is a waste of time on this kind of work.

It is understood that the young builder knows the correct names and usages for the constructions illustrated, so no time will be wasted in explaining them. But we will call his attention to the porch column and floor construction, and especially to the parts named.

A column of this kind is designed after the Tuscan order of architecture, though it does not follow it out exactly. In a future lesson the orders and their proportions will be made clear, though here it will suffice to call attention to the style used and its parts. The top of the column is called the "abacus." In this case as in most others, it is square. Below comes the "echinus," which our modern builders have changed to "cap," though the cap should include all of the column above the astragal. Further down comes the "astragal," and the space between the astragal and the cap is known as "necking." From the top of the astragal down to the top of the "base" comes the "shaft." The correct Roman name for "base" is "torus," and below it comes the "plinth." These parts should be thoroughly understood and remembered by the student.

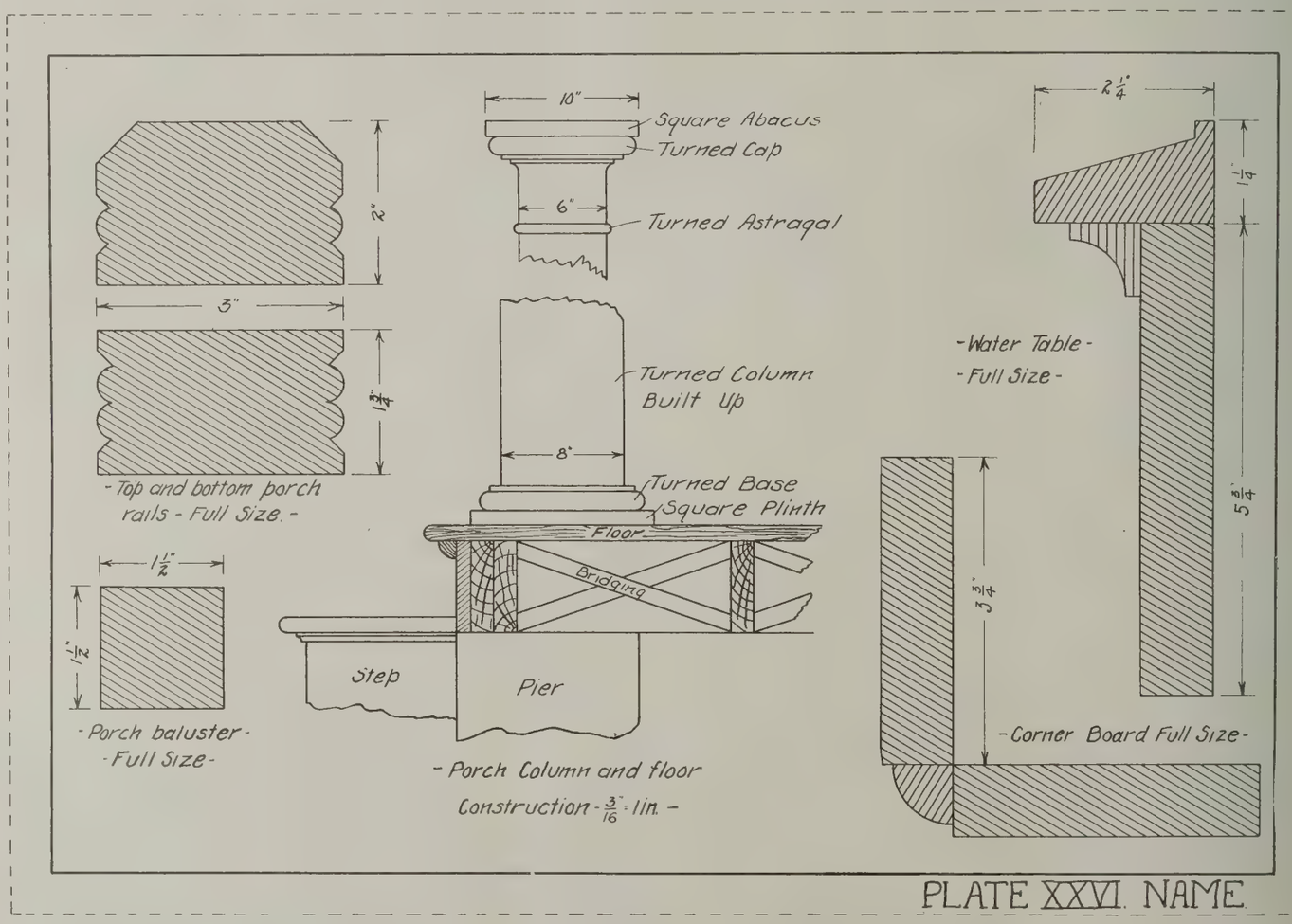


PLATE XXVI. NAME.

The floor construction is self-evident so nothing need be said concerning it.

Different localities have come to adopt different standards for trim, such as water tables, corner boards, etc., and it is advised that the young builder go to a mill and secure short pieces of the different stock materials, if he cares to save money on his mill bills. It is much cheaper to use stock materials than it is to make special designs, and it would be advised for modern buildings to do so, unless the owner cares to pay for something out of the ordinary.

PLATE XXVII. INTERIOR DETAILS.

In general, the interior trim is drawn in the same manner as the exterior, and the same things could be said about it concerning stock sizes. It must be emphasized, though, that different

parts of the interior details must be uniform in style. It will not do to have a very plain mission style mantel, and a stair whose balusters are turned and covered with beads and coves, and whose newels are covered with fancy carvings. And it also does not pay to have the trim too plain. In a modern house the style illustrated on Plate XXVII is much better liked. The pedestal of the arch is paneled after the style of the newel post, and each bears a relation to the other. Other details, such as a mantel, dining buffet, plate rail, etc., should all have some uniformity with the general style carried out.

As has been said before, we must of necessity, leave out a number of details which should be given to make everything clear to the student concerning their possibilities. But if he thoroughly understands the style of drawing and construction of those which are illustrated, he should have little difficulty in working out the rest for himself. A great help would be a scrap book in which to paste clippings from trade journals, papers, etc.; also sketches of details he encounters in his work which appeal to him as being useful. Good practice is obtained by drawing scaled details from these sketches. A number of other methods of self-improvement along this line have been tried by ambitious students, and we leave it to the ingenuity of the reader to devise other means if he really cares to make a success of his studies.

(To be continued.)

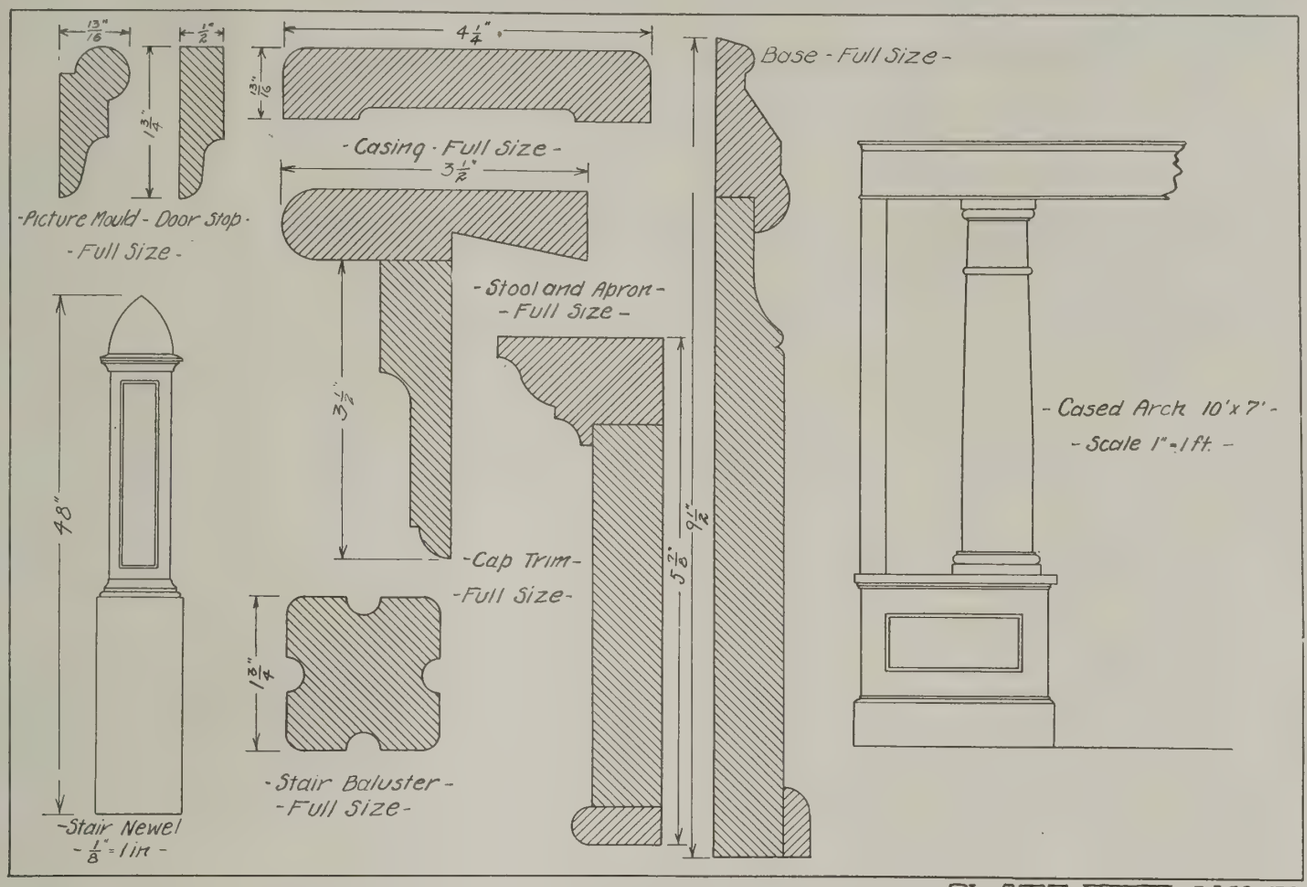


PLATE XXVII. NAME.

FUNGUS IN DAMP DWELLINGS

By ROBERT GRIMSHAW

THERE are districts in which fungus on the walls and ceilings of dwellings is common, and of course detrimental to health and property, as well as unsightly. There are also cases where the climatic conditions are such as to induce the formation of fungi; and where these are introduced in the building material, develop more or less freely according to the local conditions. We are not to understand that the appearance of fungus necessarily implies an undue amount of moisture in the building or on the premises; dry rot once under way continues under conditions which may not by any means be favorable to the starting of visible fungus on the surface of the walls. Whether or not the contractor can be made responsible for dry rot or wet rot caused by negligence, ignorance or bad faith on his part is a legal question; the main thing is to prevent its occurrence—outside of this a guarantee in the building contract that no fungus will appear within a certain time can do any harm.

Dry rot can be caused by several sorts of fungus germs; most of them are to be found in felled or fallen tree trunks which lie on the damp ground where they fell, or are stacked up without anything between them and the ground. When the trunks or logs dry rapidly, they dry without the germs having effected any visible damage; but where they are given time, temperature and moisture to favor their development they can be of incalculable harm.

Wet rot, as shown by fungus on the surface, is mostly caused by only one variety of microscopic being—the merulius lacrimans; and it can pass from house to house through the walls. At first it requires moisture to favor its development; once well started, however, it absorbs from the surrounding air, enough moisture to keep itself in good condition to enable it to propagate, even in what might be called dry buildings.

Dry rot is usually caused by the polyphorus vaporarius.

Prevention against these two evils is a matter for the builder or owner; but once the house is attacked by either the one or the other of these enemies, the house-owner should first learn which one of the two is the cause.

Wood which has started in with dry rot can be made further immune by treatment—dry warmth with plenty of fresh air is a good remedy, and specially attacked places can be treated with a suitable disinfectant. It is sometimes necessary to "iron-clad" them.

Wet rot requires more heroic measures; it is best to remove the infected wood entirely, even although its strength may not seem to be lessened by the disease.

Where the wood is not removed, it must be washed or painted with a disinfectant. When the room is used for living purposes, one must be chosen which is inoffensive to the sense of smell.



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]

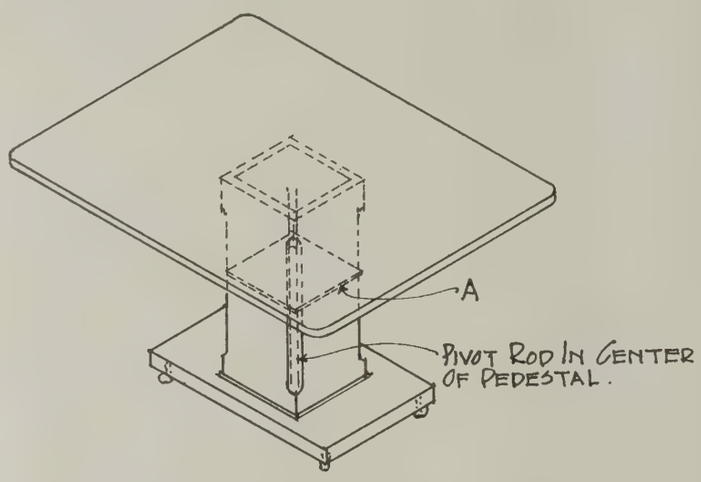


ANSWERS

REVOLVING TABLE.

From "Old Timer," Niagara Falls, N. Y.

Years ago, I made a revolving table for my own small dining room, with a top measuring 3 ft. 6 in. wide by 4 ft. 6 in. long. A heavy pedestal was made for a central post, over a foot square in section, and a round iron rod 1½ in. in diameter, went down the center of the post and was fastened to the bottom platform which was made of two inch plank about 18 in. wide and 30 in. long, and



REVOLVING TABLE.

on the four corners of which were fastened suitable castors. The center post was cut off about 13 in. from the top (Marked "A" on cut), and the iron rod ran up into the upper portion of the post which was fitted snugly over the rod, but not so tightly as to prevent the portion of post from revolving easily, carrying the top with it. The rod, of course, is fastened solid and firmly in the lower part of the pedestal, and the upper portion of pedestal with top attached, may be lifted off at any time if so desired. All other details may easily be thought out by any carpenter. If desirable, arrangement can be made at the joint of the pedestal for ball-bearing, but I have never found any trouble in the revolving arrangement of my table, although the whole work is a little crude and not as well finished as it might be.

STAIRS AND BRICKS.

From "Builder," Philadelphia, Pa.

To contractor, Green Bay, Wis.—It is always better to have bricks "wetted" before laying, but not a necessity. In cold weather, if the bricks are to be "wetted" the water in which they are dipped should be made hot before dipping, and the bricks then piled in the hod for distribution while still hot. This answers a double purpose, namely, the bricks will not absorb the water from the mortar so much, and they will be warm enough to prevent freezing before the mortar is set. As to the second query, I may say that the rise and tread of a stair step should never exceed 18 inches, measured together, and 6 in. rise and 12 in. tread comes within that limit; but this arrangement does not make the easiest stair to travel. For outside public buildings and grand entrances, the rise may be as low as 4 in., and the tread as wide as 14 in. This proportion makes a very easy grade. In designing stairs, the designer cannot always make the proportions as he would like, as the run of the stairs and the height of the story have to be provided for.

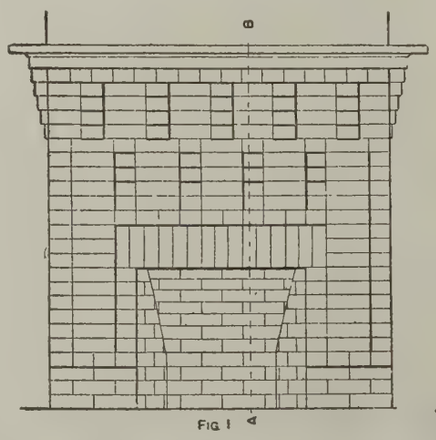
A BRICK FIREPLACE.

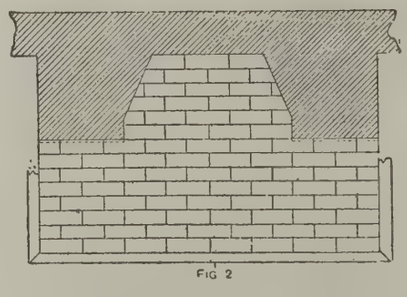
The commodious old-fashioned fireplace is a great favorite with home lovers, and it always will be. If properly constructed it will not only throw out a great deal of heat, but it will at the same time provide natural ventilation. An open fireplace, it is said, will extract about 250 cubic feet of air per minute, which will provide satisfactory ventilation for half a dozen persons. But the main reason for the popularity of the fireplace is based on sentimental grounds. It was in front of a log fire that many of us first heard of the fairies and their wonderful pranks, and it was there that the family gathered in the evening to welcome callers and display their hospitality under the cheering influence of the blazing logs.

We remember these things, the fireplace brings to our minds scenes of the past which makes us younger in the thought of them, and so the fireplace becomes a sort of rejuvenator in the cold winter evenings as we gather around it to discuss the news of the day or indulge in harmless gossip.

The open fireplace is greatly favored in England, where no matter how elaborate the heating system of a house may be, provision is always made for at least one large fireplace, where the lord of the manor may enjoy a quiet smoke and a nap, or may gather with his friends and neighbors to watch the snapping flames of the cheerful fire in the good old cheerful way.

In this country it has become the fashion, especially in the larger residences, to provide a fireplace in the living room, independently of other heating facilities. Those who gather around





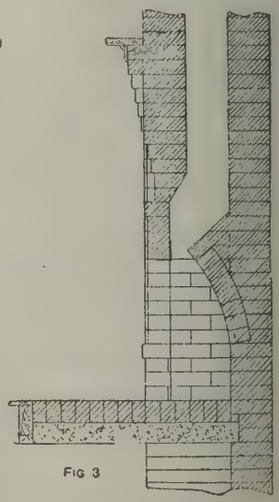


Fig 1.—Front Elevation.
Fig 2.—Plan
Fig 3.—Section on Line A B (Fig. 1)

these hearthstones assert that they make wonderfully for cheerfulness and family fellowship.

With the coming of the winter the fireplace will assume its rightful prerogatives and thousands will see pictures in the blazing logs and live again the days of their youth, inspired by the crackling wood or coal, as it vanishecs to ashes in the ruddy glare.

In this illustration we show the essential points in fireplace construction. While shown for burning wood, it is only necessary to place a fire basket in the opening in order to burn coal. It is to be noted that the back of the fire chamber curves to throw the heat down and out into the room. Above in the chimney is an inclined shelf, which serves to lead the flames back into the chimney and also to check and deflect any tendency to a down draft.

Brick in any of its many styles makes an excellent front for a mantel, and a wide choice is offered from plain common brick to a high-grade enameled brick in colors. Good red pressed brick, carefully selected for color, size, and perfect arrises, make an ideal front if laid up with one-fourth-inch black mortar joints, struck flush. The arch head may be laid square without cutting or grinding the brick, if supported by an angle iron, as shown, otherwise it will be necessary to cut the sides of the brick on radial lines. The facing brick should be well tied in by clipping off the back corners and inserting blind headers, or metal ties may be used. The expansion due to the fire is considerable and unless the brickwork is well executed, some of the brick will work loose.

BRICK MANTEL.

From "Bricklayer," Chicago, Ill.

As a reply to C. F. K., Cincinnati, Ohio, I would suggest that he write to any pressed brick manufacturing company, and ask for an illustrated catalogue and he will no doubt find in it what he wants, or get suggestions enough to suit his purposes. A single design would not likely be of any service to him. If he wants plain or tapestry brick in his mantel, it might be well to write "The Fiske" Tapestry Brick Co., Flat Iron building, Broadway, New York City, and ask for catalogue, or other trade literature.

CONCRETE MIXING BOX.

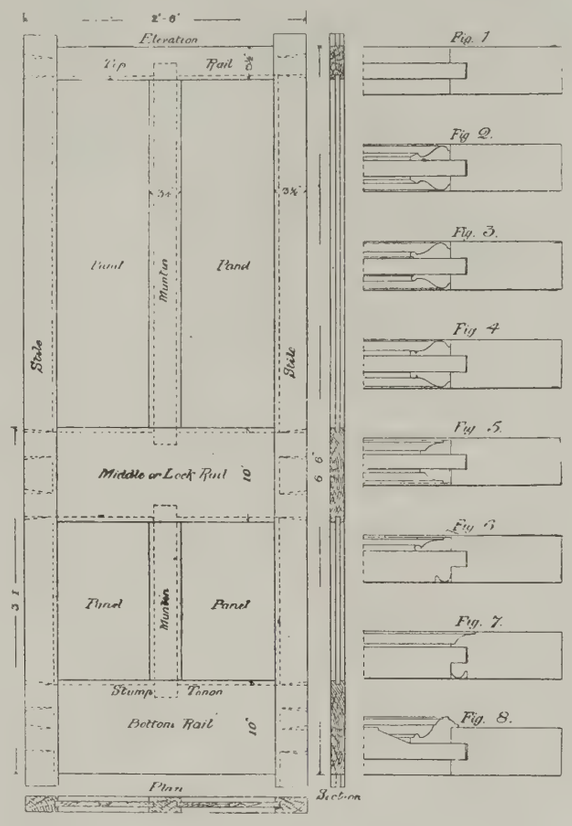
Answer for concrete mixing box.—A box that you would measure the stuff in would be very unhandy to mix in, as a large platform without any sides to bother is the best arrangement to mix by hand on. I have found the best way to measure is to take a 7 in. board and nail together a frame 4x6 ft. inside measure, no bottom. Lay this frame on your platform and fill it up level full and you have just 14 cu. ft. of stuff—very nearly a half yard—which is enough to make a nice sized batch to mix handily. The amount of cement to use to each batch will depend on the preparation desired, but all that is required to be done is to put the same quantity in each batch as desired. When the frame is filled, lift it off and you have no side of a box to bother.

FLOORING TROUBLES.

In answer to question by "Reader" in the December number, I think I can explain the cause of his trouble and the remedy. First, the trouble is caused by two reasons. As you state the 8 in. wall is only basement high and the joists run over this wall into the main outside wall. Now, it is easily understood that the outside wall will settle more from the natural shrinkage of the mortar joints than the 8 in. basement wall, because it is the full height of building and is thicker, which gives it so much more additional weight, while the 8 in. basement wall is only basement high and has nothing to carry but its own weight. This in itself might cause the floor to raise 1 in. over the remainder of the floor. Another very likely cause would be, when the joists are laid over the 8 in. wall, they would be beam filled with brick to the top of joists. Bricklayers usually fill up flush with the top of joists; if not with brick, with mortar. The joists are invariably green or wet and when they become seasoned, will shrink from a ¼ in. to ½ in. The brick and mortar does not, hence it pushes the floor up from the joist just that much when both ends of joist are pulled down with the natural settlement of the outside walls. This could be remedied without going to a very great expense. As "Reader" states the building has been up six years and has shown no signs of cracked walls; it has evidently settled all it ever will. Now, what the writer would do is take up, say, about 3 ft. in width of the top floor, where it is raised over the 8 in. wall, and reduce the 1x2 in. as required; as the raise is about 1 in. at the highest place they would be eliminated entirely there and the finished floor relaid would lay snug onto the rough floor at this point. When done, you would never know that there had been a bulge. I trust this will help out my fellow readers who encounter like troubles.

SOMETHING ON DOORS.

A "Subscriber" writes us from Peoria, Ill., and asks for some information pertaining to joints, mortising and tenoning, in woodwork, particularly as relates to the framing of doors and similar work. There is no fixed rule for the dimensions of mortises or tenons, as conditions and requirements generally govern the matter. Usually tenons are made a trifle less in thickness than one-third the thickness of the material employed for rails and stiles,



thus: Stuff 1½ in. thick will have tenons half an inch thick. Mortises, of course, are made to suit. This rule, however, is not like the laws of the Medes and Persians, it is often changed to meet various conditions and situations.

We show in the illustration—plan and elevation—the complete skeleton of a four-paneled framed door, with section, figured sizes, tenons, muntins, and panels; also sections of finish and

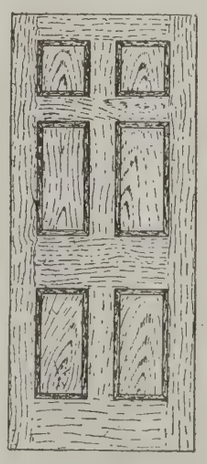


FIG. 9.

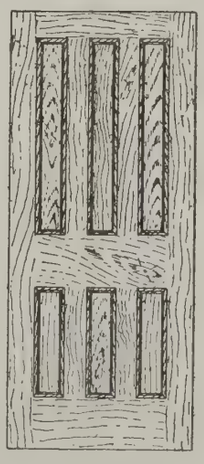


FIG. 10.

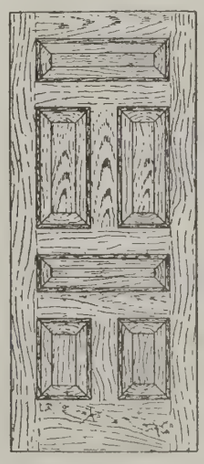


FIG. 11.

mouldings in eight different styles. The door is of standard size, being of a height of 6 ft. 6 in., and in width 2 ft. 6 in.; other sizes range upwards, increasing by inches in both dimensions, so that a door 6 ft. 9 in. high would be 2 ft. 9 in. wide, and one 7 ft. high would be 3 ft. wide.

The position of the middle rail is governed largely by aesthetic principles, but mainly for the purpose of fixing the lock. A convenient position for handling may be considered as 2 ft. 8 in.

from floor line to knob line; this may also be taken as the height of the center of the middle rail. It has been recommended that the height of the top line of the middle rail should be at a distance of 3 ft. 1 in. from the floor line, but this rule alters the height of the center of the middle rail as its width increases or diminishes.

The elevation given is that of a four-paneled door, with the position of tenons and panels dotted in. The different methods of finishing are shown at Figs. 1 to 8. Fig. 1 is a section through what is known as a square framed door with flat panels.

Fig. 2 represents a similar door, with drop or sunk mouldings of the quirked and filleted ogee type.

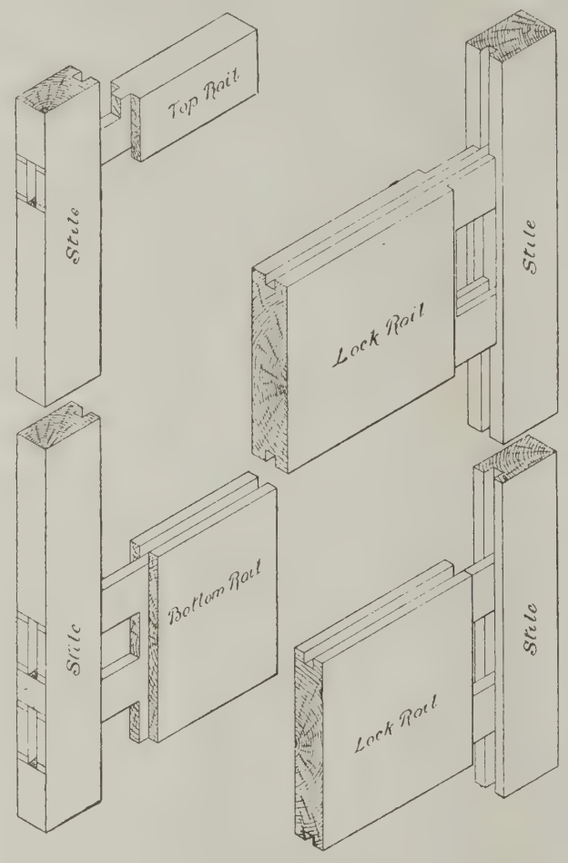


FIG. 12. Details.

Fig. 3 is a similar section, having a beaded and quirked ogee moulding, another form of which is shown in Fig. 4.

The section shown at Fig. 5 has a filleted ovolo moulding.

Fig. 6 shows a section through the stile of a square framed door, with flat panel and sunk moulding on one side, and flush panel on the other.

In the section at Fig. 7 both moulding and bead have been worked upon the framing, the external appearance being somewhat similar to the above.

Fig. 8 is a section through the stile of a square framed door, with flat panel on one side, and a raised or "fielded" panel upon the other, the latter being provided with bolection mouldings. Mouldings projecting beyond the face of the work, and being rebated over the framing, are termed "bolection mouldings." An elevation of two raised or fielded panels provided with bolection mouldings is shown.

Doors vary in size according to their position and use. External doors are generally 2 in. to 2½ in. thick. Doors for reception rooms are from 2 in. to 2¼ in. thick; while for bedroom doors 1½ in. is often considered to be thick enough. A well-proportioned door is considered to be one in which the height exceeds the width by 4 ft., except in the case of tall doors, when this rule is obviously impossible. The lock-rail is usually so placed that its center is about 3 ft. from the ground, or its lower edge about 2 ft. 4 in. from the same place; the idea being that this allows of the handles being fixed at a height convenient to most persons.

When pine is used in the construction of doors, the surface is protected either by sizing and varnishing or by painting, graining being most commonly employed in dwelling houses, as the surface so treated wears better; but, from an artistic point of view, plain tints give the best results. Doors of hardwood are most often polished; the design in this case being greatly enriched by the figure and color of the natural wood.

Various arrangements of the panels are made in order to show how a door can be altered to suit various purposes and designs without calling for the addition of any work beyond that of straight and square framing. Of the many ways in which doors can be made ornamental, the chief are (1) by the introduction of different sections of mouldings, such as mouldings worked on the solid, mouldings planted in the framing, and bolection mouldings; (2), by the use of framing having the object of splitting up the surface into a number of panels, either square, or shaped by the use of rails having curved outlines; (3), by the adoption of panels not only of different shapes but of different sections, such as squares, raised, flush, etc.

The doors shown at Figs. 9, 10, and 11, are all six-paneled, and in various styles, some showing raised panels and others with soffit panels. Indeed, there seems to be no limit to the changes that are adopted in the distribution of the panels, fashion here, as in many other cases, generally governs the number and distribution—and style—of the panels.

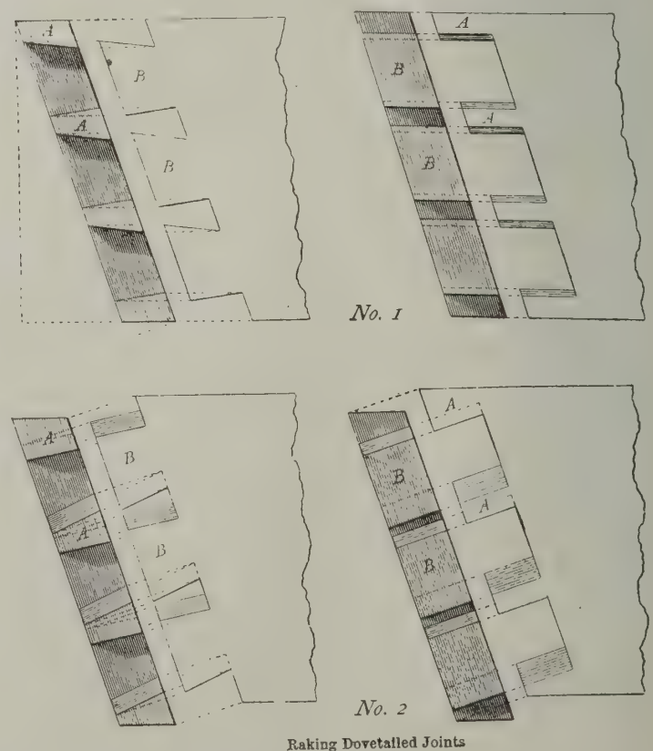
Fig. 12 exhibits the manner of mortising and tenoning rails and stiles, one lock-rail shows a double tenon, a method sometimes used in making heavy doors.

DOVETAILING.

From "T. W. Mc.," Buffalo, N. Y.

Replying to S. J. C., Brooklyn, N. Y., I submit the following which is taken from "Newhall's Universal Carpenter and Joiner," one of the best books ever published. This covers the question of dovetailing pretty thoroughly, and the examples given are quite simple and self explanatory: There are three varieties of dovetailing (see Fig. 1).

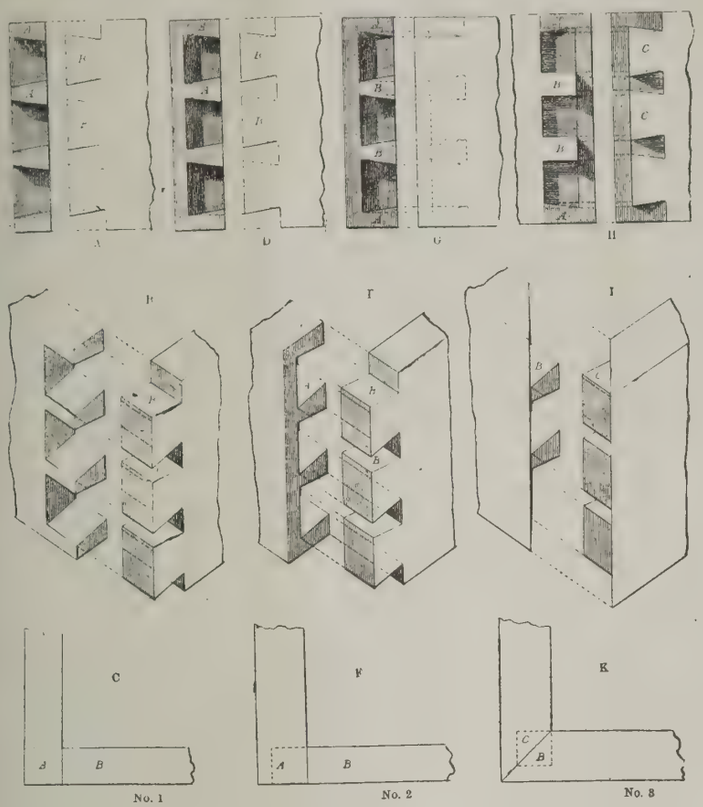
First, the common dovetail (No. 1), where the dovetails are seen one each side of the angle alternately; second, the lapped dovetail (No. 2), in which the dovetails are seen only on one



Raking Dovetailed Joints

side of the angle; and third, the lapped and mitred dovetail (No. 3), in which the joint appears externally as a common mitre joint. The lapped and mitred joint is useful in salient angles, in finished work, but is not so strong as the common dovetail, and therefore in all re-entrant angles the latter should be used. In No. 1, A is an elevation of the common dovetail joint; B, a perspective representation; and C, a plan of the same. The pins or dovetails of the one side are marked A, those of the other side

are marked B. No. 2, D, E, F,—in these the lapped dovetail is represented in plan, elevations, and perspective projection. No. 3, G, H, I, K,—in these figures the mitred dovetail is represented in plan, elevations, and perspective projection. The dovetail of



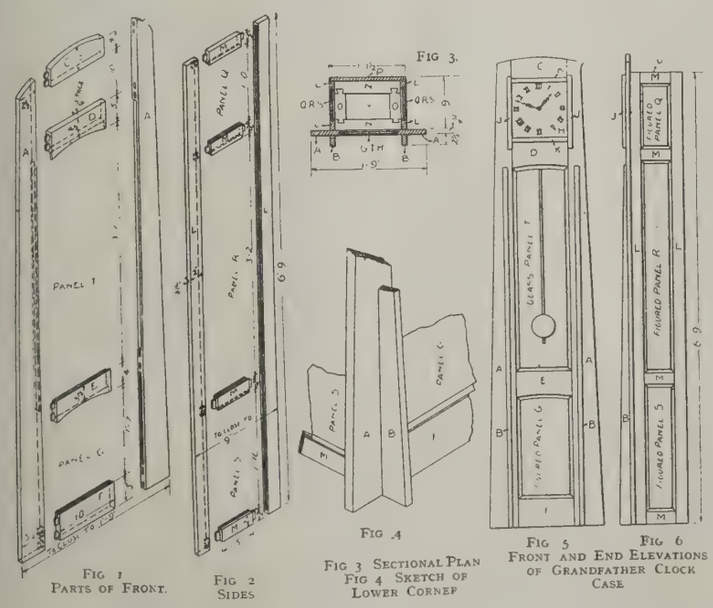
the adjoining sides are marked respectively B and C in all the figures.

Nos. 1 and 2, Fig. 2, show the modes of dovetailing an angle when the sides are inclined to the horizon, as in a hopper. The pins of the one side are marked A, and those of the other side B.

A GRANDFATHER'S CLOCK.

From "Horology," Cornell, N. Y.

I submit the following for the benefit of "A Learner," Erie, Pa., and think it will meet his needs. It is taken from an ama-



teur journal, and I can vouch for its correctness, having just finished a clock case after the directions given: The carcase in this case is made dust-tight, and is constructed of ⅞ in. plain oak, finished to ¾ in., the panels being ½ in. figured oak, finished as shown in section plan, Fig. 3.

The various drawings taken with the list of parts explain themselves. The parts marked B are cut from A; that is, a piece of oak 7 feet long was dressed on both edges straight and parallel, being 5½ ins. wide. It was then cut diagonally from end to end, making A 5½ ins. wide at one end, and 2½ ins. wide at the other. B was 3 ins. wide at one end, down to nothing at the other; but when cut short as shown was about ½ in. wide.

The sides, Fig. 2, were tenoned together, with the panels let into ¼ in. rebates, being afterwards dressed on both edges to 9 in. wide. The front, shown in Fig. 1, was also tenoned together, with the lower panel let into rebates. The glass panel, however, was not fitted in till the whole case was finished.

The cross frames were dovetailed as at Fig. 3, and fixed to sides at the centers of cross pieces, M, leaving room at the top and bottom for pieces of 3-ply wood, U and V. The front was next fixed to the sides by screws on the line of the front pieces, B. Those pieces (B) were afterwards fixed to the front by dowels.

The face, H, was made of figured oak with oxidized brass letters and hands, with a square-edged moulding, J, K, to cover the joint. The back, which was checked into the sides (see Fig. 3), was made of hazel in three pieces, the joints coming on the cross frames, N, O.

SIZES OF PARTS.

Front:		
	Pieces	
A	2	7 ft. 0 in. by 5½ in. by ¾ in.
B	2	(To be cut from piece A).
C	4	12 in. by 5 in. by ¾ in.
H	1	10 in. by 10 in. by ½ in. (Figured).
G	1	1 ft. 9 in. by 11 in. by ½ in. (Figured).
J	2	1 ft. 2 in. by ¾ in. by ½ in.
K	2	10 in. by ¾ in. by ½ in.
T	1	3 ft. 2 in. by 10½ in. by ¼ in. (Plate Glass).
Sides:		
L	4	7 ft. 0 in. by 2 in. by ¾ in.
M	8	7 in. by 2 in. by ¾ in.
S	2	1 ft. 11½ in. by 5½ in. by ½ in. (Figured).
R	3	ft. 2½ in. by 5½ in. by ½ in. (Figured).
G	2	12½ in. by 5½ in. by ½ in. (Figured).
Frames:		
N	8	12 in. by 1½ in. by ¾ in.
O	8	7 in. by 1½ in. by ¾ in.
Top:		
U	1	12 in. by 9 in. by ¼ in. (Three Ply).
Bottom:		
V	1	12 in. by 9 in. by ¼ in. (Three Ply).
Back:		
P	1	7 ft. 0 in. by 1 ft. 1 in. by ½ in. (Pine).

The lengths given above include tenons.

In this, you will notice the dial or face is provided, but in your case you seem to have the clock all complete, which will make the moderating lap difficult.

WOODEN CISTERN.

From "Wm. B.," Augusta, Maine, replying to "D. H. B.," Alice, Texas:

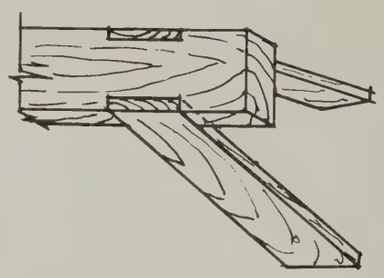
You will, of course, make your tank slightly taper, say 10 ft. 6 in. at the bottom, and 9 ft. 6 in. at the top, or thereabouts. This will hold near the same quantity as though it was 10 feet diameter at both ends. In order to do this, your staves will be a little narrower at the top end than at the bottom. This difference you can readily find by setting off on a board eight feet long a line parallel with one edge, then measuring square across the board, six inches from the edge, and making another line from the six-inch mark to the edge of the board at the other end. Or in other words, the line will be six inches from the edge at the top and close to the edge at the bottom. This last line will represent the incline of the side of the tank when standing in position. Now take the width of the stave, whatever that may be, and mark that width down from the top on the edge of your board, then square over at this point, and the distance of the point on the slanting line to the edge of the board will be the width of the stave at the top. If your staves are four inches wide, there will be very little difference between the widths at top and bottom. Edges of staves must be straight and should be so jointed that the inner edges touch and the outer edges slightly open, as the hooping up will tighten the inner joints and tend to make a water-tight joint. Staves should be all the same width or thereabouts. If there is a difference in width, the edge bevel will vary a trifle. The bevel for the edge may be found by strik-

ing an arc of a circle that will have ten feet diameter. The arc need not be more than 10 or 12 inches on the curve, then draw a radial line through the center of the circle to the arc or circumference line. Lay out the width of a stave on the arc line and join the two points on the arc line, and the true bevel for the joint will then be the two lines made by the line of the stave and the radial line. I think the five hoops should be plenty if they are wide and thick and well joined. Any good blacksmith will lend you his "traveler," which is a small wheel that must be moved around the tank where the hoop goes, to get the exact length. A tape line can be used, but it is not reliable. I hope I have made this plain as far as it goes. If not, "D. H. B." can inform me through this column and I will explain further.

QUESTIONS

A SAW-HORSE OR TRESTLE.

From "T. T. D.," Wichita, Kansas. I would like very much if some reader would explain how to get the bevels for making a



saw-horse as shown in the rough sketch (Fig. 1), by using the figures on the steel square.

ROOF TRUSSES.

From A. B. C., Marcus, Wash.

Marcus is a small town experiencing its first building boom and the carpenters have to do all the planning and designing of structures in progress, so I would like a little information through your journal.

I am going to build a 40 ft. x 90 ft. two-story concrete block store building soon, for a client here and I am at a loss how to build the trusses that will support the flat roof that spans the width of the building. No supports will be permitted as the second floor will be used for a society hall. Can you help me out with a drawing of a sufficient truss for this roof sloping from front to rear. The roof will be covered with 2-ply roofing.

METAL TRIM.

From J. H., Denver, Colo.

As I have been a reader of your very valuable paper for several years, I take the liberty of asking you to publish some pointers on the erection of metal trim. In what shape does it come to the job, and what are the necessary tools a carpenter requires to have to put it up? It is beginning to be used so extensively in the large cities that many of your readers would very much appreciate any information along this line, as the majority of carpenters are wholly unprepared to take a job on this work and may be called upon to do so at any time.

HANDY TOOL BOX.

From S. D. G., Calgary, Alta.

I would like to have a good plan of a tool box that would be easy to get anything out of without upsetting all the other tools, a box that would take a medium kit. Any suggestions would be very useful.

BALL ROOM FLOORS.

From H. G., Ottawa, Ont.

I would be very much obliged if you would advise me of the latest method of laying a ball-room spring floor. I have a number of books, but fail to get any advice through them.

HEAVY TIMBER FRAMING.

From Carpenter, Wausau, Wis.

I would like to know how to erect a frame for a heavy timbered house in which the posts and girts are framed together. Any information will be gratefully accepted.

BROKEN PLASTER CEILING.

From "General Reader," Middletown, N. Y.

I would like to ask a few questions regarding compo-board, which are prompted by your editorial note last month on this question. The ceilings of my dining room, living room, and parlor are badly cracked, and in some places seem to be broken away from the lath and hang like the sword of Damocles, as though they would fall at any moment. The plastering was done more than 50 years ago, and people tell me it is "rotten" and liable to drop on our heads at any time. Some years ago, the ceilings were papered with a good, heavy ceiling paper, and this seemed to hold them together all right for a while; but, of late, paper and plaster are broken worse than ever. Which will be the better way—to ceil with half-inch lumber or with Compo-board? Can Compo-board be well and securely fastened to the joists, and hold the plaster up safely? Any information on these subjects from my brother readers will be greatly appreciated.

STEP SCROLL.

From "Student."

Please publish a method of getting the line for a scroll, for a bottom step or a handrail, and oblige a young reader.

BIG BARN.

From "Country Builder," Montana.

I am often called upon to build barns of various sizes, and have nothing to guide me in the construction and design, but the figures of the length, width and height, and I make this appeal to readers who have had experience in barn building, to publish a few rough designs of convenient barns of any size or shape. For such designs, no matter how crude they may be, I should feel quite grateful.

CASEMENT WINDOWS

By J. CROW TAYLOR

There ought to be some good work for the carpenter and builder in casement windows, especially for enclosing sleeping porches and also verandas. This is a work that the winter time should bring a quantity of and thus help fill up the dull period by developing practically a new line of work.

The casement window is quite common in the old countries and in France the majority of windows are of the casement variety, many of them extending from the floor up and becoming virtually doors except that it is a sash and not the heavy frame of the regulation sash door.

A few years ago it looked like the casement window was coming into wide favor in this country. Right at the time when divided top sash became popular, but it is always receiving more or less set backs, because of the difficulty of rendering the casement window storm-proof and at the same time hanging it so that it is convenient to screen.

To make a window storm-proof it is almost imperative to hang it outside or else resort to some special means for safeguarding it. To hang it outside interferes with screening it and it is generally better if it can be hung inside, provided sufficient protection can be secured to keep the rain from beating in through the joints.

There is to be had some patent hardware for hanging that makes it convenient to hang inside and also makes it pretty safe. Anyway, in the enclosing of sleeping porches and verandas it is not so important to have a window storm-proof as it is when the window is part of the main house itself. The enclosing of porches is an idea that needs developing. It adds to the usefulness of the porch by making it possible to get service out of it in the winter time and by virtue of doing this it also protects the house both against cold and against exposure to the elements.

So, try cultivating this casement window idea. Make a study of it and see how much can be developed in connection with porches and balconies and afterwards you will be inclined to feature it in connection with house building, especially in kitchens, dining rooms, and places where you want to secure the maximum of air during the summer months.

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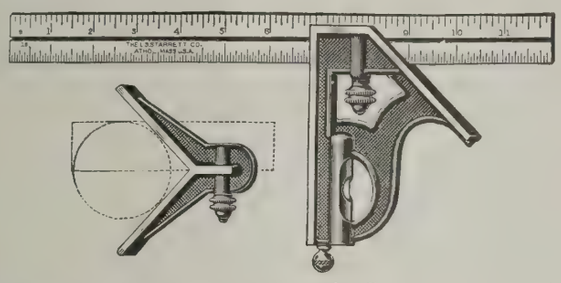
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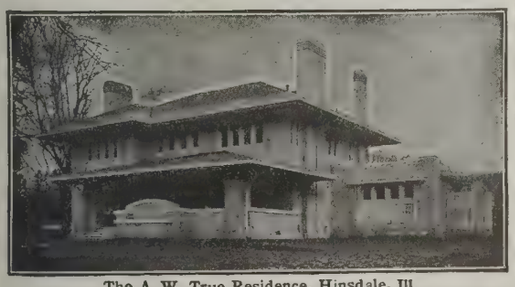


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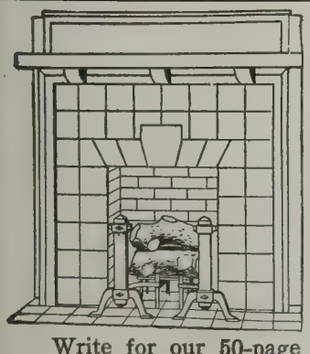


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BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

PRACTICAL CEMENT WORK.—By B. Henry. Published by the Concrete Age Publishing Company, Atlanta, Ga. Cloth, limp binding. Price 50 cents, prepaid.

This is a very handy and concise little work, and is well suited to the requirements of practical workmen, as it contains full directions for mixing all kinds of concretes, cements and stucco, with rules for the proper proportioning of sand, cement and aggregates, stating the different kinds of sands to be used for different purposes; also methods of mixing and the various appliances used in mixing, and tools required for the purpose of laying concrete and cement. The book is handy for the pocket and contains—for its limits—100 pages—a very large amount of the best up-to-date information on the subject of concretes and cements. The book may be obtained from the office of publication, Atlanta, Ga., or from this office, on receipt of price.

WOODWORKING SAFEGUARDS—For the Prevention of Accidents in Lumbering and Woodworking Industries.—By David Van Schaack, Director Bureau of Inspection and Accident Prevention. Published by Aetna Life Insurance Company, Hartford, Conn., Accident and Liability Department. Heavy, limp cover binding, and containing over 300 clear illustrations of methods and appliances made use of for the prevention of accidents; over 200 pages, printed on fine, heavy paper; sent to any address in the United States, postpaid on the receipt of the price, one dollar, which may be sent to the above address, or to this office.

This is a work that should be in the hands of every person who works about machines of any kind intended for woodworking or other purposes, as it contains so many simple devices and rules—plainly set forth—for the prevention of accidents of every possible kind. Many a man who now labors under the disadvantage of having lost one or more of his fingers—or a thumb, perhaps—or injured by flying splinters or boards, or caught by belts, might have been spared the pain and loss from these and other misadventures had he possessed a book similar to this—and made use of it—a matter of considerable importance to the workmen himself, his employer and the country. The book is not costly, and we would suggest that every mill owner in the country purchase two or three copies and loan them to their workmen, in rotation, and thus spread a knowledge of self-protection, which appears to be quite limited, or certainly there would be fewer accidents attributable to the useful but feelingless woodworking machine.

HINTS FOR PAINTERS, DECORATORS AND PAPER HANGERS.—Containing instructions and suggestions for House Painting, Stenciling, Gilding, Graining, Paper-Hanging, etc. Prepared with special reference to the wants of amateurs. By C. Godfrey, author of "How to Mix Paints," Etc. Published by the Industrial Book Company, Fulton street, New York. Cloth binding, illustrated, 122 pages, printed on fine paper and very neatly gotten up. Price, postpaid, 50 cents.

This is quite a handy little work, and contains most fo the necessary rules that a practical painter must know, if he has any aspirations to become thoroughly conversant with his trade. While the author states in his title that the work "has been prepared with special reference to the wants of amateurs," we feel that it will be equally useful to the general workman, and that even the expert may find within its covers many things he may have forgotten or overlooked in the stress of business, and that he may want in some unexpected emergency.

The little work is quite a creditable production, from a publisher's point of view, and ought to have a fairly good sale.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,007,339. Fire door. Thos. E. Collins, Chicago, Ill.

1,007,556. Fitting for reinforced concrete structures. Geo. M. Graham, assor. by Mesne assignments to Suspension Steel Concrete Co., Chicago, Ill.

1,007,287. Constructing concrete walls, subways, etc. Geo. W. Jackson, Chicago, Ill.

1,007,212. Sash-balancing mechanism. I. Lasersohn, St. Louis, Mo.

1,007,300. Window-sash ventilation lock. Chas. E. Mason, Bellefontaine, O.

1,007,313. Prepared roofing. Ed. J. Schroder, Chicago, Ill.

1,007,623. Mold for concrete flooring members. J. G. Zwicker, Mexico, Mex.

1,007,624. Concrete flooring construction. J. G. Zwicker, Mexico, Mex.

1,007,838. Door hinge. L. Aspy. Terre Haute, Ind.

1,008,118. Anchor for building constructions. D. O. Crilly, Chicago, Ill.

1,008,295. Combined floor and bench scraper. Geo. J. Engert and C. R. Hesseltine, Spokane, Wash.

1,007,953. Sash-operating device. J. E. Jones, Richmond, Ind.

1,008,209. Reinforced concrete column. Theo. H. Skinner, assor., Oneida Communty, Ltd., Oneida, N. Y.

1,008,296. Waterproof floor covering. J. Smith assor. United Roofing & Mfg. Co., Philadelphia, Pa.

BUILDING TRADES INTERESTS IN THE COURTS

By GEORGE H. MURDOCH

The word "specification," when used in a building contract, means a detailed statement of each particular part of the work to be done, usually prepared by the architect, to amplify the details of the plans.—Fowler vs. Bushby, 125 N. Y. S., 890.

A surety on a building contractor's bond for the construction of a five-story building was discharged by changes in the plans involving the addition of another story where he did not consent thereto.—Barrett-Hicks Co. vs. Glas, 111 P. (Cal.), 760.

That a subcontractor furnishing materials and labor in the construction of a building did not personally bestow labor or services on the building would not preclude him from obtaining a mechanic's lien therefor.—Barrett-Hicks Co. vs. Glas, 111 P. (Cal.), 760.

The office of the statute in requiring the conditions and terms of the contract for materials to be set forth correctly in the notice of mechanic's lien is to inform the owner as to the extent and nature of a lienor's claim so as to facilitate investigation as to its merits.—Barrett-Hicks Co. vs. Glas, 111 P. (Cal.), 760.

Where the word "specification" was stricken out in two of the four places in which it was used in a building contract, thereby making it ambiguous, any contemporaneous document, such as a duplicate of the contract, could be examined to ascertain the intention of the parties.—Fowler vs. Bushby, 125 N. Y. S., 890.

A provision in a building contract that the second payment should be made when dismissal is secured upon the certificate of the tenement house department did not bind the contractor to do work not included in the contract, in order to secure a dismissal by the tenement house department.—Fowler vs. Bushby, 125 N. Y. S., 890.

A check given in settlement of work done under a building contract, indorsed by the owner as "in full settlement of contract of December 3, 1909," only covered work included in the contract, and was not in settlement of extra work not included therein.—Fowler vs. Bushby, 125 N. Y. S., 890.

Where, after defendant claimed that certain lumber furnished him by plaintiffs was defective, it was agreed that the matter be arbitrated, and on the arbitration defendant was allowed $17 with which he was credited on his account, such award precluded him from thereafter setting up defects in the material as a counterclaim in a suit for the balance of the price.—Barry vs. Congleton Bros., 131 S. W. (Ky.), 1014.

Where plaintiffs contracted in writing to do all the work and furnish all the materials for the construction of a building and covered passageway to connect with an old building for defendant on the place to be designated by the latter and according to the plans and specifications, and defendant changed the location of the building so as to require a longer passageway, plaintiffs could not after proceeding with the work without objecting claim additional compensation.—Rebekah Assembly I. O. U. F. of Indiana vs. Pulse, 92 N. E. (Ind.), 1045.

That one who furnished materials for the construction of a building, who was also a surety on the contractor's bond, took from such contractor an assignment of all money due and to grow due on the contractor's contract merely as indemnity against his loss as a surety and to insure proper application of the money would not render such surety liable under the building contract to the owner or laborers, mechanics, and materialmen, nor preclude him from obtaining a lien for materials furnished by him.—Barrett-Hicks Co. vs. Glas, 111 P. (Cal.), 760.

While under Sess. Laws 1909, c. 45, declaring that every person furnishing materials shall "at the time" they are delivered to a contractor, deliver or mail to the owner of the property on which the materials are to be used, a duplicate statement of all such materials, a reasonable time might be taken, it cannot, in the absence of a positive showing, be said that a few weeks or a month's delay would be excused, so as to entitle the materialman to a lien; the purpose of the statute being to protect property owners against dishonest contractors.—Finley vs. Tagholm, 111 P. (Wash.), 782.

A building contract provided that the architect's decision as to the meaning of the drawings should be final. In a letter the architect stated that when the contractor figured on the house he estimated on the plans before they were presented to the tenement house department, and it was necessary to specify in the plans filed with it that the floor would be waterproof, and several other orders were received from the department on which the contractor did not figure, and as to which he had been put to some expense, and that the contract required the approval of such department, and the owner was not bound to pay the contractor extra for such work. **Held,** that the architect's decision was that the waterproofing of the floor was not covered by the contract; the remainder of his letter dealing with the construction of the contract which he was not authorized to construe, so that his statement that the owner was not bound to pay for the extra work was not binding on the parties.—Fowler vs. Bushby, 125 N. Y. S., 890.

Where a subcontract for the construction of the carpenter work of a building provided that, if the subcontractor neglected to supply sufficient workmen, the contractor on three days' notice might terminate the contract and complete the building, and the contractor thereafter, because of delay which resulted from the contractor's failure to furnish materials as he had agreed to do, terminated the contract and completed the building, the subcontractor was entitled to recover a proportionate part of the price for the work done by him, and also such profits as he would have realized if he had been permitted to complete the work.—Standard Const. Co. vs. Jeunesse, 131 S. W. (Ky.), 1028.

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If you aspire to be one of the men who do things, to rise above the poorly paid class, and to be independent, you must have special training. You have the ability, but it is latent, it needs developing. By our practical and complete correspondence courses we can positively teach you to become proficient in DRAFTING—

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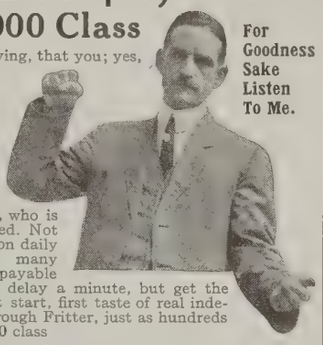
in full or partial courses to fit your individual need. The courses cover every conceivable branch of the building trades. Conducted by a large and successful firm of Chicago architects—your lessons are supervised by them. Blue prints of buildings actually being erected in Chicago to study from. Courses are especially prepared for contractors, bricklayers, carpenters and all men in construction work. Low tuition, easy terms. No text books to buy. Send for instructive folder.

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CLASS GETTING OVER $2,000.00 PER MAN.



Sectional View of "Energizer"

Korstad (Minn. farmer) received **$2,212.13 in 2 weeks;** Zimmerman (Ind. farmer) **$3,856 in 30 days;** Stoneman (Nebr. photographer) **$3,841.68 in 60 days;** Rasp (Kansas agent) **$1,685 in 73 days;** Juell (Canada clerk) **$6,800;** Oviatt (Iowa minister) **$4,000;** Hart (Va. farmer) **$2,000;** Wilson (Ky. cashier) **$3,000 in 30 days;** Beem (Kans.) averaged **$164.25 weekly** for 3 months; Langley (Dak. liveryman) **$115 first day.** No wonder these men bless the day they joined Fritter's $1,000 class. Reads like fiction, yet it's the gospel truth. **Proven by sworn statements—investigation—personal interviews.**

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IT'S SOLVED. The long-desired, much wanted, universal bathroom has come. Requires **no plumbing, no waterworks—no water systems. 10 minutes to install—$6.50 to buy. The equivalent of any $200 bathroom.** Self-heating—hot or cold running water facilities. Cleansing, friction, massage and shower baths in any room. No tubs to clean bowls or buckets to fill. Simple, durable, handsome, sanitary. The dream of millions come true. Modern homes, modern bathing facilities within the easy reach of every man, woman and child in the land. No experiment. **Used by U. S. Government. Over 200,000 delighted customers.** With such an article, with exclusive selling rights, with Fritter's help and your nerve you're bound to make from $1,000 to $5,000 this year. **It's not a question of ability, location or capital** (for we **give credit** to active workers), but **whether you act quick enough to get into Fritter's $1,000 class. Once in you're good for a $1,000 anyhow.** Reese solicited 60 people—sold 55; McDaniels 20—sold 19; Lodewick 41—sold 39; 17 orders in one day; Hart "16 in 3 hours"; Wilson 102 in 14 days.

Address Fritter personally today—make him prove his claims and above all that you too can get $1,000. Don't accept anything without proof. First get Fritter's entire proposition—it's free. Then decide. Just a postal will do.

M. FRITTER, Secretary and Manager

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SCHOOL OF APPLIED ART

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677 APPLIED ART BUILDING



A Happy New Year to Everybody

I'm The Bay State Coating Man

My goods are backed by twelve years of practical experience in making a cement coating. They have been tried under all sorts of conditions and met all the requirements.

Years before anyone else had put a coating on the market Bay State Brick and Cement Coating was an established success. It had been used on large and small houses, factory walls and factory floors, on the vats and damp rooms of textile mills and breweries. It is the only coating that I know of that won't burn when subjected to heat. It has a flat finish, doesn't destroy the texture of concrete and saves it from cracking from moisture.

Just write me for our booklet No. 10.

Give our salesman a good hearing when he calls. He's got the goods.

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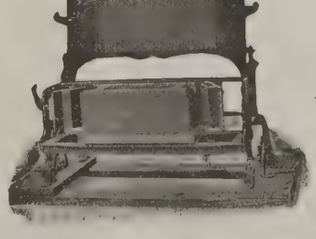
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The SIMPLEX Improved Mixer

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3 Hoppers, continuous feed, rolling mix, low-down steel frame, simple, strong and accurate—



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No. 5, Down Face Wet Concrete Block Machine

Makes Stone

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In Widths 4, 6, 8, 10, 12 inches.
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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Southern Ontario. Corrected by F. C Frants.	Los Angeles, California, by Courtesy of B. & O.
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM S 2 S	M ft. BM R G
2″x4″ to 8″ up to 16′, No. 1	yp $20.00	h $24 00	op $22.00 to 24.00
2″x4″ to 8″ up to 16′, No. 2	16.00	22 00	21 00
2″x4″ to 8″ 18 & 20′, No. 1	21.00	26 00	23 00
2″x10″ up to 16′, No. 1	21.00	24 00	24 00
2″x12″ up to 16′, No. 1	22.00	25.00	24 00
2″x14″ up to 16′, No. 1	24.00	26 00	25.00
Each 2 ft. over 20 ft., add per M	1.00	2.00	1 00
Select stock as above, add per M	5.00	*	10.00
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
1″x3″ to 1″x8″, No. 1	yp $35 00	wp $35 00	rw $35.00
1″x10″, No. 1	35 00	40 00	36.00
1″x12″, No. 1	40.00	42 00	37.00
1¼″x3″ to 1¼″x12″, No. 1	42 00	45 00	50 00
1½″ and 2″ same as above	42.00	42 00	52.00
1″ drop siding, No. 1	25 00	35.00	26.00 to 30.00
½″ lap siding, No. 1	18.00	30.00	18.00 to 20.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft. BM S 1 S	M ft. BM D 2 S
1″x4″ to 1″x8″, No. 1	yp $18.00	wp $30 00	op $25.00 to 30.00
1 x8″ to 1″x10″, No. 1	18.00	h 24 00	25 00 to 30.00
1″x10″, No. 1	18.00	24.00	30 00 to 35.00
1″x10″, No. 2	15.00	22 00	25.00 to 30.00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.
⅝″, T. & G. Flooring No. 1	yp $30.00	wp $40 00	op $40 00
⅝″, T. & G. Flooring No. 2	25.00	wp 30.00	35 00
Add for ceiling per M	1.00	1.00	1.50
Add for partition per M	2.00	2.00	2.50
⅜″x4″, Ceiling No. 1	25.00	np 30.00	27.50
	100 ft. run	10° ft run	100 ft run
4¼″ Moulded Casing	yp $1.85	wp 2.00	rw or op $3.00
4¾″ Moulded Casing	2.10	2 50	3.50
7½″ Moulded Base	3.25	4.50	6.00
1⅛″x9½″ Moulded Base	3.75	6.00	8.00
1⅛″x4½″ Moulded Window Stool	3.00	4.00	7.50
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	re $3.50	be re $3.75	rw $2.75
Shingles, No. 2	3.00	*	1.75
Shingles, fancy	5.00	8.00	rw 3.75
Lath, 4 ft., No. 1	yp 3.60	wp 5.00	4.50
Lath, 4 ft. No 2	2.75	s 3.75	3.50
Pickets, 1″x3″x4′ 6″, dressed	40.00	*	25 00
Pickets, 1 x3″x4′ 6″, rough	*	*	20.00
	Piece.	Piece.	Piece.
6″x8′ Post split	Cdr $0.13	*	re $0.30
8″x8′ Post split	.20	*	.40
8″x8′ Post whole	.44	Cdr $0.30	.50
6″x8′ Post whole	.25	.25	.40
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3.50	$2.85	$3.00
Nails, cut, common	4.00	3.00	3.10
Nails, wire, fine finishing	1.60	4.00	3.50
Sash Weights, cast iron	1.50	2.25	1.60
Tarred Felt Paper, best 2-ply	Roll. *	Roll *	Roll *
Tarred Felt Paper, 3-ply	*	*	*
Red Rosin, Atlas brand	.90	$0.50	*
Red Rosin, durable brand	.75	.60	*
Black Neponset	*	2 50	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*		$9.00
Brick, blue, at kilns, No. 1	*		6.50
Brick, blue, at kilns, No. 2	7.50		6.00
Brick, white, delivered, face	7.00	*	*
Brick, red, delivered, backing	7.00	*	*
Brick, delivered, dry pressed	18.00	$17.00	*
Brick, vitrified, dry pressed	*	*	*
Lime, best gray	bbl. $1.30	bbl. *	bbl. $1.80
Lime, best white	1 40	*	2.00
Cement, Portland	0.95	1.80	2.15
Plaster, calcined	2.40	bbl. $2 50	2.25
Hair, 8 lb. per bush	.25	*	0.48
		Plaster (patent) $6 per ton. White Rock $11.00 per ton.	

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

CATALOGUE AND MATERIAL INDEX

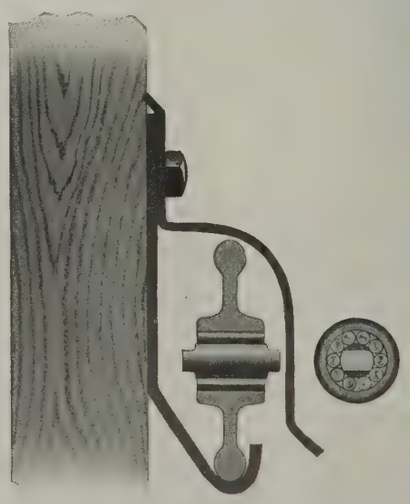
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Beaver Co. 70

BARN DOOR HANGERS.

We often wonder if too much thought is not spent on the luxuries of life and not enough on the necessities. We are advised that the farm population is decreasing and the city increasing, which may account for a part of the high cost of living. But we also find every incentive to live in the city. The inventions for convenience and comfort nearly all cater to the city man rather than to the farmer.



In the matter of hardware, fine door locks, massive bronze decorations, cylinder locks, etc., are none too good for the city man, but how much thought is expended on the homes of the country man. Frequently the houses and barns are locked with a wood button or



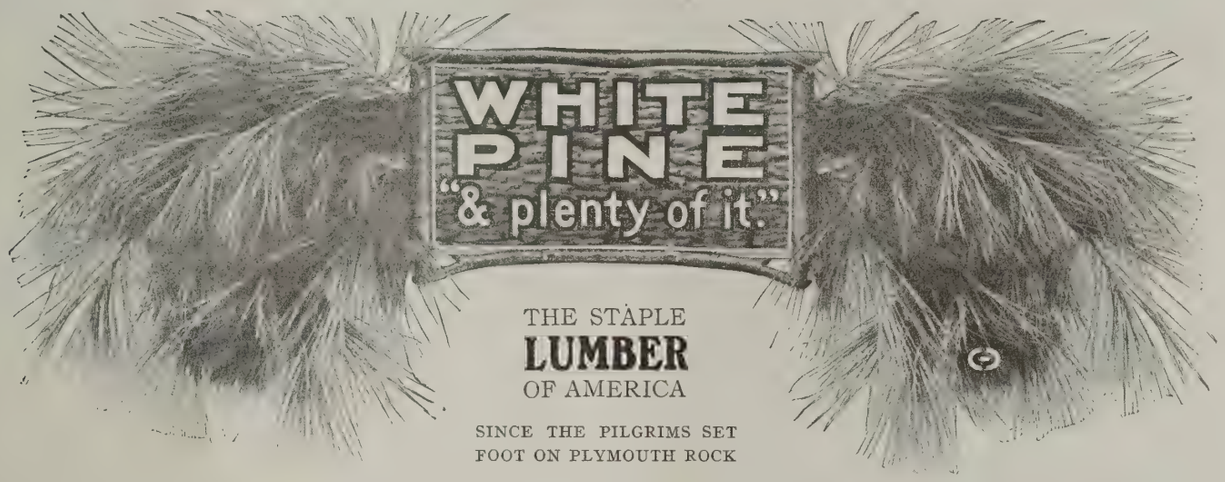
old-fashioned hasp and staple; and a padlock is the regular equipment of even otherwise well built structures.

In the matter of barn door hangers, particular attention should be paid to conditions to secure the best results. Often the door is

GOOD NEWS for Carpenters and Builders

Don't Miss a Word of This

ED. NOTE:—The article below is one of unusual interest to every one concerned in building, either as architect, contractor or owner, and also of the highest educational value in these days of thoughtless and ill-advised use of inferior substitutes for wood. Wood has been well called, "Mankind's instinctive reliance" as a structural material. LUMBER still is the greatest building material in existence—the safest, the most adaptable and most economical. And WHITE PINE and its "half-brother," NORWAY PINE, are by many regarded as the best wood known for most of the uses with which they are historically associated. White and Norway Pine are so essentially "the peoples' lumber" in the diversity of their every-day uses that it is good to learn that the supply is ample and easy to get if demanded.



"The Leader in the Markets for 250 Years" (U. S. Government Report Bulletin 99, October 1911)

When the folks landed from the Mayflower in 1620 they found themselves on the edge of a dense forest of superb WHITE PINE, covering practically the whole countryside, "and then some." Fine, great trees they were—diameters as big as 7 feet, and towering up to 240 feet. (One WHITE PINE monarch that stood on the present site of Dartmouth College was 270 feet high.)

The cutting of WHITE PINE began at once. Within 15 years they were shipping cargoes of White Pine masts to England. Within 30 years they were sending it to Madagascar and trading it for slaves for the Virginia market. White Pine proved so superior a wood that THE REST OF THE WORLD WANTED IT, JUST AS IT DOES TO THIS DAY, and the thrifty colonists' foreign trade in it grew so that

IN 1650 FEARS WERE EXPRESSED THAT THE DRAIN WOULD SOON EXHAUST THE SUPPLY.

(*See Page 37 Govt. Rep't.*)

Many years later the alarm was raised again, but far-sighted

JOSHUA McGEE REASSURED THEM

and told the anxious ones that "cutting a few hundred masts a year would make little inroad on America's forests" which he stated to be "*14 or 15 miles long and 300 to 400 miles broad.*" (He was a true conservative!) And the cutting went right along, yet *HERE WE ARE IN THE YEAR*

1912 AND STILL PLENTY OF WHITE PINE

AS GOOD AS EVER and plenty of NORWAY PINE TOO

(Which for most uses is just as good as White Pine)

And the best of it is that *there is going to keep on being plenty.* After 288 years of White Pine cutting in Massachusetts alone (which by many is supposed to be denuded of timber) there were 238,000,000 feet of White Pine alone cut in 1908 (Government figures). The Forest Service further reported that "it is not improbable that a similar cut can be made every year in the future from the natural growth of White Pine *in that state.*" And Massachusetts is "not much" these days on White Pine production. Minnesota and Wisconsin now produce *THE BEST* as well as the most White Pine. This Government report also says, "*The supply of White Pine lumber need never fail* in this country, provided a moderate area is kept producing." You may rely on us to see that through *WIDE AWAKE RETAILERS EVERYWHERE,* ***YOU*** may secure this "staple American lumber" with the same *certainty* and the *SAME QUALITY ADVANTAGES ENJOYED BY YOUR ANCESTORS.*

If you ever buy lumber, from a chicken coop to the "trim" of a palace, WRITE US before you do it. Inform yourself—this question of "what wood to use" is deeper than many realize. We will reply PROMPTLY AND CANDIDLY.

SPECIAL NOTE:—Anyhow, drop a card for our little book (you need it for your own sake, not ours.) FREE on your simple request. Don't wait—there's no profit in waiting. Write TODAY.

NORTHERN PINE MANUFACTURERS' ASSOCIATION

1119 LUMBER EXCHANGE MINNEAPOLIS, MINNESOTA

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

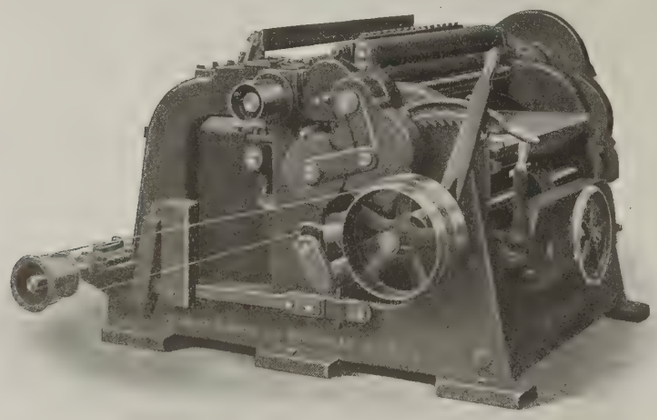
blocked by snow and ice, jammed by cattle or farm wagons, and, in fact, exposed to the severest service. A hanger which would do well in a mansion would be useless here, for the conditions are far different.

With a view of producing a hanger which would successfully meet all the adverse conditions under which it would be used, the National Manufacturing Co. of Sterling, Ill., have placed on the market their No. 77 Storm-Proof Hanger. They claim it is proof against snow or ice, birds or other sources of trouble. Being self contained, there is no extra work putting up brackets, guides, housing, etc. The hanger wheels run on roller bearings, thus reducing the friction and necessity for oiling.

A special descriptive circular "A" has been prepared by the manufacturers, the National Manufacturing Company, Sterling, Ill., and we are advised that it will be sent on request.

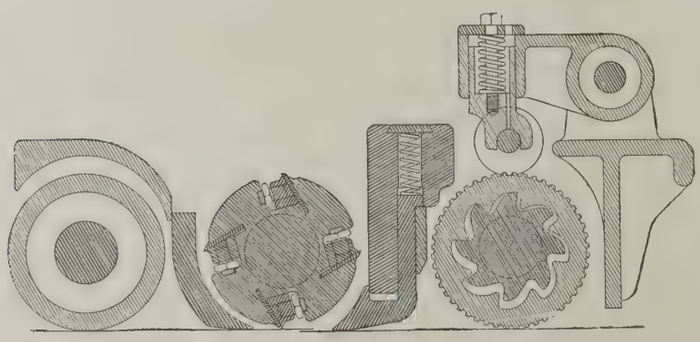
SMITH'S NEW 30-INCH CABINET OR SMOOTHING PLANER.

The Improved Cabinet Surface Planer built by the H. B. Smith Machine Company, of Smithville, N. J., is about the last word in machines for this purpose. As regularly built, the planer is fitted with patent sectional feed rolls, patent sectional chip breakers and new round head with self hardening cutters. The planer is built in three sizes to accommodate material 30, 36 and 42 inches wide by 7 inches thick, and is capable of modification for special work or conditions. As this machine is intended for the very finest work, no attempt has been made to save metal at the cost of freedom from vibration, as is evidenced by the weight varying from 5,480 to 7,000 pounds. This amount of metal allows very rigid crossbracing in the frame and the support of the working parts in the most substantial manner.



RIGHT SIDE FRONT VIEW OF NO. 32-C 30-INCH HEAVY CABINET PLANER.
Showing Patent Gear-Case Coverings; Automobile Chains for Conveying Power to Discharging Feed Rolls; Combination of Weights and Springs to Insure a Positive Feed, and Solid Table Mounted on Incline-Planes.

To raise or lower the bed it is only necessary to throw in a clutch by the hand lever shown on the front left hand side, although the bed can be changed by the hand wheel in front. As the bed works on inclines extending from front to rear, it is very rigid.



Showing Relative Position of the Feed Rolls, Cutter Head, Chip Breaker and Pressure Bar, and Incidentally Showing Construction of New Round Head, Patent Sectional Chip Breakers and Method of Giving Pressure to Patent Sectional Feed Rolls.

A very good idea of the machine can be obtained from the cuts shown in this article, and the method of feed is also shown.

The H. D. Smith Machine Company, Smithville, N. J., will be glad to give further information regarding this and other wood-working machines.

BAY STATE CEMENT COATING.

Man points with pride to the Pyramids and other structures in the old countries as an instance of permanency in works of stone and masonry, and attention is often called to the early decay of modern building materials. To many it would seem that the ancients had secrets which they did not hand down to the present day builders, but is this true? It is well known that practic lly no works in wood remain, and the reason the stone remains intact is due largely, if not entirelv, to the climate of Egypt and other eastern countries, where rain seldom or never falls, and the temperature rarely ever approaches the freezing point. Given similar conditions in this country, the work of the builders would be ideal, but the chances are no one would like the attendant evils of the dry, warm climate.

In many parts of the United States it is necessary to provide for extremes of temperature, often amounting to 150 degrees from July to January, with many heavy rains, and often a succession of days when the thermometer would show alternate thawing and freezing. It is severe conditions, such as these, that play havoc with our pretty ideas and ideals in plaster, stucco and even brick, stone and cement.



How can we combat these conditions? As practically all materials, except the oily asphalts, are more or less porous, it would seem that a heavy coating of black asphalt or similar composition would do the trick. Possibly it would, but would the result be pleasing? The coating would lack the texture of the body material, as well as the colors, but might do for many places where such effects made no difference, such as for underground or engineering work.

Many chemists and paint manufacturers have gone to great expense to find a compound or substance which would be at once available and suitable—among the first firms carrying on such investigations, we find Wadsworth, Howland & Co., Inc., 82-84 Washington street, Boston, Mass. Under the name of Bay State Coating they have for twelve years been marketing a product which they claim meets all the requirements of a perfect coating for all brick, stone, cement, plaster and stucco walls, exposed to moisture. The length of time this coating has been on the market speaks well for its permanency, and the varied conditions under which it has been used indicates its possibilities. Apparently it is an appropriate coating for all sorts of buildings, factory walls and floors, as well as for inside work on tanks, vats, etc. It seems to fill the pores completely and penetrate to an appreciable distance, and still preserves the texture of the surfacer. Being in the nature of a cement held in suspension in a volatile oil, it is not affected by acids, gases, heat or cold. Neither moisture nor fire changes its color, and, in fact, it is so good a fire-retardent as to have the approval of the National Board of Fire Underwriters on every package.

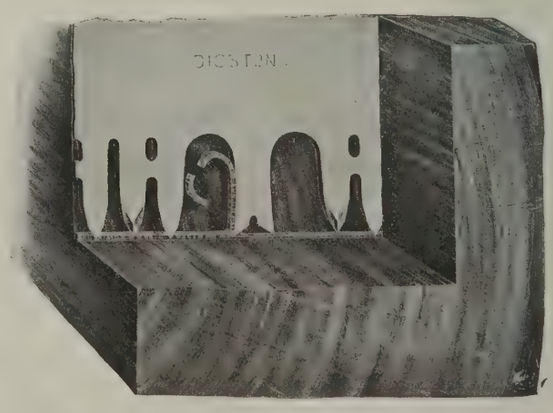
There are so many other uses than the ones we have touched upon that the reader is urged to write Wadsworth, Howland & Co., Inc., 82-84 Washington street, Boston, Mass., and ask for Booklet No. 10, which covers the subject in detail.

DISSTON CROSS-CUT SAWS.

Keeping everlastingly at it is generally considered a requisite of success, and from this standpoint Henry Disston & Sons deserve the high reputation which they have. For seventy-two years they have been making saws, and other tools, too, in such ever-increasing quantities that there must be merit in the goods which creates and satisfies the demand for good tools for such a long period.

From the start in 1840 the Disston plant has steadily grown until it is really a city in itself and would attract considerable attention for that, were it not in such close connection with Philadelphia.

There may be many reasons for the remarkable growth of this plant. Call it business sagacity, supplying a necessity, keeping up with the times, etc., but one fact stands out prominently—Disston made a name for his tools and the tools back up his guarantee. The absolute certainty that a complaint would be investigated and made good has made the sales at the top prices, for the first class mechanic wants and will pay for the best.



With such a past and with such a bright future, there is every reason for continued success and increased business, and there is little doubt but that another seventy-two years will see "Disson" means the highest quality, as it does NOW.

In a recent catalogue one can see some of the technical reasons for the success of their tools. We reproduce one cut showing the action of their cross-cut saws.

The careful manufacturer is here supplemented by instructions to the filer and user. A careful study of this cut will show how the cutting teeth prepare the way for the planing action of the Raker or Cleaner tooth, and the reason for the smooth and fast cutting of a properly made saw.

There are many other excellent points brought out in the catalogue and every saw user should have it.

INVISIBLE JOINT STEEL CEILINGS.

The accompanying illustration shows Invisible Joint Steel Ceilings manufactured by the Milwaukee Artistic Metal Ceiling Company of Milwaukee, Wis., and Kansas City, Mo., used in a very handsome banking room. This particular case serves to emphasize the fact that metal ceilings are becoming from day to day more popular for

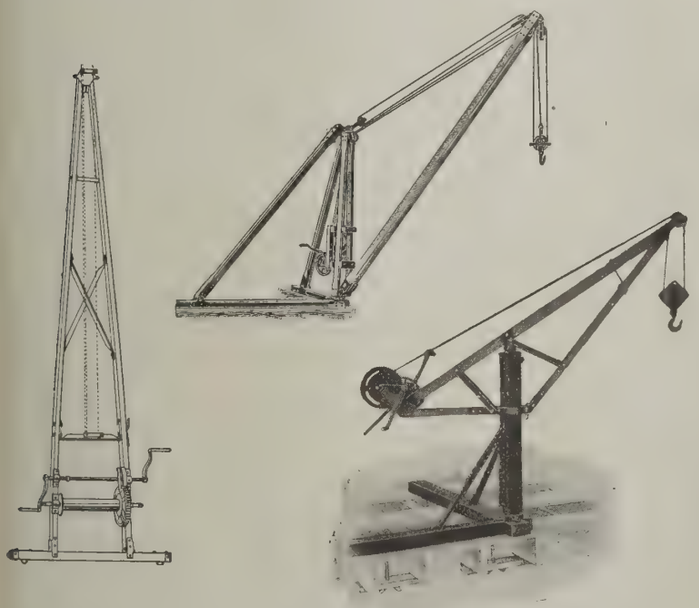


use in establishments where high class decoration is desired. The artistic and beautiful effects on the Invisible Joint Metal Ceilings are well known and the manufacturers are ready to supply catalogues and other information which will be of value to those in any way interested in this particular line.

NEW SASGEN DERRICKS.

Sasgen Bros. have a new circular which shows several new derricks that they have added to their well-known line. One is the Sasgen Standard Reinforced Circle Swing Builder's Derrick, especially practical for on high buildings and where large capacity is desired, and which is equipped with a geared winch holding sufficient cable for a twenty-five story building. This derrick is built of selected wood and fitted throughout with malleable and crucible steel fittings, including winch.

Another described in the catalogue is The Sasgen Light, Strong and Portable Stiff Leg Derrick, which can be used by hand or power without altering the derrick and making it especially handy on building. It is built with a split mast and boom and fitted throughout with crucible steel fittings.



The Sasgen Top Point Setter Derrick is also one of their new makes. For setting structural iron, stone, etc., where loads run only to about one and one-half ton, this derrick is recommended very highly, as it is light and handy to get around with, especially where it is used from the floors above.

No building contractor needs to be told the necessity of having a good, serviceable hoisting derrick on the job. The better the derricks, the quicker the contractor can work, and well made derricks are great accident preventers. The Sasgen derricks have been on the building field so long and are so well liked by all who use them that they have practically become standard in their demand.

Those interested in new equipment of this kind should write Sasgen Bros. for full information, addressing them at 2056 Racine avenue, Chicago, or 103 Park avenue, New York.



P. S. & W. TRADE MARK TOOLS GUARANTEED REG U S PAT OFF.

The MARK of the MAKER on this chisel guarantees good service.

THAT means more than quality alone, though the quality is there, just as in every P. S. & W. Hand-Tool.

Not only a special high-carbon tool-steel in the blades; but a temper that gives the sharpest and longest-wearing edge.

Not only straight-grained, seasoned hard-wood in the handle, but handles that are turned to fit smoothly and snugly in the socket.

These are but two of many service qualities that have given P. S. & W. Chisels and Gouges the leading position with expert mechanics.

Guaranteed P. S. & W. Braces

Next time you go to a hardware store—ask to see a P. S. & W. "Samson" Brace. It has the vise-like grip and instant release of the ball-bearing chuck, as well as a steel-clad head with dust-proof ball bearings. It's one of the top notchers in our very complete and extensive line of hand tools for Carpenters.

Write today for our free 170-page, "Mechanics' Handy List." It contains 35 pages of useful information, and a catalog of over 200 tools for Carpenters, Machinists, Electricians and Tinsmiths.

The Peck, Stow & Wilcox Co.

MFRS. of the Largest Line of Mechanics' Hand-Tools Offered by Any Maker.

Address correspondence 32 Murray St., New York City

Established 1819 Five Large Factories

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$15 SAVED ON EVERY FRAME HOUSE YOU BUILD WITH

Wheeler Safety Scaffolds

No lumber or nails used—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

Write today for our trial offer

AMERICAN STEEL SCAFFOLD CO., 60 McGraw Bldg., Detroit, Mich.



THE PERRY LUMBER RECKONER

ESTIMATING ERRORS ELIMINATED

Mistakes are impossible with the Perry Lumber Reckoner, as all the figuring is done for you.

The lumber tables give the number of board feet in any number of pieces, from one to a hundred, for all the commercial sizes of lumber. You can turn instantly to the right page. Ask your bookseller about it, or send direct.

Price, prepaid $1.00

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Mr. Builder:—If you are lucky enough to read this advertisement, and wise enough to write and tell us what you buy in

IRON, BRASS AND BRONZE

we will send you catalog that is attractive enough to go in any man's library. Do you want it?

DOW WIRE & IRON WORKS, Incorporated

LOUISVILLE, KENTUCKY

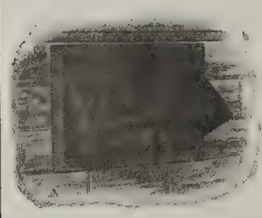
ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO



The Window Chute

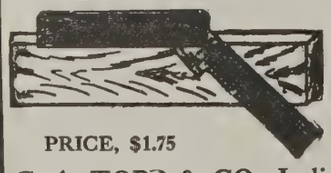
FOR BUILDERS OF MODERN HOMES

Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

HOLLAND FURNACE CO.

HOLLAND, MICH.

Topp's Framing Tool A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

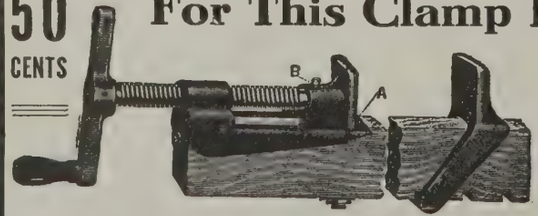
IT DOES ALL THIS

It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.

PRICE, $1.75

G. A. TOPP & CO., Indianapolis, Ind. See tool at Your Hardware Dealer's.

50 CENTS **For This Clamp Fixture**



IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO., 321 N. May St., CHICAGO



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MATHEMATICAL AND DRAWING INSTRUMENTS.

Under the above heading the Keuffel & Esser Company are sending out from their general offices at Hoboken, N. J., a new circular showing a few items from their complete catalogue. We are advised that such of THE NATIONAL BUILDER readers as are interested in Drawing Materials, Drawing and Mathematical Instruments, Surveying Instruments and Measuring Tapes, can obtain their complete catalogue by mentioning THE NATIONAL BUILDER. As the Keuffel & Esser Company carry a very complete stock of the above goods, it is well to have their catalogue on file for ready reference.

The same company is sending out a beautiful celluloid pocket calendar for 1912 which will be useful to everyone. Those on their mailing list will be remembered and others may obtain it by writing for it.

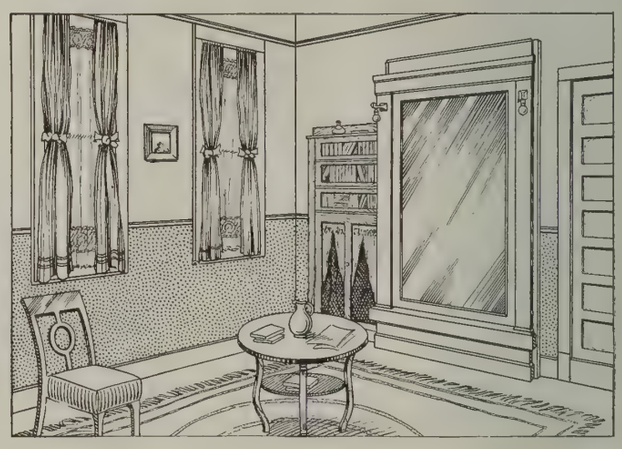
THE I. H. C. ALMANAC AND ENCYCLOPEDIA.

No line of work is more dependent upon the weather than farming, and so we see the farmer eagerly grasping any literature which promises to aid him in forecasting the weather or making suggestions to work in harmony with the weather reasonably certain to come. The International Harvester Co. are sending out from their Chicago office an almanac which, besides being a reference book for astronomical data, tables, useful information, etc., contains articles of an educational character written by recognized authorities.

The book is dedicated to those who are striving to improve American Agricultural Methods, and we understand the remaining copies will be sent free to those who ask for it promptly.

NEW CATALOGUE OF THE NORTHWESTERN GRILLE WORKS.

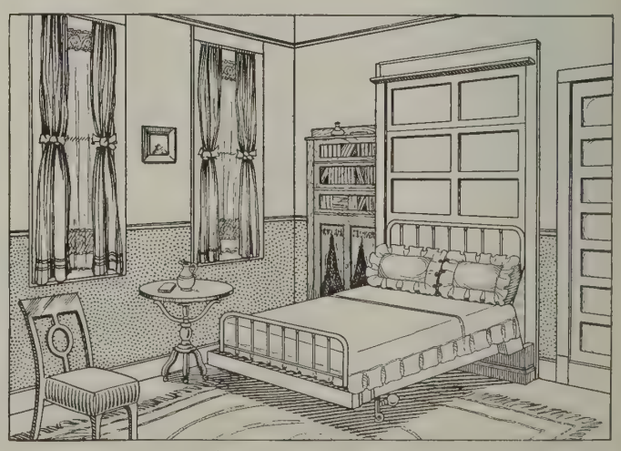
Catalogue No. 17 of the Northwestern Grille Works is in our hands, and we find it contains a number of novel items of interest to the progressive builder. One of the newest ideas is that of a Combination Wall Bed and Consol, which when closed, has the appearance of a high-class consol, but which can readily be changed



to a full-size bed. This combination can be used to advantage in small bedrooms, and can also be used to supply an extra room. With slight modification, it can be used on a sleeping porch.

The catalogue also shows an excellent line of Consols, Sideboards, Grilles, Columns, Arches, etc.

Careful attention to details, the use of the best materials, and prompt service have given the Northwestern Grille Works a fine



reputation among their customers. With the idea of extending their trade, they are offering to send this catalogue free to contractors, builders and other interested parties. Their offices, showrooms, and works are at 1824 Milwaukee avenue, Chicago.

The Next Time You Buy TOOLS AND SUPPILES

don't scatter the order to all parts of the country. You can save time, trouble and money by purchasing the entire lot from ORR & LOCKETT'S. And when you send that list in to us you can dismiss it from your mind as filled —*we* will see that the goods reach you quickly and as ordered.

In the first place we carry at all times the largest and most complete line of tools and builders' hardware in the West, so we seldom have to hold up an order because something is "out of stock." And this huge assortment (including the well known brands) gives you the greatest possible choice of kinds and prices.

Then everything coming in one lot means a saving in shipping charges and bookkeeper's time, and insures quicker delivery.

Altogether you will find it more convenient, more satisfactory and cheaper to place your entire order with ORR & LOCKETT—"for over forty years the leading hardware dealers of the West."

LET US SHOW YOU

ORR & LOCKETT HARDWARE Co
Established 1872
14-16 W. Randolph St. CHICAGO, ILL.



Asbestos "Century" Shingle Roof—Quintard Estate, Portchester New York. Reroofing Contractor, John Gery, Paterson, N. J.

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

Your clients will pay just about the same for an Asbestos "Century" Shingle roof as for any other roofing that is ordinarily put on first-class buildings.

But consider their durability—their immunity from fire risk—their freedom from repairs and painting—

You find that Asbestos "Century" Shingles are the cheapest roofing known to the building trade.

Two hundred million Asbestos "Century" Shingles were sold last year at a price that enables the architect and builder to specify them in competition with other roofings—and brings us a conservative profit on the cost of making.

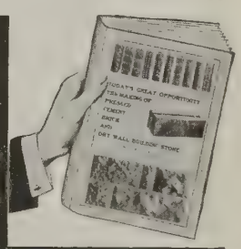
You can get Asbestos "Century" Shingles in shapes to suit any architectural scheme—in several sizes—and in **three colors**: Newport Gray (silver gray), Slate (blue black), and Indian Red.

Send for Quotations, and booklet "K. & M. 1911."

The Keasbey & Mattison Company, Factors
Ambler, Pennsylvania
Branch Offices in Principal Cities of the United States

SEND for this BIG FREE BOOK MERELY SIGN THE COUPON

Tells How to Make $20 to $50 a Day in Concrete



Many report daily profit of $20 and upwards. Some as high as $50. One reports $2,430 made in 90 days. Another secured $90,000 U. S. Government contract after product was placed to severe tests. Learn all about it in this BIG FREE BOOK Tells how you can do it, how simple it is, and the equipment needed, explains it completely. The most thorough book on concrete ever printed.

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—Selecting materials	—Table of compression	—A waterproof building
—How to proportion	—Working values	—System fully illustrated
—How to cure product	—Ways of making products	—Weights of materials
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But if not, then we would not even sell you these books or desire to tell you about HELM PRESSES—how they are built in different sizes—for hand or power—combined for brick and blocks—about their wonderful capacity and pressure, or their labor-saving and profit-making features.

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STILLWELL CALIFORNIA BUNGALOW BOOKS



PACIFIC COAST HOMES combine individuality of design with artistic and economical construction. Western Homes are of absorbing interest in exteriors and plans. Genuine Bungalows especially appeal to everyone and are a popular and profitable form of investment. Our two books contain plans, descriptions, and cost estimates of low-cost houses suitable for any climate. **"REPRESENTATIVE CALIFORNIA HOMES." Price 50 Cents.** A book of 50 Bungalows, Cottages and two-story Residences, 5 to 10 rooms costing $1500 to $6000. **"WEST COAST BUNGALOWS." Price 50 Cents.** A book of 50 one-story, very artistic, inexpensive Bungalows of four to six rooms costing $500 to $2000.

BUILDERS' SUPPLEMENT No. 1. Price 10 Cents. *FREE with orders for two books*

Remittances of coin or money orders preferred.

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Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS



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The New

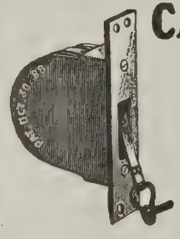
PARKHILL PITCH GAUGE

on a square gives the easiest method ever devised to mark roof framing—and by far the quickest. Complete framing for **any** roof pitch—of hundreds—marked on the timbers inside of 5 minutes. Any hip in a few seconds (7). And in 17 seconds all the following:—Side bevel for jack; miter bevels for roof sheathing, facia, plancher, purline, and a hopper; also length and cuts for an irregular hip. Other cuts, etc., with equal ease and speed.

The PARKHILL PITCH GAUGE has no equal AS A STAIR and BRACE GAUGE

See illustration in National Builder for September. If these statements strike you as strong, it costs nothing to verify them, as a Gauge Set with directions will be sent you prepaid for $1.50, with the privilege of returning it inside of 30 days and get your money back.

JOHN PARKHILL, Reference—First Nat'l Bank ROCHESTER, MINN.



CALDWELL SASH BALANCE

Does away with weights and cords and VASTLY more durable.

Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.



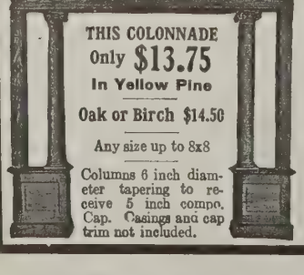
Diamond "N" Expansion Shields

The corrugated ribbed exterior surface gives increased holding power. The longitudinal ribs at the outer end of the shield prevent the shield from turning when the screw is inserted.

THEY HOLD AS LONG AS THE WALL LASTS

DIAMOND EXPANSION BOLT CO.

90 WEST STREET, NEW YORK.



THIS COLONNADE Only $13.75 In Yellow Pine

Oak or Birch $14.50

Any size up to 8x8

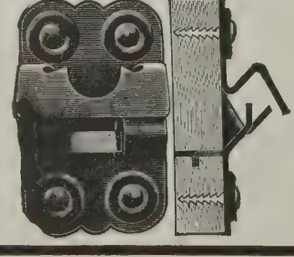
Columns 6 inch diameter tapering to receive 5 inch compo. Cap. Casings and cap trim not included.

THIS is positively the best Colonnade for the price in the market today. We want every Contractor and Builder to take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

Our Catalogue No. 35 shows many new designs. Write for it.

Bertelsen Adjustable Grille Co.

615-617 So. Clinton St., - Chicago



THE WATROUS No. 18 SAFETY SASH HANGER

EASIEST AND QUICKEST TO SET

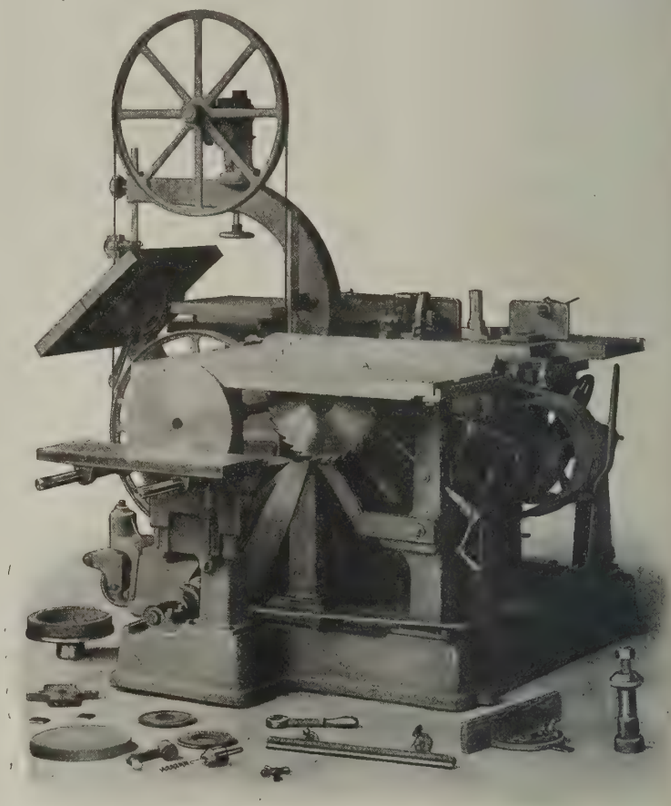
Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.

E. L. WATROUS MFG. CO., Des Moines, Iowa

SUBSTANTIAL EQUIPMENT FOR THE SMALL WOOD WORKING SHOP.

Recognizing the urgent need of substantially-built machines for use in the smaller shops, The Crescent Machine Co., 10 Main street, Leetonia, Ohio, have brought out their No. 51 Crescent Universal Wood Worker. In building this machine it has been the aim of the manufacturer to give the small shops the same substantial equipment as is used by the larger planing mills and factories. That their efforts have been successful is proven by the fact that the new machine has the enthusiastic approval of experienced wood workers, who pronounce it the best combination wood-working machine on the market today.

With this machine the small shop is practically converted to an up-to-date planing mill. The machine is portable, being fitted with special devices for making it instantly available for transport-



ing from one place to another. This feature appeals to the small contractor who can take the machine out on a special job and thus save many dollars on the cost of mill work.

The machine combines a band saw, shaper, jointer, saw table, and borer.

The band saw is equipped with re-saw attachment. It has tilting table, and is in every way a substantial machine.

The jointer is the regular pattern 8-inch jointer, made by The Crescent Machine Co., and when desired can be equipped with round safety head. It is in every way a substantial machine, and is provided with tilting gauge, that is adjustable over the full width of the table. Of course, the jointer is equipped with the Crescent jointer guard, which is a part of the regular equipment on all Crescent jointers.

The shaper spindle is conveniently placed and revolving in a vertical position; the machine is admirably adapted for surfacing one side and straightening one edge of a piece at the same time. The shaper spindle is reversible and has a vertical adjustment so it can be lowered below the surface of the table when desired.

The saw table is equipped with a ripping fence that is adjustable to an angle of 45 degrees, and the adjustable cut-off fence is graduated for setting to any angle up to 45 degrees. The saw can be adjusted for cutting through any thickness up to 4 inches.

The borer can be stopped and started at will. It is conveniently placed at the side of the saw table, and operates entirely independent of the saw table. It is provided with adjustable table and has self-centering chuck. It can be quickly converted into a hollow chisel mortiser.

An attachment for grinding planer knives is furnished, as are also a disk grinder attachment and emery wheel, for making the machine available for any kind of work coming within the range of the average shop where wood working is done.

With this machine in his shop the small contractor could save himself many dollars in convenience and actual time saved in getting work from the mills. He can also have his work just when wanted and thus be enabled to finish up many more jobs in a season. The manufacturers will be glad to give you further information upon request.

VANADIUM STEEL.

It is hard to realize the improvements on old methods and materials, for new matters are daily astonishing us. A pamphlet from the American Vanadium Co., Frick Building, Pittsburg, Pa., gives some remarkable facts regarding tools and machinery made of Vanadium Steel. The pamphlet, which is the December issue of American Vanadium Facts, gives statistics of interest to everyone using metal working tools, and we believe a request from any of our readers will secure this and future numbers of the publication.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Stanley's Butts and Hinges

The Standard of the World
Imitated but Not Equalled

To avoid substitution of inferior goods specify Stanley's Numbers **239, 241½ or 241,** when you buy Door Butts. Or, better still, try Stanley's Ball Bearing Hinges, which prevent friction and binding, wear and noise.

Write for our interesting Booklet and Handsome 1912 Art Calendar, "The Yellow Rose," to Dept. "N"

The Guaranty TRADE S.W. MARK of Quality

The Stanley Works

New York New Britain, Conn. Chicago

30 Days Free Trial



Sharpen your knives, twist drills, gum your saws—put all your tools in perfect shape—use this complete outfit 30 days free—then, if you feel it doesn't save you lots of time, work and money, send it back at my expense.

Dimo-Grit wheels, "the wheels for steel," 25 times faster than grindstone, 10 times more efficient than emery wheels—will not draw temper

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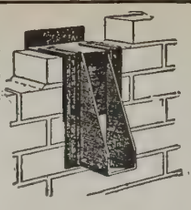
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METAL CEILINGS.

Probably no one item is more before the public today than conservation. Not only must our raw products and mineral resources be used economically, but the vegetable growth, timber, etc., must be preserved from too rapid destruction. No agency is more destructive than fire, and the efforts being made to reduce the fire loss, and the fire risk, are being increased every year.

To prevent the spread of fire inside the building, the use of metal covered walls and ceilings serve the purpose admirably. Good



protection is assured by even very thin sheets of metal, and we are glad to note the increasing use of metal for this purpose.

For external use, a somewhat heavier sheet of metal is generally used, as the material must stand the weather as well as the fire.

The various places in which sheet metal products are used permits the use of tin plate, iron and steel sheets, zinc, galvanized iron and steel, copper, etc. The location and use determines the amount of ornamentation which may or should be used.

There are a number of companies engaged in the manufacture of sheet metal products for building purposes, among them being the Indianapolis Corrugating Company of Indianapolis, Ind. In their catalogue "B," just off the press, we find a number of beautiful designs in ceilings and wall plates, cornices, mouldings, etc., one of which we illustrate. With the proper equipment and experience of twenty years, this company is able to get out the highest class of work. Their catalogue, which is sent free to our readers on request, contains a great deal of useful information regarding metal ceilings, etc. As this material is being used more and more, it is well to have their catalogue on file.

OAK FLOORING GRADES.

The Oak Flooring Bureau announce that owing to the confusion existing relative to the commercial grading of oak flooring, it has been deemed advisable to revise the rules governing the classification and specification. Under the new grading, it is hoped less misunderstanding will occur as regards the quality ordered or delivered. That our readers may be conversant with the grading, we print it in full below.

Oak Flooring Grading Rules Revised.

The grades of oak flooring shall be known as "A" grade, sap clear; "B" grade, common and factory.

Quarter-Sawed: "A" Grade (Clear).—Shall have one face practically free of defects, except 3/8 of an inch of bright sap; the question of color shall not be considered; lengths in this grade to be 2 to 16 feet, not to exceed 10 per cent under 4 feet.

Sap Clear (Sappy Clear).—Shall have one face practically free of defects, but will admit unlimited bright sap. The question of color shall not be considered. Lengths in this grade to be 1 to 16 feet.

Plain Sawed: "A" Grade (Clear).—Shall have one face practically free of defects, except 3/8 of an inch of bright sap; the question of color shall not be considered; lengths in this grade to be 2 to 16 feet, not to exceed 10 per cent under 4 feet.

"B" Grade (Select).—May contain bright sap, and will admit pinworm holes, slight imperfections in dressing; or a small tight knot, not to exceed 1 to every 3 feet in length; lengths to be 1 to 16 feet.

Common (No. 1 Common).—Shall be of such nature as will make and lay a sound floor without cutting. Lengths 1 to 16 feet.

Factory.—May contain every character of defects, but will lay a serviceable floor with some cutting. Lengths 1 to 16 feet.

SAMPSON CORDAGE CALENDAR.

A useful desk calendar is being sent out by the Sampson Cordage Works, Boston, Mass., in which a sample of their celebrated "Spot" cord is artistically used in connection with the calendar.

As practically every reader of the NATIONAL BUILDER is interested in Sash Cord, the calendar will be a constant reminder of its adaptability for its varied uses. A table, on the back, gives the standard sizes in which the cord is made, with other useful information.

We understand that the calendar will be sent to readers of the NATIONAL BUILDER on request.

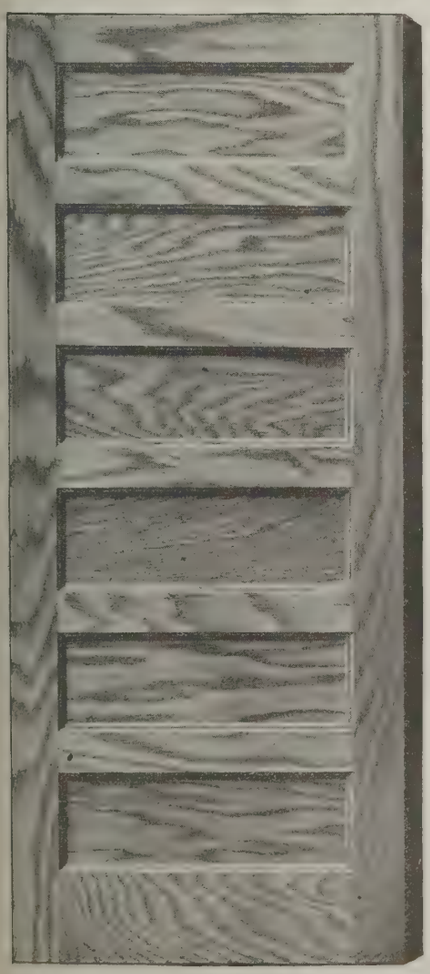
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at Less Than Dealers Ask For Pine

Despite the growing scarcity of Oak, which has been seized upon by lumber dealers and manufacturers as a pretext for raising prices on Oak Doors, Interior Finish and Flooring, we are actually selling the very finest qualities and grades at **less than dealers charge for Pine.** Years ago the Gordon-Van Tine Company arranged for the output of large tracts of the best Oak timber in America. **Our customers profit by our foresight.** We are actually selling Oak to carpenters and contractors at less than the same material would have cost you **ten years** ago. The cut in prices not only affects **Oak Doors,** but extends through the whole line of **Oak Finish and Interior Trim.** A further reason for our low prices on Oak is the big scale on which our goods are manufactured, and our small selling expense.



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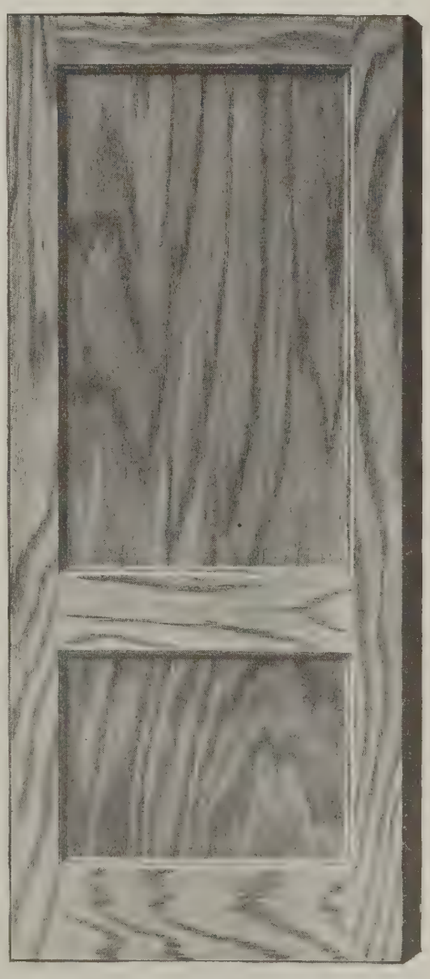
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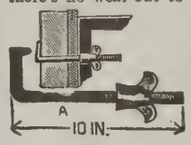
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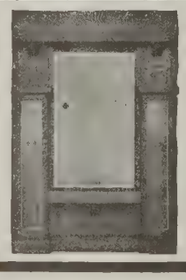
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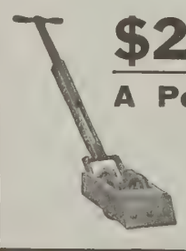
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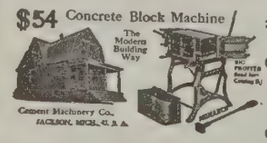
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In all the processes of modern manufacturing there is probably no more interesting story than that of Trinidad Lake Asphalt. It is not only as fascinating as a novel in itself, but it also has a genuine commercial value to all who have to do with the roofing trade, directly or indirectly, for it instructs as well as interests, gives to every person interested in roofing valuable data which will make him an abler, readier, better-informed judge of roofing values. He could read no more interesting and convincing facts than those of Trinidad Lake Asphalt which is used in the manufacture of the well-known ready roofing called **"Genasco."** It shows how man has seized upon the forces set up by nature herself and has utilized them with enormous success in fighting nature.

Many years ago Charles Kingsley, the great English novelist, described Trinidad Lake on the Island of Trinidad, British West Indies, as "one of the Wonders of the World." Here in a great bowl-shaped depression in the earth, 114 acres in area, there wells up with steady, inexhaustible flow a mighty volume of asphalt. The center of the lake is about three-quarters of a mile from the shores of the Gulf of Paria and about 135 feet above the level of the sea.



Digging Asphalt from Trinidad Lake and transporting it for Genasco Roofing.

Out of this asphalt "lake" no less than 140,000 tons of asphalt are taken every year. But the quantity that remains is always the same, for from the hidden and mysterious well-springs far below there issues forth a fresh supply to fill in the cavities caused by removal. Teams can drive over the surface, except in the softer center portion, but it is necessary for them to keep on the move or they will be slowly swallowed up by the black viscous mass.

The surface of the lake is dotted by a half dozen islands from 50 to 150 feet in diameter. They all have vegetation, with trees 30 to 40 feet high. Imperceptibly, yet almost constantly, these islands shift their positions, another weird feature of this weird, freakish "lake."

The soft, fresh-issuing asphalt slowly bubbling forth raises the center of the lake a foot higher than the edges.

The Barber Asphalt Company, in Philadelphia, recognized in this queer, uncanny lake of asphalt the presence of a natural product of the utmost value to mankind. After a series of tests and a study of the proper process of refinement this concern has built up an enormous industry which supplies Trinidad Lake Ashphalt to many branches of trade, and which has made it famous and invaluable the world over for a great variety of building, paving, and roofing purposes.

The asphalt is dug right out of the surface of the lake by gangs of men wielding pick axes, is shipped to the Gulf of Paria, loaded into vessels, and transported to the Barber refineries located at Maurer, N. J. There it is refined and it is there that the celebrated Genasco Ready Roofings are made.

It can be seen at once why it is valuable to know these facts about the origin of the life-giving asphalt in Genasco Ready Roofings, for they reveal that Trinidad Lake Asphalt is a natural asphalt, that it is nature's own great water-proofer, and that it has withstood the tests of time, of flood, of rain, of wind, of heat, and of the furious elements of nature, for centuries in place from which it was taken.

So to put a stout covering of Genasco—that is, of Trinidad Lake Asphalt—over your roof is to fight nature with her own weapons. And what is more, to fight her with weapons which have been victorious over herself.

But no one is obliged to accept the word of the Barber company that the Genasco Asphalt is a natural product, and being such, is the best water-proofing and all-around weather-proofing there is. To prove the truth of the weird natural origin of the asphalt in Genasco all one has to do is to purchase any one of the scores of imitation ready roofings, made either of chemical substitutes for natural asphalt or



Another portion of Trinidad Lake showing Natives digging Asphalt.

by "secret processes" which are palpably described as secret in order to cloak the worthless nature of the compound.

An asphalt or other substance which is not "made by nature" will dry out, crack, become brittle and break under the relentless onslaughts of sun, wind, rain, cold and snow. It will not stand up under the long strain of the seasons. But **Trinidad Lake Asphalt** has stood up under winds and sun and rains for centuries. On the roof, in Genasco, it will continue to endure.

How the asphalt is made into the famous Genasco Ready Roofing, the different styles which are manufactured by the Barber Company, the ease of its application by persons not skilled in roofing, its permanence and other advantages can all be read in the "Good Roof Guide Book," mailed on request by the Barber Company from their offices in Philadelphia, New York, San Francisco or Chicago.

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Or No. 1143 with French Bevel Plate Mirror, instead of wood panel **$3.00** additional.

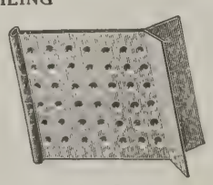
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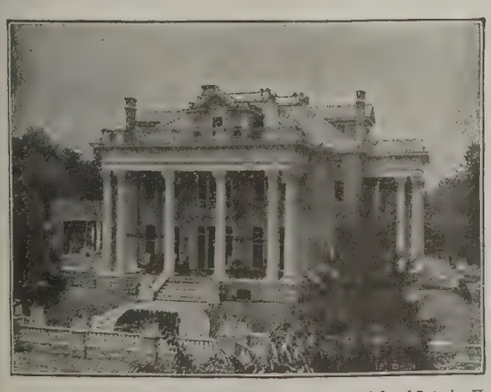


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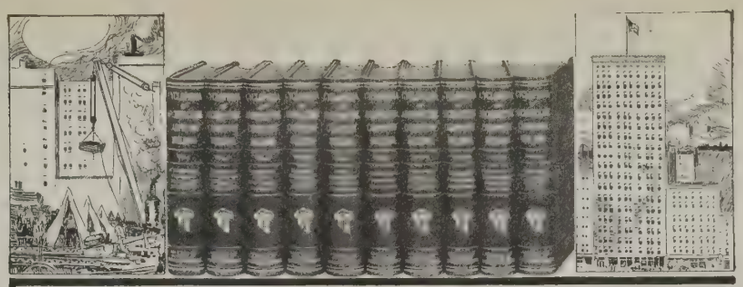


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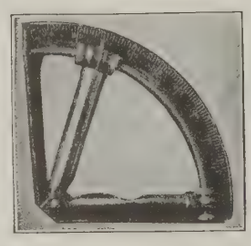


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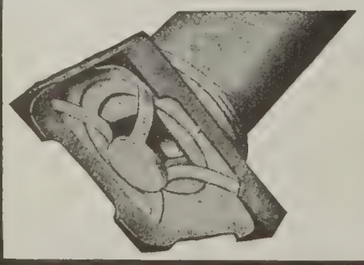
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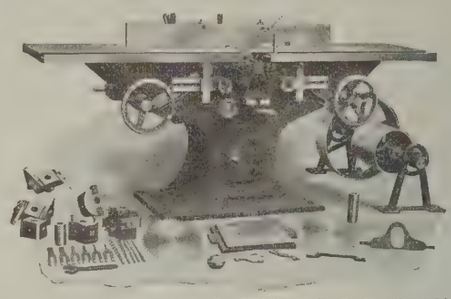
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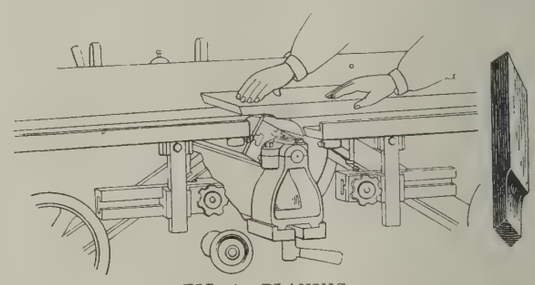


FIG. 1. PLANING.

that cannot be handled easily on a Royal Standard Universal. The accompanying illustrations are very instructive in showing how to hold material for some of the different work done on this machine.

Fig. 1 shows planing up to 12 inches wide, removing the warp or twist out of rough stock and establishing a true level or flat surface. Air-tight glue joints are made in the same manner. The size of the opening between tables is 2½ inches.

Fig. 2 shows how to hold the material when making joints, breaking corners and chamfering. Fence angles to 45 degrees; it is made 4 feet long and 4¾ inches high and is finished on face and side edges.

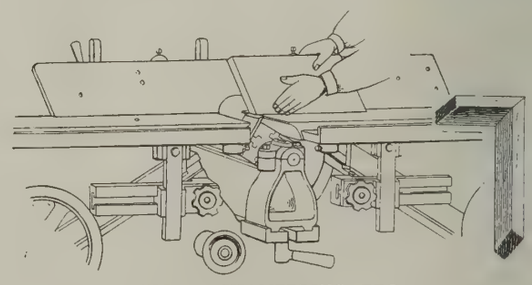


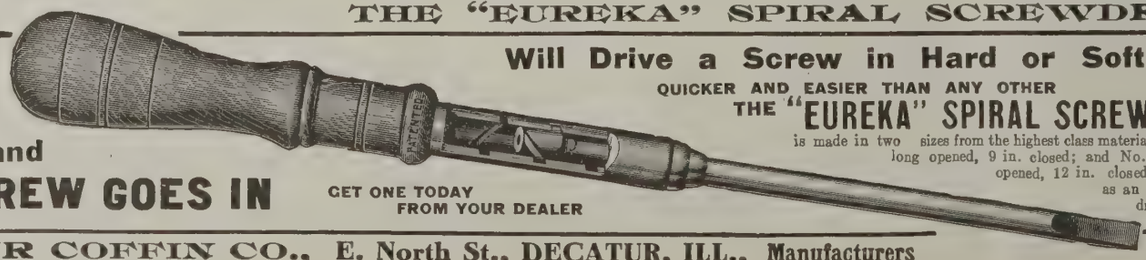
FIG. 2. CHAMFERING, ETC.

A catalogue showing many other views of the different kinds of work this machine will do can be had by contractors and builders interested in adding an outfit of this kind to their shop equipment.

The Royal Standard Universal Woodworker is manufactured by the Cordesman-Rechtin Company, 10 Butler street, Cincinnati, Ohio. This company has been making high-class woodworking machinery for years. The machine described here is one of their most popular outfits and has made many friends among builders and woodworkers on account of its low expense of operation and fine cut material it will turn out. The catalogue will be sent on request.

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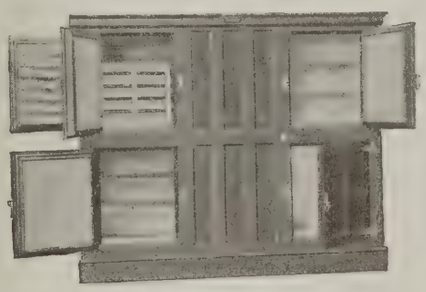
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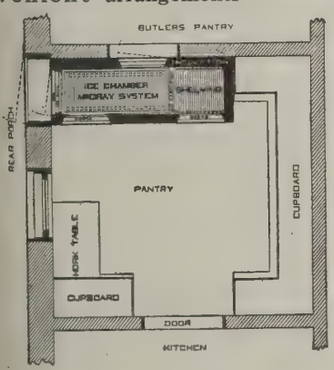
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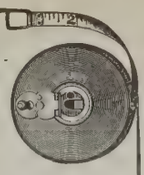
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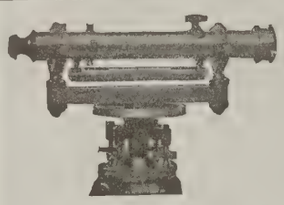
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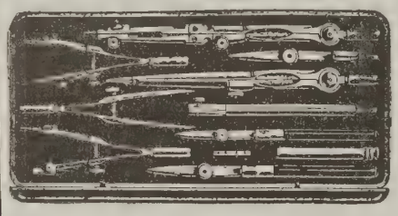
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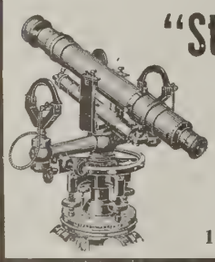
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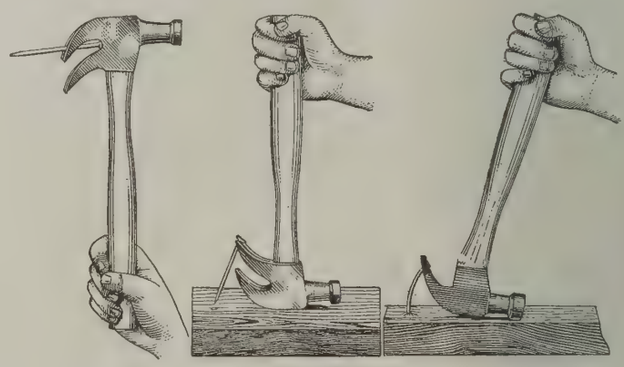
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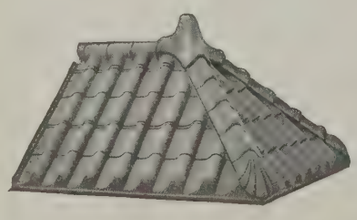
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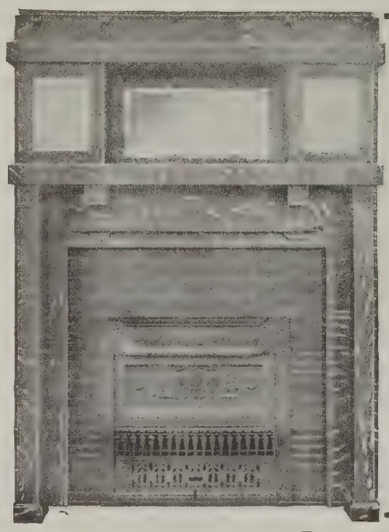
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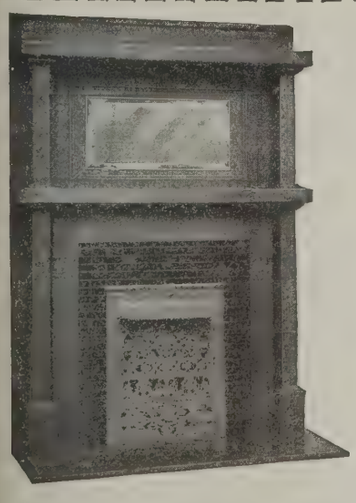
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NAME.....

ADDRESS.....

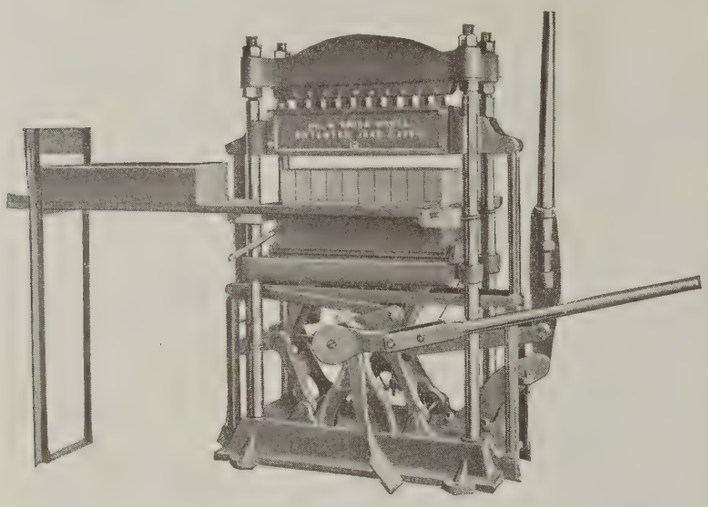
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

CONCRETE BRICK AND BLOCK HANDBOOK.

Our readers will no doubt be much interested in the two books on concrete which are being issued and distributed by the Queen City Brick Machine Co., of Traverse City, Mich. One of these books is a Hand Book on Concrete Brick and Block Making. It covers sixteen subjects of very great importance to the concrete worker. They are as follows:

The field for concrete.	Ways of making products.
Selecting materials.	Various building systems.
How to proportion.	Forming the product.
How to cure product.	Steam curing.
Plant arrangement.	A waterproof building.
How to estimate.	System fully illustrated.
Comparative tests.	Weights of materials.
Table of compression.	Hints on selling.
Working values.	Profits in concrete.

For the next thirty days the above company is sending out this valuable hand book absolutely free to all who inquire for it, and in addition they send along a complete catalogue illustrating and describing Helm presses and the Helm dry wall building system.

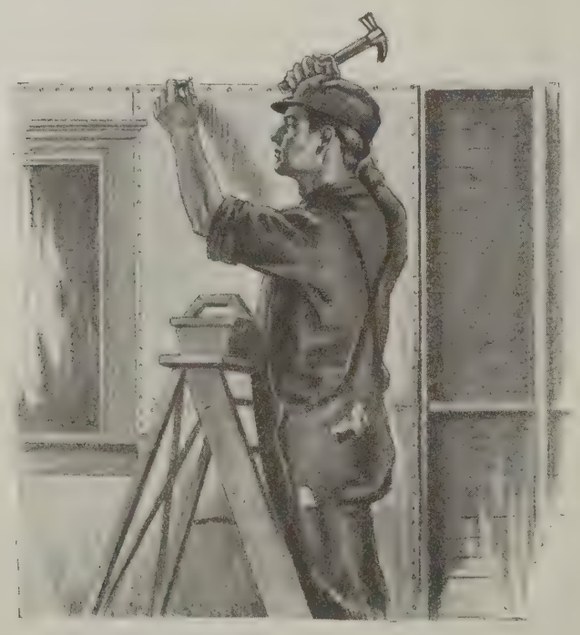


The accompanying illustration shows one of the Helm presses which is built for making pressed cement brick or the dry wall building blocks. These presses are built in different sizes and for hand or power operation. They exert a pressure of 80,000 pounds and do away with tamping. The Helm dry wall building system makes it unnecessary to use furring and lathing and consequently saves money for the builders. This system is being rapidly adopted.

Both of the valuable books mentioned above can be secured absolutely free by our readers by simply writing to the Queen City Brick Machine Co., 481 Bank Bldg., Traverse City, Mich.

BEAVER BOARD.

Modern invention has done much toward improving industrial conditions, and at the same time the genius of our architects and



builders have made our homes and other buildings far more habitable. Of what use would we consider wireless telegraphy if we had to sleep under a leaky roof, and how little would we care for steam yachts if we had to do without modern plumbing facilities in our homes? But there are leaky roofs today, and many homes are without the comforts which most of us consider luxuries.

There are a number of reasons why this should be so. A new country builds up with only the bare necessities, often of the rudest construction, depending upon prosperity to rebuild entirely or to add such improvements as can be obtained. When the time for rebuilding comes, frequently the disinclination to suffer the inconvenience of building, rebuilding and moving deters many from making more than the necessary repairs.



Room ready for Beaver Board construction. Studs evenly spaced and headers in correct position to suit panel design adopted.

For several hundred years the finished wall surface of the better class of buildings has been some form of plaster. Often the surface was ornamented with castings, or the flat panels were covered with various forms of decoration, fresco paintings, gilding, paper or hung with tapestries. Excellent as these surfaces are, they, too, have their disadvantages and many substitutes have been tried with the object of securing a better surface for durability, decoration or ease of application. Thus, we have seen the introduction of patent plasters, pulp plaster, plaster boards, and finally wall board. The search has always been for the smooth surface and the materials employed have undergone a complete change. Much of this is due to our change of construction from masonry to frame, and the change is logical. Why should we build a house of wood or frame and then line it with a masonry product like plaster? Is it not more natural to build of frame and line with a wood product, giving a surface perfectly in harmony with the rest of the structure?

There are several companies making products of this character, of which the Beaver Company is one of the best known. With the idea of extending the already very general use of their popular brand of wall board, they have inaugurated a unique advertising campaign of education addressed to carpenters and builders.



Nailing up panels.

While a great bulk of Beaver Board sales originate from the carpenter or builder who has come to know Beaver Board excellence as a wall covering, as a home-beautifier and as a heat, cold, shock and vibration-resistant, the Beaver Company realizes that its product, its properties and its possibilities are not as well known to the trade as they should be.

The National Builder this month presents the first of a series of Beaver Board educational advertisements which are to run throughout 1912, twelve advertisements in all.

Readers of The National Builder are to be taken through each step of the Beaver Board proposition, in an endeavor to thoroughly acquaint them with the wonderfully practical and decorative possibilities of Beaver Board, its ease of application and profit-making features.

The series has very properly been labeled the "A B C" of Beaver Board construction. The first "talk" begins at the obvious beginning. The carpenter is told that Beaver Board is made of pure-wood-fibre in panels so conveniently sized that waste is practically eliminated, of its practical resistant qualities, its sanitary, artistic and wearing qualities; its adaptability for walls and ceilings of both old buildings (in which it can be nailed up over old plastering) and new buildings (where it is applied directly to the studding). These "talks" we illustrate by actual photographs, tending to make the simple text simpler. For instance, "chapter one" is illustrated by the photographs shown in this article. They show all four stages of Beaver-Boarding a room in a new residence from the barestudding stage until the lady of the house has arranged her furniture and ornaments.



Before putting on decorative strips. Panels are painted at this stage.

If Beaver Board popularity continues to grow as it has been, it won't be long before it will have displaced lath and plaster as a standard. Discriminating builders and house-owners have already refused to consider lath-and-plaster at all. Hundreds of homes and buildings that haven't a bit of lath or plaster in them—all Beaver Board—have been built during the past few years.

Beaver Board superiority, of course, has been primarily responsible for Beaver Board's popularity. A big factor, however, has been the Beaver Company's very extensive national advertising to owner, builder and dealer. As a consequence there are today thousands of dealers selling Beaver Boards to carpenters, or to house-owners who are, in a great majority of cases, employing carpenters to put it up. The carpenter and the dealer have been making good money in the process and the house-owner has been saving it.



The finished room, in use.

The Beaver Board people have always held that Beaver Board is essentially a proposition for carpenters and builders, and are taking this method of bringing its merits and capabilities before every one interested. The current and following chapters will be followed with interest.

Amatite ROOFING

AMATITE has a real mineral surface and therefore needs no painting.

There have been other ready roofings in the past which had a mineral surface, but they were not practical.



Amatite, however, is successful because the mineral matter is imbedded in *pitch*. Pitch is very tough and has great adhesive power. Year after year these roofs will give faultless service without anybody giving a thought to them. This is the kind of roofing to have! The day of these smooth coated roofings that require a heavy coat of paint every year or two is past. They cost too much to maintain. More money can be spent on the paint alone during ten years than a new Amatite roof would cost.

A free sample of Amatite Roofing and further information can be obtained by addressing the nearest office.

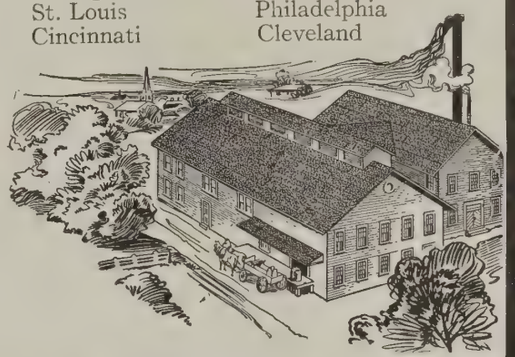
Everjet Elastic Paint

A very low-priced black paint—very tough and durable. Stands heat so well that it can be used on boilers. For wood or metal, ready roofings, fences, iron work, farm implements, tanks, etc.

Barrett Manufacturing Co.

New York
Boston
Pittsburgh
Kansas City
New Orleans
Chicago
St. Louis
Cincinnati
Minneapolis
Seattle
Philadelphia
Cleveland

Canadian Offices:
Montreal
Toronto
Winnipeg
Vancouver
St. John, N. B.
Halifax, N. S.



For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but **one coat of paint.**
The treatment permeates the fabric and preserves the fibre

BEST FOR PIAZZA ROOFS AND PORCH FLOORS

Ask for Sample Book B-6 and Prices

John Boyle & Co., 112-114 Duane Street, 70-72 Reade Street **New York**
202 and 204 Market Street, ST. LOUIS

The Standard Brand of White Canvas
All Widths—All Weights—Any Quality

GULF STREAM ROOFING CANVAS

Our co-operative department gives complete instructions for laying
BAYONNE or GULF STREAM

JOHN BOYLE & CO.'S Awning Stripes have been the Standard for 50 years

It's A Question of Cost

and the first cost is not all important—it's the first cost **plus repairs.**

"Buckeye Brand"
RED CEDAR SHINGLES
Reduces Roofing Cost

because a properly laid Red Cedar Shingle roof will wear twenty years—and longer. That means much to every builder.

We sell retail lumber dealers only, but yours will get these good shingles for you.

R. J. MENZ LUMBER CO.
SEATTLE, WASH., U. S. A.
Pacific Coast Lumber and Timber Lands
MENZ TIMBER GOLD BONDS
Buckeye Brand Red Cedar Shingles
Profit Sharing Interest Bearing Deed Protected

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Glidden

Green Label Varnishes are the highest grade varnishes made. They are made in the largest, most complete and best equipped varnish plant in the world, and are the result of nearly half a century's experience in manufacturing varnishes for all purposes.

Wherefore, it redounds to every builder's credit to use Glidden's Green Label Brand.

To any builder who is interested in the subject of wood finishing, we will gladly send demonstrating panels of Glidden's Endurance Wood Stains and Glidden's Green Label Varnishes They give to interior trim a richness and beauty that cannot be imitated.

The five Brands we recommend your specifying:

	Per Gal.
M. P. Durable Exterior - - - -	$4.00
M. P. Durable Interior - - - -	3.00
M. P. Durable Floor - - - -	3.00
Glidden's Velvet White Enamel (Egg Shell Finish) - - - - - - - -	5.00
Glidden's Superior White Enamel (Gloss Finish) - - - - - - - -	5.00



These varnishes are high in price, but as the finish is the final touch that completes the job, the finishing material should be of the best. Price ought not to be considered.

The Glidden Varnish Company

Factories: Cleveland, Ohio; Toronto, Canada

Branches. New York—Chicago—London

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Glidden

M. P. Durable Interior, because of its light color, its wonderful flowing and brushing properties and its extreme elasticity and durability, is the highest grade varnish made for interior use.

Glidden's M. P. Durable Floor stands unscathed, even when subjected to usage that would destroy any other floor varnish made. We can prove this statement. It combines hard and quick drying properties with great elasticity. It is impervious to water and will not mar nor scratch white.

Glidden's Velvet White Enamel (Egg-shell Finish) dries with the appearance of a dull, velvet finish and thus saves the expense of rubbing, though it can be rubbed and polished beautifully, if desired. It produces a more artistic finish than any other white enamel on the market, and the surface produced is waterproof and non-porous, thus resisting the action of repeated washing, alkalies and the fumes of the atmosphere.

Let us send you demonstrating panels.

The Glidden Varnish Company

Factories: Cleveland, Ohio; Toronto, Canada

Branches: New York—Chicago—London

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO



INVESTIGATE Compo-Board

Best for Walls and Ceilings.

Better then than and plaster. More economical and durable. Can be put on in any weather and will stay up and look well as long as the building lasts.

Compo-board is made of strips of thoroughly dried lumber well glued. These strips are then covered with a specially prepared moisture proof paper, which is cemented under intense heat and pressure.

This makes a wall lining that will last indefinitely. Cannot crack or crumble off. Cannot chip off or mar by banging furniture into it. It is moisture and cold proof and fire resisting. Warm in winter and cool in hot weather.

Beside being a wall lining, Compo-Board has many other uses around the house and in the yard, in the office and factory. For remodelling the house or finishing off an extra room in the attic or basement, it is ideal. Summer cottages can be made as warm as the city home. Use it for partitions or back plastering.

Compo-Board can be had in strips four feet wide and one to 18 feet long, in any length in even feet.

SEND FOR SAMPLE AND BOOKLET

Fully describes Como-Board and its many uses and advantages, and the sample will show you what it is.

NORTHWESTERN COMPO-BOARD CO.

5776 Lyndale Ave. No. MINNEAPOLIS, MINN.

(The border of this advertisement is a cross section view of Compo-Board.)



WE WANT TO SEND YOU A SAMPLE

We want every carpenter and builder and home owner in America to know about and to have a sample of

UTILITY WALLBOARD



It is to your interest to have this sample and to become thoroughly familiar with this remarkable material.

Utility Wall Board marks the greatest advancement that has been made in interior building construction in a hundred years.

It is made of fibre—very hard and tough and durable. It is waterproofed on both sides. Being a non-conductor, it is largely heat and cold and sound proof.

It is very easily put on—nailed right to the studding and takes the place of both lath and plaster.

It is the only wall board on which you can safely use wall paper. At the same time it lends itself admirably to tinting and stenciling, or other forms of decoration. Made in various widths and lengths to meet all requirements of interior finishing.

Write today for the sample and for the new book of interiors.

Utility board is sold through dealers in builders' supplies everywhere.

THE HEPPES COMPANY

4502 Fillmore Street, Chicago, Illinois

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

A series of talks to carpenters about the practical use of *Beaver Board*, the pure-wood-fibre wall and ceiling material that is durable, economic, artistic; has none of the disadvantages of lath, plaster and wall-paper; and is appropriate to any type of building, new or old.

Beaver Board is essentially a proposition for carpenters and builders.

CHAPTER I

What Beaver Board Is, and How It Is Put Up and Decorated

This brief, concise description is merely to start you right, and will be followed by other advertisements dealing each month with concrete examples of its use for different purposes.

BEAVER BOARD is a pure-wood product, and can be handled as easily, quickly and satisfactorily as any wood-product. It is made in panels of various sizes to meet all requirements These panels can be cut with a fine cross-cut saw to fit about door-jambs, window-casings, etc., but the sizes are such that there is practically no waste. The panels can also be easily moulded to an arch, as they have sufficient elasticity.

Exact Instructions with Each Shipment

Although it is easy to get good results in putting up *Beaver Board*, you want the very best. So does your client; so do we. Therefore, with every shipment we send printed directions which cover all the little points that long experience has shown help to make a thoroughly satisfactory job. Always look these over carefully before beginning actual construction.

Beaver Board Decoration

Beaver Board is painted after the panels are nailed up and before the panel strips are put on. It is never papered over. Wall-paper is not only less durable and artistic than painting, but much less sanitary; and nowadays folks demand clean, sound, healthful construction in everything.

Beaver Board Sizes

Stock sizes carried by dealers are in 32 in. and 48 in. wide by 4, 5, 5½, 6, 7, 8 and 9 feet long. Sizes in stock at factory for immediate shipment are 24 in., 32 in., 36 in. and 48 in. wide in any length from 4 to 16 feet. Lengths above 10 feet require crating, for which an additional charge is made to cover actual cost. *Beaver Board* is 3-16 in. thick. Decorative strips, moulding, plate rails, etc., can be purchased from planing mills and lumber dealers, but where unobtainable can be furnished by us.

Beaver Board Advantages

Beaver Board is economical, easy to handle, suits any kind or sort of building, retards heat, cold and sound, doesn't crack, check or deteriorate with age. Its endless possibilities for all kinds of uses are fully described in our free booklet, "Beaver Board and Its Uses," with many pictures of different interiors. Write for it today.

Look for Chapter II in the next issue of National Builder.

The BEAVER COMPANY of BUFFALO

443 Beaver Road, Buffalo, N. Y., U. S. A.

THE BEAVER COMPANY, LIMITED

383 Beaver Avenue, Ottawa, Canada



Room ready for Beaver Board construction, studs evenly spaced and headers in correct position to suit panel designs adopted.



Nailing up panels, using flat-head nails ¾ inch from edges 3 inches apart, and bung head nails 6 inches apart for centers.



Before putting on decorative strips center nails are countersunk, sizing or first coat applied, depressions filled and panels painted.



The finished walls and ceilings are more attractive and sanitary than lath and plaster, don't crack, saves frequent repairing, etc.

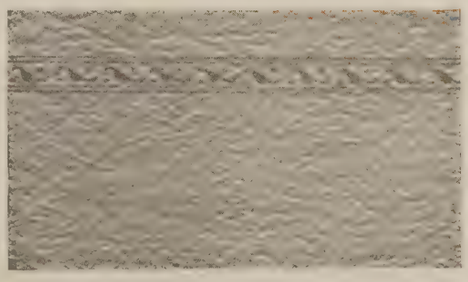
BEAVER BOARD

PURE-WOOD-FIBRE

WALLS & CEILINGS

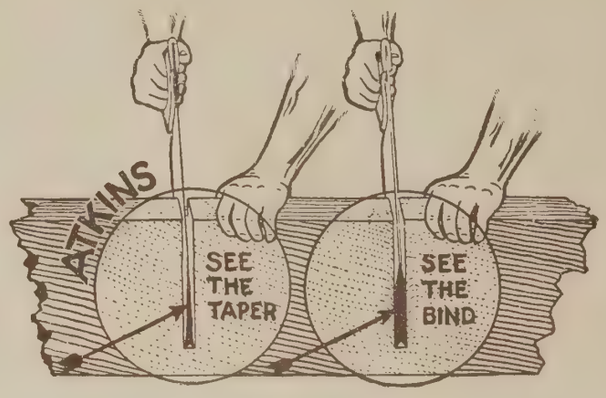
BEAVER BOARD PURE WOOD FIBRE

Look for this mark on the back of every panel.



One of the greatest attractions of Beaver Board is its beautifully pebbled surface. The photograph reproduced above gives an idea of it, but no illustrations can show the soft, rich color of that surface when painted. Beaver Board is 3/16 of an inch thick.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



LOOK HERE, MR. CARPENTER!

See the big difference between the ordinary "thin-back" saw and the Atkins "taper-ground" saw! It's easy to see why the Atkins cuts faster, easier and straighter.

The ordinary "thin-back" saw has a little bevel along the back to make it *look* thin.

The rest of the blade is of uniform thickness, except that the teeth are spread out ("set") so as to cut a path wider than the blade.

If you don't give the teeth plenty of "set," the blade doesn't have elbow room, and sticks in the wood.

But the more "set" the teeth have, the harder the saw runs. And there you are!

With the Atkins it's different.

The blade is thickest at the tooth-edge and thinnest at the back. And it tapers *all the way* from tooth-edge to back.

Almost no "set" on the teeth is needed, because the tooth-edge is the widest part of this tapering blade.

The result is that wherever the teeth go, the rest of the blade follows without a struggle. No "bucking!" No "binding!"

You can easily see why the Atkins ought to be just what it is—

The easiest running, fastest cutting, easiest guided saw you ever put through a board!

The Atkins Perfection Handle makes it still easier. Takes the strain off the wrist and gives your whole body an easier position. But you can have the old-style handle if you prefer.

Better Than Razor Steel

Silver steel is our own secret formula, and it is gas-tempered by our own secret process. Both these secrets have been carefully guarded in the Atkins factory for over 50 years.

No such steel was ever used in any other make of saw the world over. It's better steel than you'll find in most of the high-grade razors.

And it's a peculiar steel. Holds its sharp edge longer than any other, needs less filing, and yet files very easily. Doesn't rust easily, either.

ATKINS
Silver Steel
SAWS

Trial Order

Go to your dealer and select an Atkins Silver Steel Saw. Be sure the blade says "Silver Steel"—that's our best saw. Take that saw and try it! If it isn't the best saw you ever touched, take it back to the dealer and he will refund your money.

Now, Mr. Carpenter, if you want to know which is really the best saw, there's the way to find out, without risking a cent.

FREE to Carpenters

Write us today (enclosing 10 cents in stamps to cover postage), and we will send you free a good strong Nail Apron, our Carpenter's Time Book, and another mighty hand booklet, "Saw Sense." Address our Carpenter's Department.

E. C. Atkins & Co., Inc.

Indianapolis, - - - - - - - Indiana

Largest Exclusive Saw Manufacturers in the World

If your dealer doesn't handle Atkins Saws, or hasn't the particular saw you wish, ask him to order it for you from the wholesale house. He should be glad to do this. It's no trouble—and he will do it promptly if you make the request.

MORE COPIES
PRINTED AND CIRCULATED THAN ANY OTHER BUILDING PAPER IN AMERICA.

THE NATIONAL BUILDER







PUBLISHED MONTHLY

Twenty Cents Per Copy — Two Dollars Per Year

FEBRUARY, 1912

The mechanic using **DISSTON**

Saws, Tools and Files

obtains those full and satisfying results which make him an earnest advocate of the

DISSTON BRAND



ESTABLISHED 1840

HENRY DISSTON & SONS

INCORPORATED

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS

PHILADELPHIA

You Make No Mistake

When You Buy RUSSELL JENNINGS Bits

Whether you buy the ordinary shank bit, or the new Precision turned shank bit, you may be sure of the quality when you see Russell Jennings stamped on the round.

Our regular style auger bit, with ordinary bit shank, is made with 3 different threads on the screw point,— standard for ordinary boring,— quick boring, for hard or gummy woods, and double quick boring for rapid work in soft wood. These bits have been the standard among the best workmen for over half a century and are backed by the RUSSELL JENNINGS GUARANTEE.

Our new Precision turned shank auger bit is the same as our regular auger bit, but with a turned shank which makes placing or removing from the brace chuck easy and rapid. Once placed it cannot wobble or pull out.

Russell Jennings Precision tools are now sold separately or in sets, and may be seen at your dealer's. Ask him for the new bulletin describing them.

Incidently, if you want to know about the care of auger bits, ask for our booklet, "How to Sharpen Auger Bits." It tells you what you ought to know about bits.

Russell Jennings Mfg. Co.

Chester, Conn.

21-74

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Paying Business For Winter Months

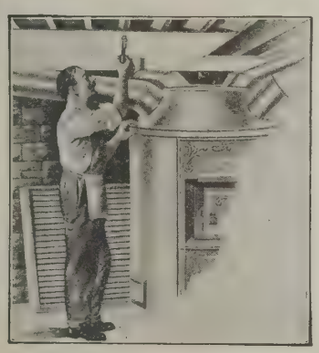


Applied Dry Winter or Summer.

Shows Construction of Bishopric Wall Board.

CONTRACTORS AND BUILDERS—Bishopric Wall Board makes a busy season for you in the dead of winter. There are buildings in every community which could be remodeled **at once** if you only showed the owners how well and how low-priced it can be done with Bishopric Wall Board. Look for these jobs. You don't have to wait for building weather. **This** is the Bishopric Wall Board weather—and remember—your Bishopric jobs will look just as handsome and last longer than the best lath and plaster ever put up.

12,685,500 square feet of Bishopric Wall Board and Sheathing sold in one year. This is going to be a greater year for these products than ever. "There's a reason."



Making Cellar Air Tight with Bishopric Wall Board

Remodel Stores, Residences, Offices, Amusement Halls, Etc.

The finest Residences—Cottages—Bungalows—Apartment Buildings—Offices—Stores—Stock Exchanges—Banks—Hotels—Cafes—Restaurants—Gymnasiums—Bowling Alley Rooms—Box Ball Rooms—Lodge Rooms—Conservatories—Convention Halls—Schools—Colleges—Churches—Hospitals—Public Buildings—Club Rooms—Bed Rooms—Rest Rooms—Toilet Rooms—Bath Rooms—Waiting Rooms—Reading Rooms—Libraries—Opera Houses—Moving Picture Houses—Pool and Billiard Rooms—Pleasure and Bath Resort Buildings—Railway Stations—Factories—Warehouses—Portable Houses—Garages—Boat Houses—All Farm Buildings—Pantries—Kitchens—Bins—Fair Booths—Telephone Booths—Consultation Rooms—Doctors' Offices—Workshops in Cellar, Attic or Out Building.

Bishopric Wall Board is made with Asphalt-Mastic. This is asphalt toughened by a patented process and it won't burn. In hot Asphalt-Mastic kiln dried dressed laths are imbedded at a pressure of 500 pounds to the square inch. The other side of the Asphalt-Mastic is surfaced with heavy sized cardboard. It is ready at once for paint, paper, burlap or other wall decoration. Or paneled its natural gray tint is highly artistic.

Bishopric Wall Board is the only wall board made with laths. Laths are positively necessary to back up a wall board—to make it rigid and substantial—and to keep a perfectly flat surface. Without lath, wall board swells, warps, cracks and pulls away from the joints.

Bishopric Wall Board comes to you in sheets all ready to put on. Any man who can drive nails can apply it. Sixteen sheets to the crate. Prices, $2.50 per 100 square feet; $6.40 per crate of sixteen sheets, or 256 square feet. Bishopric Sheathing comes in crates of sixteen sheets, 256 square feet. Prices $2.35 per 100 square feet; $6.00 the crate, f. o. b. Cincinnati.



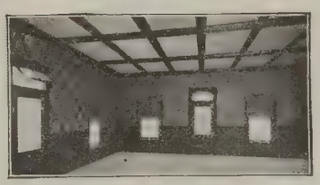
Applying Bishopric Wall Board to Ceiling.



Laying Bishopric Wall Board Under Floor, Making It Cold and Moisture Proof

Get Our Special Proposition

We have a special and very attractive proposition for contractors and builders. You can not afford to pass this remarkable opportunity without investigating. Fill out the coupon in this advertisement—or drop us a letter or a postal today. You put yourself under no obligation to us whatever. All we want is an opportunity to show you how you can make Bishopric Wall Board and Bishopric Sheathing a big paying part of your business—a business that goes right on through your slack season as well as your busy season.



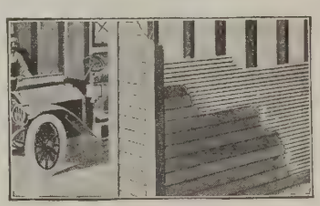
Paneled Room Finished in Bishopric Wall Board.



Enclosing Attic with Bishopric Wall Board.



Applying Bishopric Wall Board to Walls.



Garage Finished with Bishopric Wall Board.

CONTRACTORS AND BUILDERS COUPON

The Mastic Wall Board and Roofing Mfg. Co.
316 Este Avenue, Cincinnati, Ohio

Send me Free, sample of Bishopric Wall Board, Booklet describing its uses and your special Proposition to Contractors and Builders. This places me under no obligation whatever.

Name .....

Post Office..... State.....

THE MASTIC WALL BOARD AND ROOFING MFG. CO.
316 Este Avenue, Cincinnati, Ohio

BISHOPRIC WALL BOARD AND SHEATHING

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Utility Wall Board lends itself admirably to any type of house or style of decoration—

Use it in the bath room or kitchen and by decorating with white enamel paint secure a beautiful and lasting tile effect—

Use it in the living room or bed chamber, the parlor or hallway—

Use it to turn the bare attic into a cozy bedroom or nursery; line the laundry with it and add 100 per cent. to its comfort and usefulness—

Use it for making closets or for partitions—

Use it in any type of construction either new or old—and you will find in every instance an easily put up job—a thoroughly satisfied customer—and a good profit for yourself.



As a Carpenter and Builder have you ever carefully investigated the possibilities of

UTILITY WALL BOARD

Do you realize that here is a comparatively new material that is practically revolutionizing interior construction?

Utility Wall Board does away entirely with the need for lath and plaster—

You put it right on over the studding—

It comes in sheets of various sizes and widths suitable for wall and ceiling use—it is as easy to cut and handle as a thin pine board—yet is so tough and durable that it gives much better service than lath and plaster—

You can put Utility Wall Board on at any time without regard to weather—You don't have to wait for it to dry—There is no muss and dirt to contend with—

Utility Wall Board is very tough and durable—lasts longer than lath and plaster—is much more easily applied—makes a better looking wall and costs less—

WE WANT TO SEND YOU A FREE SAMPLE OF UTILITY WALL BOARD, TOGETHER WITH OUR ILLUSTRATED BOOK OF INTERIORS. WILL YOU SEND US YOUR NAME?

THE HEPPES COMPANY 4502 Fillmore Street CHICAGO, ILL.



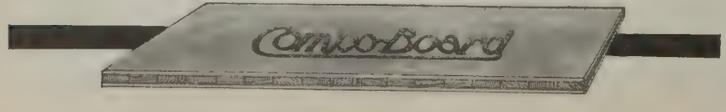
This Modern Wall Lining Makes Good Under Severest Tests

By every test, Compo-Board has proven itself the most satisfactory wall-lining. It has stood the test of time for periods of ten to twelve years in hundreds of homes. It resisted earthquake shocks in California which crumbled plaster walls. It keeps the bitter cold out of log cabins in Alaska. Furniture manufacturers using it in their products found that it will not warp. In apartment houses it has stood rough usage, the knocks of furniture and the kicks of children without injury—without peeling or crumbling. It has made thousands of homes everywhere better places in which to live.

Our booklet and sample will explain why every user of Compo-Board, including the U. S. government, well known Universities, big hotels and apartment house owners, home owners, contractors and builders prefer it to any other wall lining. There are money making hints in this book for you. Just send your address on a postal.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No. Minneapolis, Minn.



Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

A series of talks to carpenters about the practical use of *Beaver Board*, the pure-wood-fibre wall and ceiling material that is durable, economical, artistic, has none of the disadvantages of lath, plaster and wallpaper; and is appropriate to any type of building, new or old.*

Beaver Board is essentially a proposition for carpenters and builders.

CHAPTER II

BEAVER BOARD for Residences

The carpenter or builder who is looking for business—*and profits*—that will keep him busy no matter what the weather, will find big business opportunities in *BEAVER BOARD'S* use in residences.

Whether the house is new or old, *BEAVER BOARD*-ing is *inside* work. Unlike plaster, *BEAVER BOARD* can be successfully applied in *any* season, onto *bare studding* or *over old lath and plaster.*

Things to keep in mind in BEAVER BOARD-ing

Any carpenter can put up *BEAVER BOARD*, but there are a few little things—just a few—he must keep in mind.

He shouldn't drive a nail until he has had every detail of the job thoroughly worked out, or had us work it out for him; as in everything else, you must *plan* if you're going to *BEAVER BOARD* right.

We're willing—anxious to help. Our Architectural Department will plan the whole job for you if you wish it, and give you estimates, too.

Your problem, if it is only that of BEAVER BOARDING to best advantage a 10x12 room, will be given just as serious and careful attention as the other fellow's 12-story office building job.

Some BEAVER BOARD "Don'ts"

Don't paper or plaster over *BEAVER BOARD.*

Don't put up *BEAVER BOARD* immediately if it has become damp in transit; let it dry out—flat.

Don't paint *BEAVER BOARD* until it has been well sized.

Don't put on decorative strips until *BEAVER BOARD* has been painted.

BEAVER BOARD'S endless possibilities for all kinds of uses are fully described in our free booklet, "*Beaver Board and Its Uses*," with many pictures of different interiors. Write for it today.

BEAVER BOARD

PURE-WOOD-FIBRE WALLS & CEILINGS

BEAVER BOARD PURE WOOD FIBRE

Look for this mark on the back of every panel.

If it is a new house, earn the plastering money yourself

Once you've tried *BEAVER BOARD*, you're primed for convincing the house-owner that he needn't wait for better weather before plastering, and, indeed, needn't think of plaster at all.

Win him over to *BEAVER BOARD*, save him the delay and trouble and litter and *the greater expense* of plastering, and create for yourself more work and more profit.

If it is an old house—

Why, there's a new, virgin field for you. Talk *BEAVER BOARD* walls and ceilings to the owner whose walls need re-plastering or re-papering.

Let BEAVER BOARD do the talking

BEAVER BOARD advantages argue its own case. Those are:

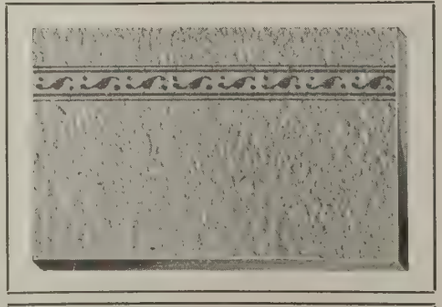
BEAVER BOARD is economical, easy to handle, suits any kind or sort of building, retards heat, cold, and sound, doesn't crack, check or deteriorate with age.

**This is the second of a series of twelve advertisements written with a view of acquainting the carpenter with BEAVER BOARD and its more-business possibilities. The first appeared in the January number. We will be glad to send you back chapters you miss.*

The BEAVER COMPANY of BUFFALO
444 Beaver Road, Buffalo, N. Y., U. S. A.
The BEAVER COMPANY, LIMITED
384 Beaver Avenue, Ottawa, Canada



How BEAVER BOARD is applied to a room in a new house. Note the absence of litter.



A sample of BEAVER BOARD, showing its pebbled surface, which so lends itself to painting.



A BEAVER BOARD living room, shown in a model bungalow at the Memphis Tri-State Fair.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

PAINE LUMBER CO., LTD.

OSHKOSH, WISCONSIN, U. S. A.

These Plants Produce TWO-THIRDS of A



We Make Everything in M

OUR SPECIALTY

Korelock Veneered Doors

Cost but a little more than Pine

WRITE FOR CATALOGUE C

Whenever You See a Korelock Joint Thi

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

PAINE LUMBER CO., LTD.

OSHKOSH, WISCONSIN, U. S. A.

ne Standard Veneered Doors Used in the World



vork in Any Kind of Wood

OUR SPECIALTY

Korelock Veneered Doors

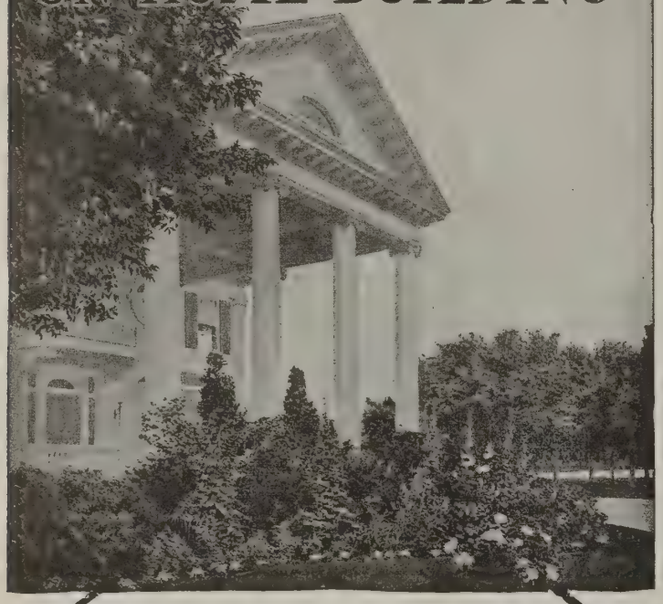
Birch and Oak Doors Ready to Ship

WRITE FOR CATALOGUE C

f Paine Lumber Co. — The Originators

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS
IT WILL HELP

KEITH'S MAGAZINE ON HOME BUILDING



The Recognized Authority

EACH issue of 72 to 80 pages is complete with instructive articles finely illustrated by half-tone cuts, artistic designs for moderate cost homes, contributed by leading architects. A year's numbers furnish a splendid variety of strictly new and high class work.

Construction Problems

A series of articles by Architect H. Edw. Walker now running in Keith's Magazine, with drawings illustrating his monthly talks on "Construction Problems," will prove of unusual interest and practical value to every builder. You will be sure to want every number. Send in your subscription and book order NOW to start with our **FEBRUARY** NUMBER.

KEITH'S BOOKS OF PLANS

are known and sold all over the world. Get a Plan Book with a reputation behind it. Get "KEITH'S" and "Do It Right."

KEITH'S books at newsdealers or direct $1 each, are:—

Vol. I—215 Plans for Bungalows and Cottages costing less than $3000
Vol. III—200 " " Attractive Homes costing.....$2000 to $4000
Vol. IV—175 " " " " " .....$4000 to $5000
Vol. V—175 " " " " " .....$5000 to $6000
Vol. VI—125 " " " " " .....$6000 and upward
Vol. VII—100 " " Cement, Brick and English Half Timber Houses
Vol. VIII— 50 " " Modern Garages costing.....$200 to $2000
Vol. IX—182 Beautiful Interior Views of living rooms, fireplaces, etc.
Vol. X—172-p. book, "Practical House Decoration," illustrations and studies

SPECIAL OFFER

Send $2 and I will mail you any one of these $1 books, enter you for a full year's subscription to KEITH'S monthly magazine and mail you *now* 3 numbers published in 1911. ($3 value for $2.)

Any 5 books and a year's subscription $5.

Fill Out This Coupon and Mail Today

M. L. KEITH, 420 McKnight Building, Minneapolis

Dear Sir:

I accept your Special Offer and enclose $2 for a year's subscription to the well known KEITH'S MAGAZINE on Home Building, with 3 recent sample numbers extra and one of your $1 books. I have selected from your list, Vol. No._____, which please mail to me at once.

SIGNED _____

ADDRESS _____

HARRIS & COLE BROS.

Durabuilt
TRADE MARK

Red Gum and Oak—Trim and Mouldings
Red Gum and Oak—Finishing Lumber

We Can Furnish Red Gum Finishing Lumber and Oak Finishing Lumber in Any Width Desired and Ship Quick.

"Write for Circular on New Clear Cypress Porch Column"—the **finest porch column ever built.**

HARRIS & COLE BROS.
CEDAR FALLS, IOWA

Miller's Two Minute Lever Lock Mortiser

Actual Use of Tool ½ Minute



Chisels the opening for Locks. Over 5000 Mortisers Sold Mean Something.

One builder wrote us: "I was surprised, I did not think it would do the work so quick. This is the best I ever saw."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS

GUARANTEED

to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs, and similar work which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

Main Office and Factory
RIVERSIDE, CAL.

Eastern Office and Shops
CINCINNATI, OHIO

HARTMANN-SANDERS CO.



Manufacturers of
KOLL'S PATENT LOCK JOINT COLUMNS
Universally Recognized

As the leaders in Arctitectural Beauty and Quality.

When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.

We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, **that's why** we are selling more columns today than ever before.

Ask for Catalogue "T"—it's worth having for any **Home Builder.** Send for Catalogue T-27 of pergolas, sun dials and garden furniture or T-40 of wood columns.

We manufacture a full line of porch material and Interior Hardwood Columns.

MAIN OFFICE AND FACTORY, 2165 ELSTON AVENUE, CHICAGO
EASTERN OFFICE, 1123 BROADWAY, NEW YORK CITY

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

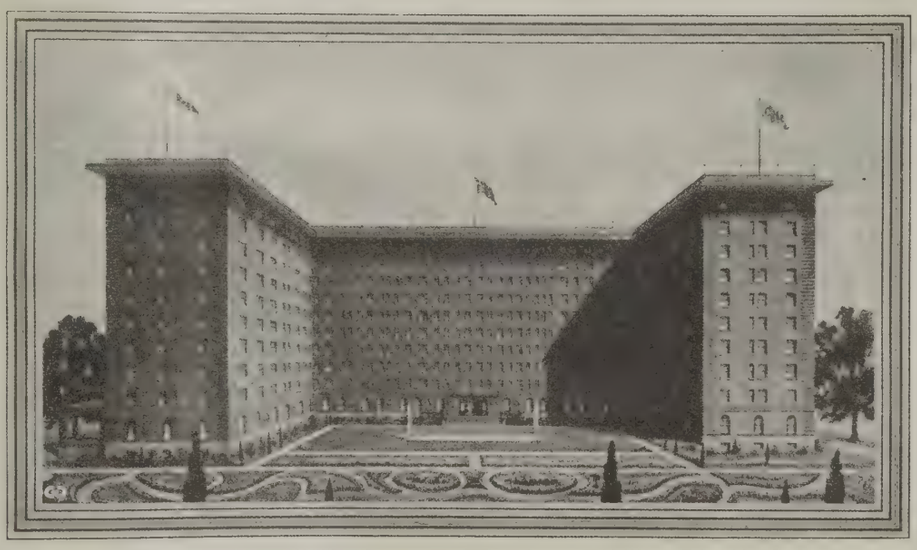
HERE'S A CASE OF WISDOM WORTH NOTING

WHAT WOOD DO YOU THINK WAS USED FOR

THE INTERIOR TRIM

of the superb HOTEL LEAMINGTON, MINNEAPOLIS (*shown below*)? It was

SAP GUM



F. E. LOCKWOOD, Archt., Leonard Construction Co., Contractors

NOT some "better" wood—***there IS NO BETTER WOOD for such use*** in cases where ***reliability***, ease of handling, adaptability to the finest staining effects, and moderate cost are to be considered.

NOT some more expensive wood—why lay out unnecessary money when SAP GUM, beautifully finished and skillfully installed, is ***an honor to*** this fine structure?

SO THEY USED 6 CARLOADS OF GOOD SAP GUM

—160,000 board feet of it—in this one building.

Thrifty and up-to-date builders are fast learning that they can benefit themselves and ***add to their reputation by recommending*** SAP GUM ***to their clients.*** DO YOU?

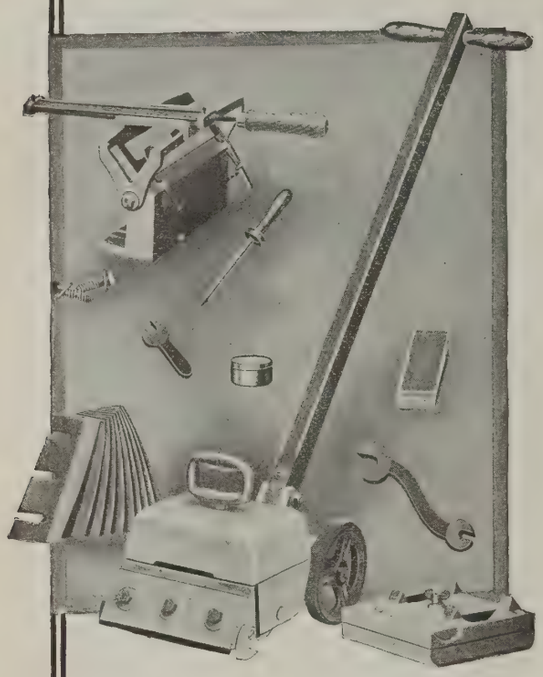
SAP GUM has all the good qualities of RED GUM except the beautiful markings. On the other hand SAP GUM ***takes stains as no other wood does***, and thus lends itself to the nicest requirements of the architect's color schemes by permitting a wide variety of differing decorative effects.

Builders desiring to see samples of ***RED GUM*** *and* ***SAP GUM*** *both rough and finished or who wish market prices of selected* ***RED GUM*** *and* ***SAP GUM,*** *are invited to correspond with any of the following firms:*

CARRIER LUMBER & MANUFACTURING COMPANY - - - - Sardis, Mississippi
BAKER LUMBER COMPANY - - - - - - - - Turrell, Arkansas
ANDERSON-TULLY COMPANY - - - - - - - - Memphis, Tennessee
THREE STATES LUMBER COMPANY - - - - - - - Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER COMPANY - - - St. Louis, Mo.
LAMB-FISH LUMBER COMPANY - - - - - - Charleston, Mississippi
HIMMELBERGER-HARRISON LUMBER COMPANY - - - Cape Girardeau, Missouri

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

OVER $100,000.00



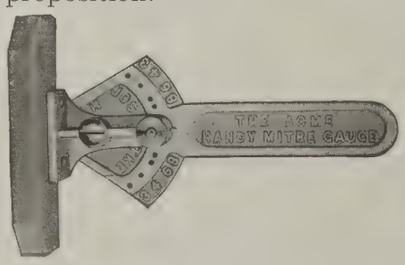
Has been SAVED by USERS of the

Acme Floor Scraping Outfit

during the past five years. Thousands of machines are now in daily operation, and every mail brings letters from users commenting upon the satisfactory work their outfits are doing and the vast amounts of labor expense they are saving.

Now, Mr. Contractor, you do not have to rely upon what I say regarding the merits of my machines, but I want you to let me send an outfit to you on **one week's free trial,** and you can then let the machines demonstrate on your own work just what they can do. If, after working with the equipment for one week, you are not convinced that the same will save you many dollars, and do your floor scraping better than it was ever done before, just pack up the machines, return them to me, and you will owe me nothing.

Write to-day for booklet and full details of my proposition.



The Acme Handy Mitre Gauge

is another labor saving tool. It is absolutely accurate, can be set at any angle and fits in the pocket where it is always ready for instant use. If your dealer does not carry them in stock, then write to me for circular describing this wonderful little tool.

JOSEPH MIOTKE

249 Lake Street : : Milwaukee, Wis.

PEARSON'S AUTOMATIC SHINGLE NAILER

PAYS FOR ITSELF ON ONE FAIR-SIZED SHINGLING JOB



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.



PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼-in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented. *Write for Circular "N."*

PEARSON MFG. CO., ROBBINSDALE, MINN.

Triple "A" Spring-Driven Floorsmoother

CUT DOWN EXPENSES

A DOLLAR SAVED is twice made. You can save a lot of money on your floor work by using up-to-date methods and machinery.



You can do much better work, and the houses you build will be worth more money, and draw bigger rent when the floors are properly surfaced.

Do it the Triple "A" way

and you will enjoy health, wealth and happiness—that's the only way.

FOR TWO CENTS you can learn all about it—

DROP US A LINE

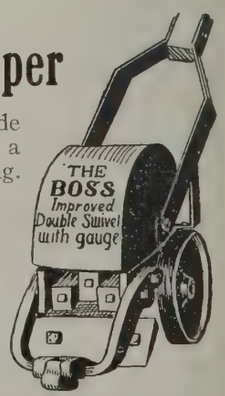
Triple "A" Machine Co.

30 North Clark Street CHICAGO

SENT ON FREE TRIAL

It Works Like a Plane

The Boss Floor Scraper



The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. **Why?** Because the Boss is made with a gage on front to which is attached a pear-shaped wheel which raises when the machine is pulled and lets the knife down gradually.

The Boss can be set for any thickness of shaving, it also can be set for any shearing cut, right or left, up or down, to suit the kind of lumber.

It is guaranteed to give absolute satisfaction.

G. J. Kepplinger,

Manufactured also in Canada

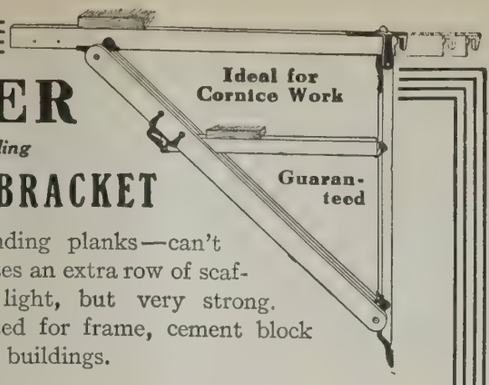
MAIN OFFICE
Dwight, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

WEBER

Double-Folding

SCAFFOLD BRACKET



Has two standing planks—can't swing. Eliminates an extra row of scaffolding. Very light, but very strong. Especially adapted for frame, cement block and brick veneer buildings.

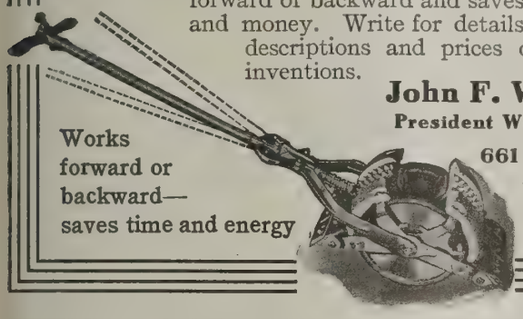
Read This Letter

"Your brackets gave great satisfaction—saved time and lumber—which means money. First thought price high, but now consider them cheapest, handiest brackets on the market. Would not be without them.—Louis A. Greulich, Bellevue, O."

The WEBER DOUBLE ACTING Floor Scraper

FIVE DAYS FREE TRIAL

Try it for five days on any flooring. If its work isn't the best you ever saw, return it—at our expense. Works forward or backward and saves time, energy and money. Write for details of offer and descriptions and prices of all Weber inventions.



Works forward or backward—saves time and energy

John F. Weber
President Weber Mfg. Co.
661 71st Avenue,
West Allis, Wis.

THE RAPID FLOOR SCRAPER



FREE TRIAL use it—then pay us.

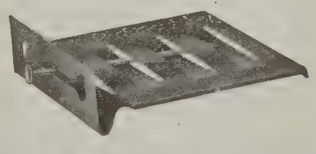
Large wheels, easy motion. Automatic Brush cleans floor, saving knife edge. Knife adjustable to any angle. Knives sharpened in machine.

With the Rapid KNIFE SHARPENER (free with machine) any man can sharpen knives.

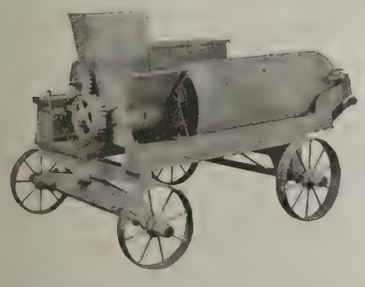
MONARCH METAL WALL PLUG

The lowest priced standard plug on the market. Has a positive grip on the nail, and a definite key in the mortar.

SAMPLE FREE



MONARCH CONTINUOUS CONCRETE MIXER $218.00



Complete with high grade gasoline engine, all on truck. Low feed. Capacity 40 to 50 yards in 10 hours with two men to do all the work. Saves its cost in 2 months use. Concrete Machinery of all kinds. Mixers from $35.00 up.

CATALOG FREE.

Monarch Mfg. Co. 252 SHEPARD BUILDING, GRAND RAPIDS, MICH.

THESE TWO MACHINES FOR $170.00

Read What Contractors Think of Our Machines.

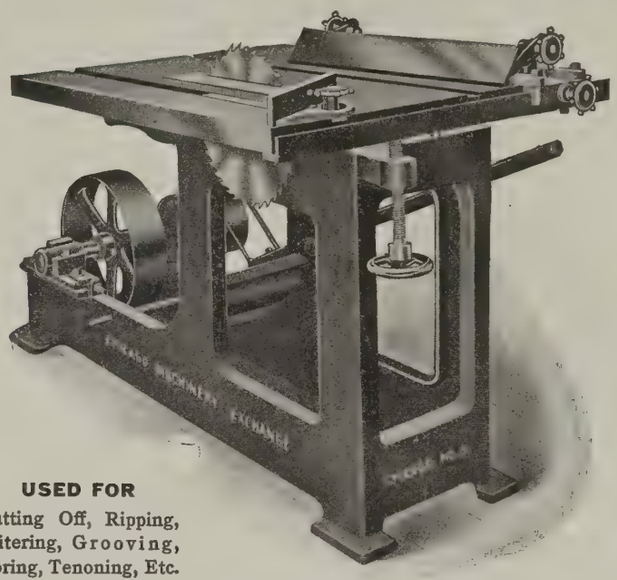
Charleston, Ill., July 13th, 1911.

Chicago Machinery Exchange, Chicago.

Dear Sirs:

Your saw table which I bought of you last fall is a complete success, the best I ever saw for the money, and I worked in a good mill for ten years. You can refer anybody to me in regard to your saw table No. 5.

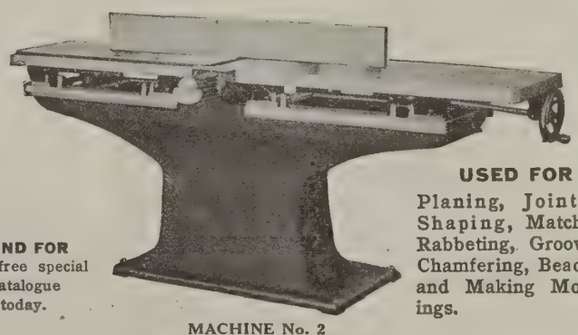
Yours,
CLARENCE B. MUCHMORE



USED FOR
Cutting Off, Ripping, Mitering, Grooving, Boring, Tenoning, Etc.

MACHINE No. 1
Chicago No. 5 Combination Saw Table

These two machines are always ready for work without any changing. They are a big bargain at $170.00. This price includes belt for saw arbor, countershafts, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼ in., 5-16 in., ⅜ in., ½ in., ¾ in.—and 1 pair of jointer knives. Ask for price on one if you cannot use both.



SEND FOR Our free special Catalogue today.

USED FOR
Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading, and Making Mouldings.

MACHINE No. 2
Chicago 12-Inch Jointer and Planer

WE ISSUE A CATALOGUE OF MACHINES ESPECIALLY ADAPTED TO CONTRACTORS' AND BUILDERS' USE.

CHICAGO MACHINERY EXCHANGE

1217 TO 1225 W. WASHINGTON BLVD.

CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



The SIMPLEX Improved Mixer

1912 Model

3 Hoppers, continuous feed, rolling mix, low-down steel frame, simple, strong and accurate—



"THE MILES"

No. 5, Down Face Wet Concrete Block Machine

Makes Stone

in Lengths 4, 6, 8, 10, 12, 16, 18, 20, 22, 24 inches.
In Widths 4, 6, 8, 10, 12 inches.
In Height 4, 6, 8 inches.

Also Angle Stone, Circle Stone, Gable Stone Hollow or Solid Stone.

THE CONTRACTORS FRIEND. Simple, Strong and Rapid. LOWEST IN PRICE.

Write For New 1912 Catalogue

THE MILES MFG. CO., Inc.

303 E. FRANKLIN ST. JACKSON, MICH.

A FREE BOOK

On Concrete Machinery

BUILDING BLOCKS
BRICK
PORCHES
CHIMNEYS
DRAIN TILE
SEWER PIPE
SILO BLOCKS
AND OTHERS

It isn't exactly a catalogue, because it gives you the cost of making concrete Blocks, Bricks, Porches and Chimneys. It tells all about the profits in making Drain Tile for farmers. The advantage of drainage, etc.

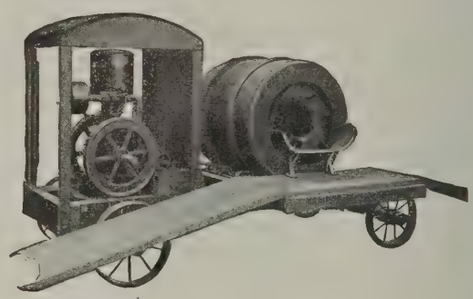
You ought to have this book if you are interested in concrete. Sixty-four pages of illustrations and interesting reading. Send at once, today, a postal will do.



W. E. DUNN MFG. CO., 4135 Fillmore St., Chicago

"THE STANDARD" Low Charging Concrete Mixer

(Formerly Eclipse)



"THE STANDARD" will be used in the future as the name of the mixer which we manufacture.

This corresponds with our firm name as well as with "THE STANDARD" Scales which are so largely used all over the world.

We find that while we have been selling our mixer under the name of Eclipse, it is known very largely by the public in general as "THE STANDARD" machine.

"THE STANDARD" mixers will be of the same high grade construction as heretofore, using all improvements and best designs from our many years of experience as manufacturers in this and other lines of machinery.

"THE STANDARD" Mixer will have our patented low charging arrangement and also our semi-automatic discharge, which together with other special features has enabled us to build up our large volume of business and have made our machinery so popular with contractors and users.

"THF STANDARD" mixer will be built following out our general plans, to produce a high grade, simple constructed machine at moderate price, omitting all complicated and unnecessary mechanism and producing by a very simple method, the thorough mixing required for high grade concrete.

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"THE STANDARD" Mixer will merit the good record already built up for the Eclipse.

Write for catalogue No. 32 which gives full information regarding this low charging machine.

The Standard Scale and Supply Co.

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PHILADELPHIA, 35 S. FourthSt. NEW YORK, 136 W. Broadway

M ASHLAND M

Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers

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The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry. A high-grade mixer at minimum cost. Our business has been built up on repeat orders. Correspondence invited.

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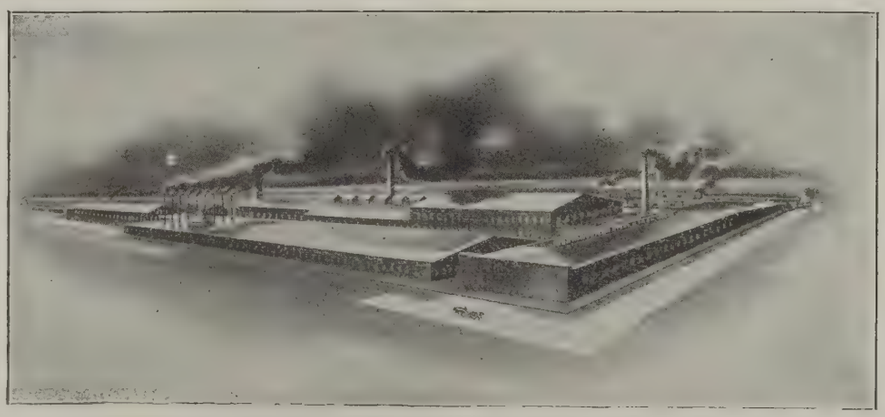
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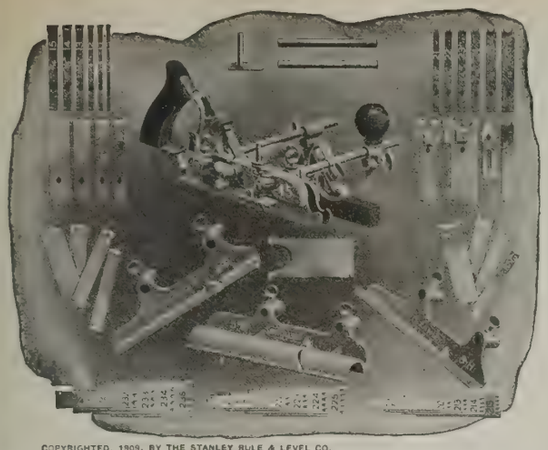
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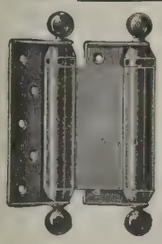
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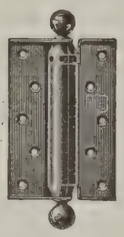
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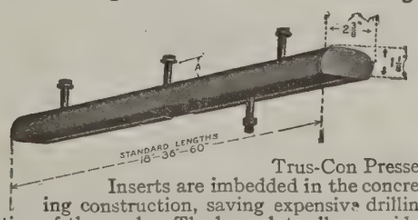
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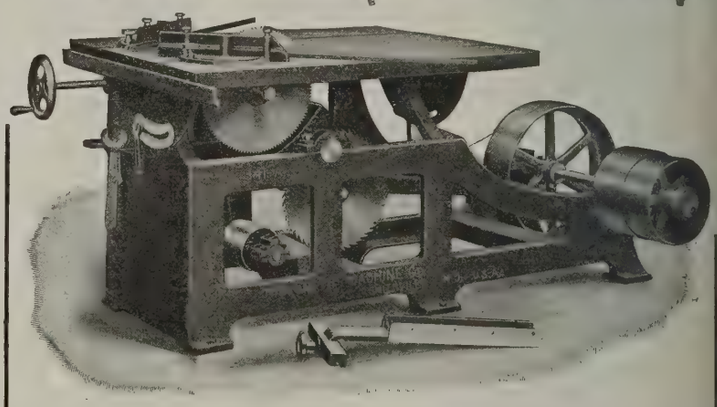
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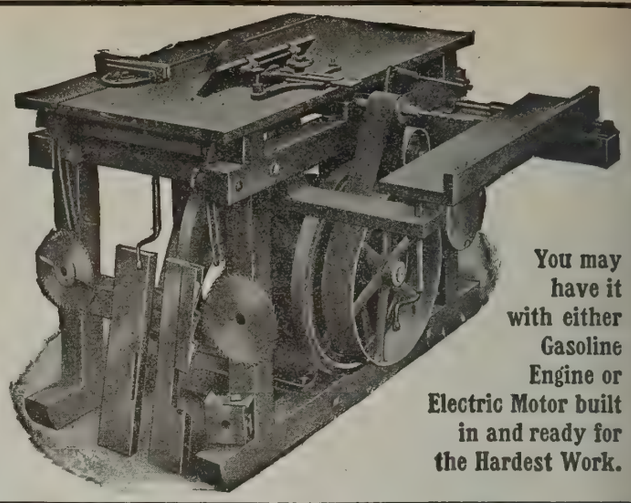
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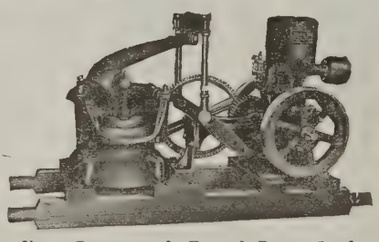
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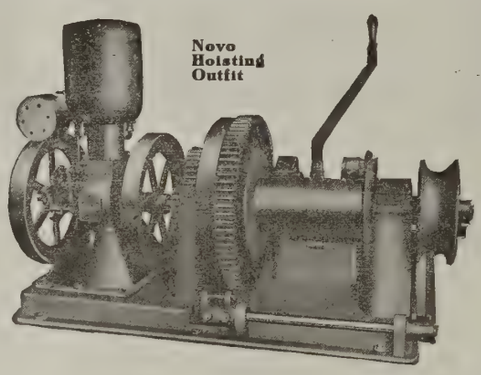
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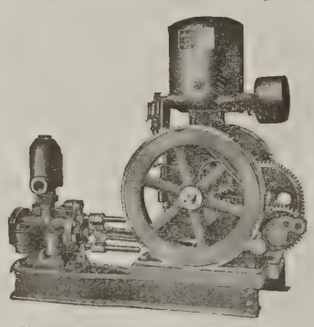
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Novo Hoisting Outfit

NO TANK
NO FAN
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GIVES BETTER SERVICE THAN STEAM OR ELECTRIC MOTOR



Novo Engine Direct-Connected to Pump

The Novo has many advantages for hoisting or other contracting work over other means of power.

No licensed engineer is needed—anybody can run a Novo.

It occupies small space and is readily moved—it's the lightest engine for power developed.

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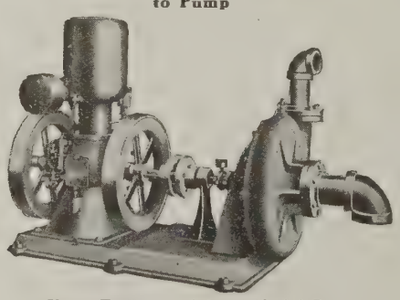
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The Novo Engine is adaptable to every contractor's needs within range of its horse-power. It is simple, reliable, exceptionally economical, and very compact. Working parts are enclosed against dirt and constantly lubricated by a splash system—even the main bearings. The Novo cooling system is self-contained and guaranteed proof against freezing damage. Weather conditions do not affect the Novo Engine. 1 to 10 H. P.

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NOVO CONTRACTOR'S OUTFITS

include Novo Engines and Trench Pumps, Hoists etc. Centrifugal Pumps, direct-connected or belted.



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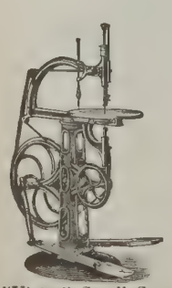
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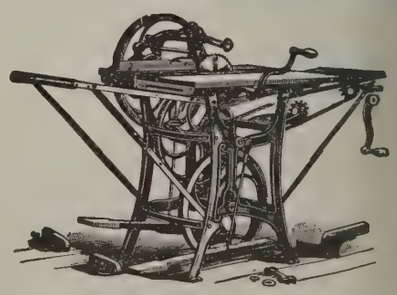
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Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor-saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.

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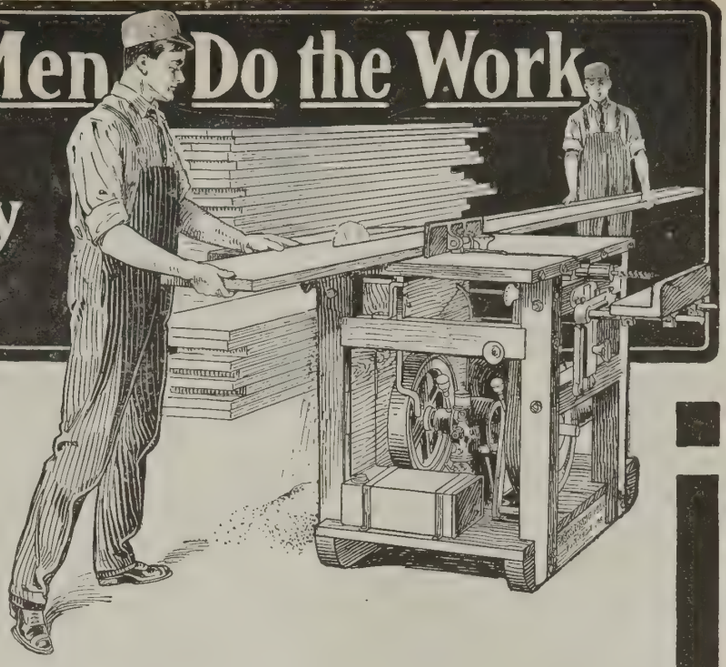
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Can Be Moved Anywhere. One Man Can Pull It. Two Men Can Lift It and Your Wagon Can Take It to Any Job.

These are weighty reasons, Mr. Contractor. A few minutes figuring will convince you that a machine that will do all your jig-sawing, dadoing, mitering, beveling, ripping, boring, sanding, etc., for **25c for 10** hours is a mighty profitable proposition. Fistfuls of letters from enthusiastic contractors—big and little—prove our claims. The

TRADE OSHKOSH MARK

Eveready SAW RIG

Is Guaranteed for Life

Operating cost 2c per hour—Never tires—never stops because of hot weather—neither perspiration nor sunshine has any effect on it—alway good natured—always on the job—will work overtime.

It pays for itself in a surprisingly short time. When not in use it doesn't cost a cent. But there's scarcely a day you'll not use it at a profit.

The Engine and Frame.—It's a quick actor—a snap of your finger! a twist of your wrist! and off she goes with a merry hum. It is a 4 H. P. of the valveless type which gives double the power of 4 cycle styles and has no complicated parts. The bearings are large, will stand unusual strain and are enclosed, away from grit and dust. A highly sensitive governor insures steady movement under any load. The table, frame and skids are of very best rock maple air and kiln seasoned. Will never warp.

Write for prices. Then work your pencil for 5 minutes comparing your present costs and that of operating an Eveready. The big chance is that you'll order—for you'll conclude as others have proven that—

It Will Increase Profits on Your Contracts

You Run No Risk

Return This Rig at our expense—after six days' trial in your own shops—if it is not exactly as represented. Every one is sold under our steel-riveted guarantee—hand signed if you ask it.

Send for Literature

giving complete description of the Eveready, price, etc., at once and commence to save money.

ALL THESE ATTACHMENTS FREE

Jointer Head—This works on exactly the same principle as an up-to-date planer. Produces a smooth, even job with no deep cut as the material leaves the jointer head. 2½ inches in size.

Boring Attachment—A high class attachment. Guaranteed absolutely accurate. Extra long boxes insure easy long-running qualities on the guides. Bits, standard size.

Jig Saw—Not a cheap one, but the best 13 inch jig we can make. All joints reinforced with steel, equipped with brass bushings. Once use it and you won't part with it.

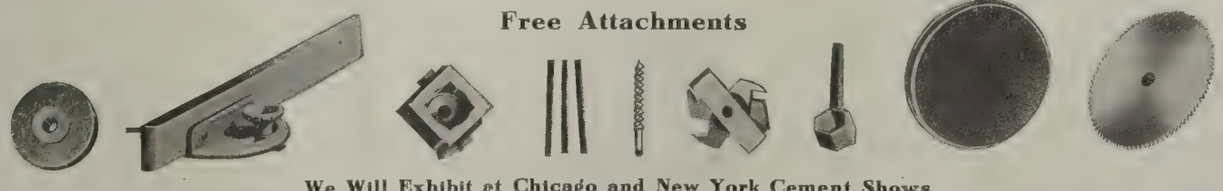
Sander—The best one yet—a great time and money saver over old methods in change and economy of paper. Our method of holding paper will not blister as do many others. 10 inches in diameter.

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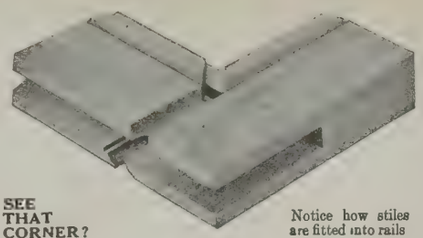
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ALWAYS READY FOR INSTANT USE

The FIRST and ORIGINAL COMBINATION of Circular Saw, Jointer and Band Saw, ever placed on the market.

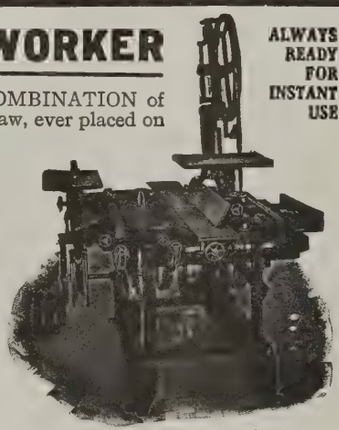
Reversible Spindle Shaper, Boring and a dozen other valuable attachments can be added.

Each machine is sold separate or can take a circular saw and add to it all desired.

The long base best arranged for Portable Use with engine attached.

BUY from the ORIGINATORS and LEADERS in improvements and you will be sure to get the best

Our Ball Bearing Machines are the greatest improvement ever made in Foot and Hand Power Circular and Band Saws. *Write for Catalog and Prices,*

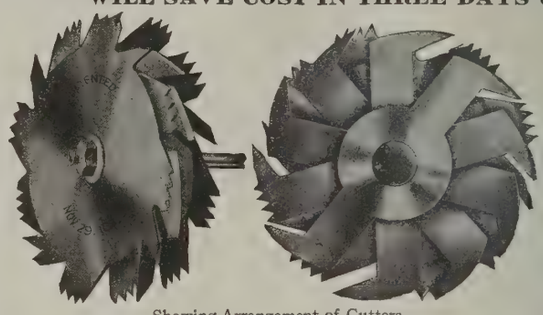


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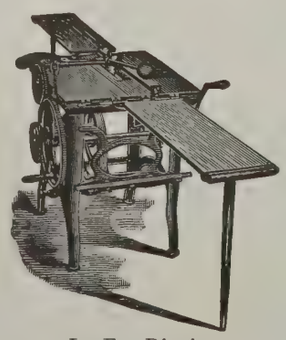
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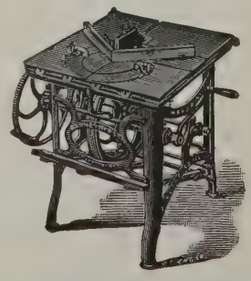
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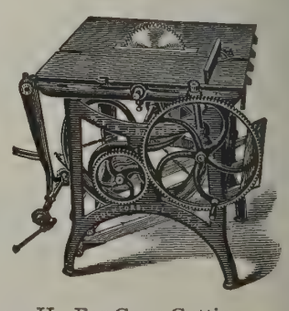
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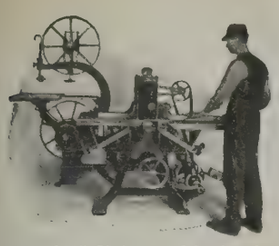


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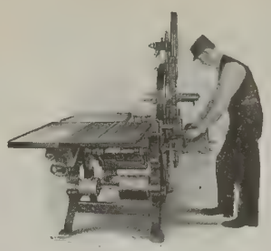
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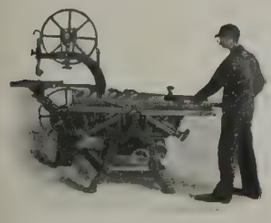
FAMOUS Universal Woodworker operated as a Disc Sander.



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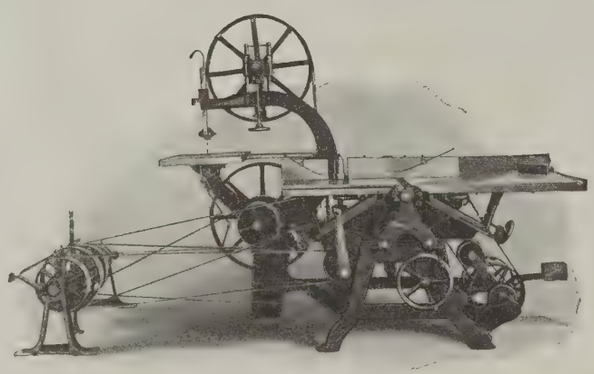


FAMOUS Universal Woodworker operated as Single End Tenoner.



FAMOUS Universal Woodworker operated as Jointer, Two Side Edger and Moulder.

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Instead of Buying Sixteen Woodworking Machines, buy ONE Machine—buy a FAMOUS

Universal Woodworker, which combines the working qualities of sixteen and is a complete planing mill in itself.

All the machinery a carpenter or contractor needs is combined in this one machine. It can be adjusted for the different operations almost instantly and permits of a number of men working at one time. It is the original and only practical woodworker on the market today.

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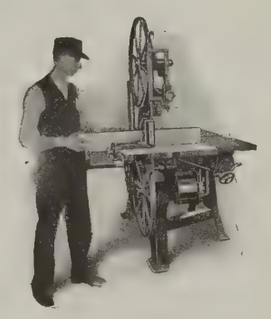
You owe it to your business to get full particulars of this wonderful machine; write for a copy of our latest catalog and details of a machine to fit your needs.

The Sidney Tool Co.

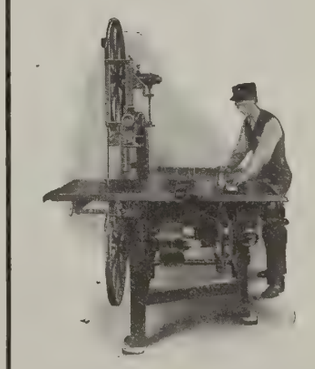
Sidney, : : : : : : Ohio



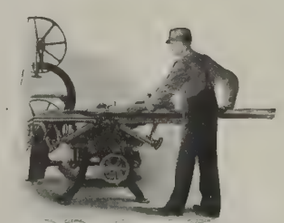
FAMOUS Universal Woodworker operated as Felloe Rounder.



FAMOUS Universal Woodworker operated as a Re-Saw.



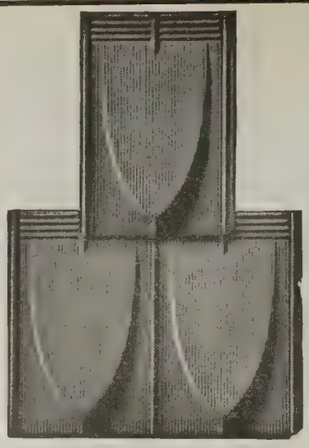
FAMOUS Universal Woodworker operated as Single Spindle Shaper.



FAMOUS Universal Woodworker operated as a Pole Rounder.

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STYLE B.
Showing Method of Laying

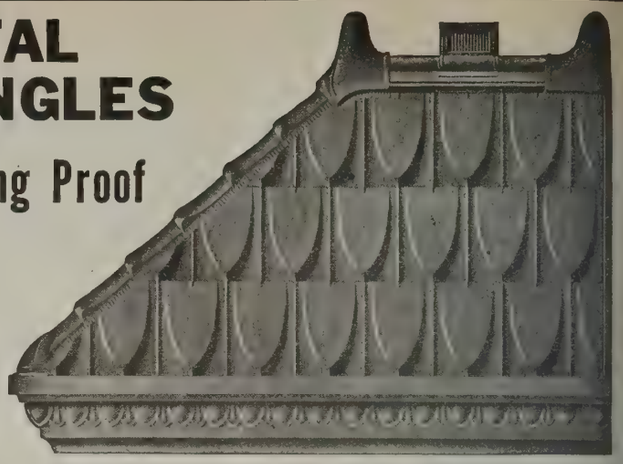
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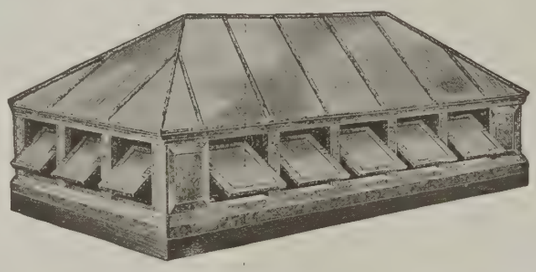
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MILWAUKEE, WIS. KANSAS CITY, MO.



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Willis Self-Installing Sky Lights

From Factory to Builder
No Other Labor Necessary

Willis Skylights are constructed so that any person handy with a hammer or screw driver can install them. It is not necessary to have a soldering outfit or tinners' tools.

They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

Catalogue No. 6 gives our large line of other Sheet Metal Building Material. Send for it.

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These Shingles Are Fully Guaranteed



THOUSANDS of buildings—homes, schools, churches, etc., are today covered with Reynolds Asphalt Shingles. Many of these have stood the heave of frost and the wear and tear of storm for 10 years and are in every way as good as when first laid.

Reynolds Asphalt Shingles have "made good"—they have stood the test. So satisfactory are they in durability and appearance, that leading architects and builders are specifying them for new work on the best class of modern homes.

Reynolds Flexible Asphalt Slate Shingles

Reynolds Asphalt Shingles **last.** They are 8x12¾ in. and lay 4 in. to the weather. They are fire-resisting and weather-proof. Never split, warp nor rot. **Cannot** color rain water. These shingles are mineral surfaced and laugh at wind and weather. No better shingles are made than these. If you want to enjoy life, roof your home with Reynolds Asphalt Shingles and—"forget it." We also make strictly high-grade granite surfaced roofing in rolls.

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THE WINTHROP **Solid Tapered Asphalt Shingles**

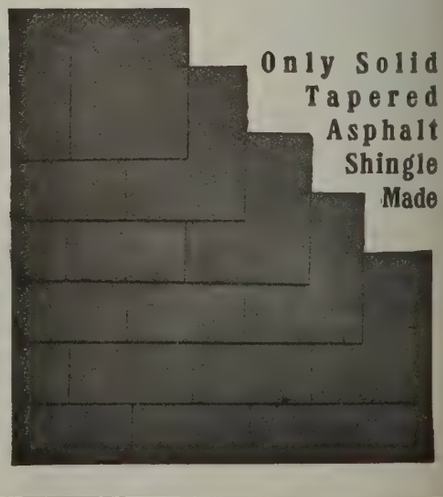
ARE OF A COOL, GRAY SLATE COLOR

And have the durability of asphalt—the fine appearance of slate and the light weight and cost of wood shingles. They are fire-resisting—weather-proof—wind and sun-proof and never crack, break or fall off. Laid with regular shingle nails, the same as wood shingles.

SPECIAL INDUCEMENTS TO THOSE WHO APPLY FIRST ROOF IN EACH TOWN

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VERSUS
The Laminated Kind

J-M Transite Asbestos Fireproof Shingles are moulded under powerful hydraulic pressure in one solid, compact, homogeneous mass.

Therefore they cannot exfoliate, warp or curl like the laminated kind, which are made like paper on a paper-making machine, are liable to do.

Therefore J-M Transite Asbestos Shingles have no weak spots like shingles made in layers pressed together. They are more closely knit, have double the life, are more ornamental and render more efficient service than the kind built up layer-on-layer.

J-M Asbestos Shingles are furnished in all sizes and in three colors: Natural Gray, Indian Red and Slate.

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Manufacturers of Asbestos and Magnesia Products — ASBESTOS — Asbestos Roofings, Packings, Electrical Supplies, Etc.

Baltimore, Boston, Chicago, Cleveland, Dallas, Detroit, Kansas City, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Omaha, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis

For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver, B. C. 1456



Residence of D. Miles Rigger, Wildwood Crest, N. J. Covered with J-M Transite Asbestos Shingles. Lynn Boyer, Architect. R. A. Larcombe, Builder.

Try It FREE

Why, compared with the grindstone or emery wheel, it is mere child's play to do the toughest job of grinding—and with the patent tool rests and attachments an apprentice can do any job of sharpening, such as gumming saws, sharpening plane bits and twist drills as well as a high paid mechanic. Try it 30 days absolutely free—then if you don't want to keep it, return it at our expense.



A Work Shop in Itself

Extra Attachments convert the Luther "Hummer" Tool Grinder into jig and circle saw, lathe, force-feed drill, blacksmith forge, etc.—you can completely equip your workshop at very low cost—free book illustrates and describes extra attachments—17 in all. Write for Free Book today.





Dimo-Grit Sharpening Stones

Ask your dealer for Dimo-Grit sharpening stones—the fastest, smoothest sharpening substance for steel. Look for the name "Dimo-Grit" on the stones.



Cuts Steel as Emery Does Copper

Dimo-Grit, the new artificial diamond abrasive, peels steel away in tiny shavings—25 times faster than grindstone, 10 times more efficient than emery—no need of water cooling, no danger of drawing temper. Will not glaze or wear lopsided. Dimo-Grit is especially adapted for steel. Carborundum Wheels supplied when wanted.

Luther Shop Tool Grinder

Foot and engine power—built completely of steel and iron, enclosed shaft drive like an automobile, dust-proof bearing—runs as easy as sewing machine—4000 revolutions per minute by foot power.



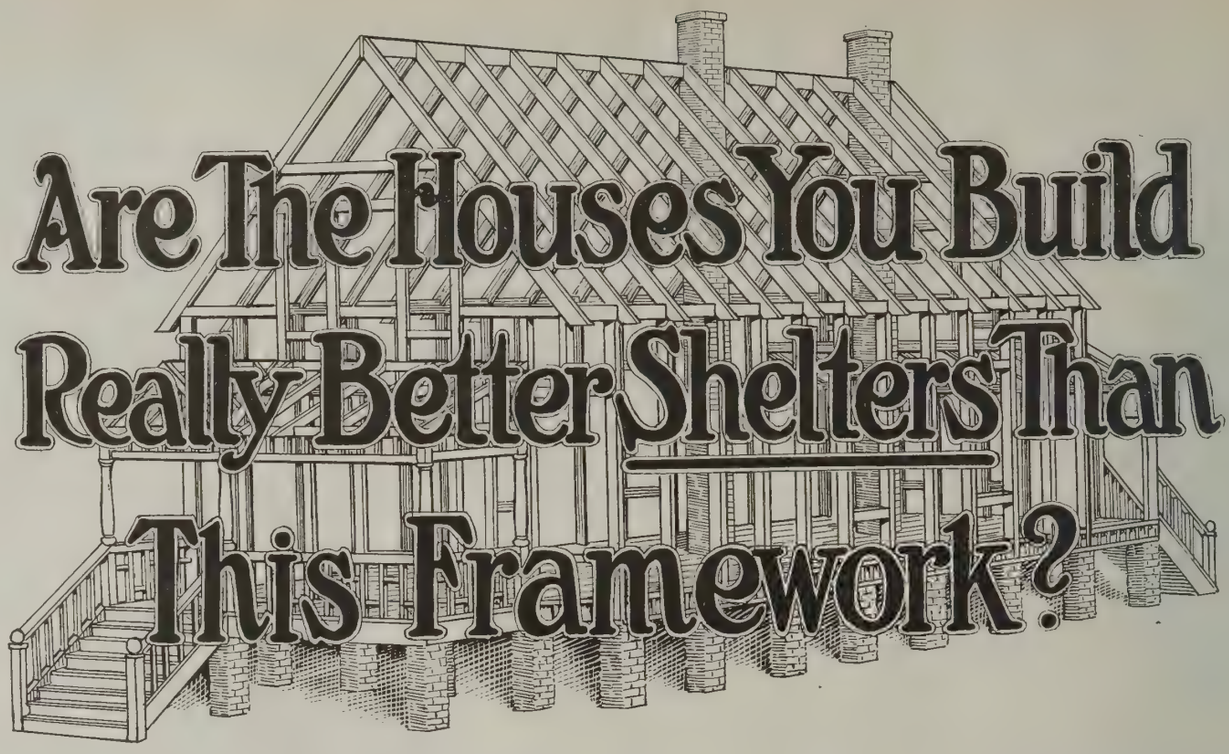
14 Machines in One 1—Fine Dimo-Grit Wheel. 2—Coarse Dimo-Grit Wheel. 3—Universal Toolrest. 4—Chisel and Plane Bit Guide. 5—Dimo-Grit Razor Hone. 6—Dimo-Grit Scythe Stone. 7—Dimo-Grit Saw Gummer. 8—Felt Polishing Wheel. 9—Medium Dimo-Grit Wheel. 10—Cloth Buffing Wheel. 11—Dimo-Grit Oil Stone. 12—Dimo-Grit Pocket Hone. 13 Plane Bit Honing Attachment. 14—Twist Drill Sharpening Attachment.

40-Page Free Book

Shows all ways this machine saves and earns money and makes work easier—gives valuable pointers on tool sharpening. Prove this machine's value to you in your own work. Send for full information, then decide if you want to try the shop outfit for 30 days free. Don't delay. Write today.

Luther Grinder Mfg. Co., 419 Michigan Street, Milwaukee, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Are The Houses You Build Really Better Shelters Than This Framework?

After all is said, isn't it true that the single word "shelter" completely covers the purpose for which any house is built? Whether you're building a detached house or an apartment, its primary requisite is that it be a **shelter**—(1) from the **public view,** (2) for the **safe-keeping** of your personal effects, (3) from the **wind, rain and snow,** and (4) from **heat** and **cold.**

(1) Curtains and blinds, (2) strong doors and locks, (3) solid walls and roofs—all do their work well. But how about **heat** and **cold?** Come, let's be frank—are your houses **really** shelters from **them?**

LINOFELT
—Linen Felt made from Flax Fibre

in the walls you build will keep cold on one side and heat on the other just as a solid black curtain keeps light and dark separate. Clapboards, sheathing, brick, hollow-tile—no matter of what material or how thick you build the walls—they **don't** insulate against heat and cold.

This glimpse at the scientific side of it means enthusiastic customers and clients for you. To stop the passage of heat and cold demands a substance containing a countless number of microscopic sealed **dead** air-cells, with the cells separated by material of the lightest possible specific gravity.

Flax fibres meet this condition better than any other substance capable of use in building. Linofelt is a quarter-inch quilt of specially treated flax fibres bound between two sheets of building-paper—rosin-sized or waterproof. In resisting the passage of heat and cold Linofelt is. **much** more effective than **38** thicknesses of building-paper.

There's the brief scientific fact. It shows you why Linofelt, used in walls and roof instead of building paper, will cut 40 per cent off your customer's coal bills every winter—and keep his house cool in summer as well.

That means **real shelters** from heat and cold. Linofelt comes in rolls 200 feet long and 3 feet wide. It will never add more than one per cent to the cost of building, and **need** not add anything.

Build with Linofelt, and make your houses faithfully serve their primary purpose; make them **genuine shelters.** Write for our special booklet and complete information today. Call upon our staff of draughtsmen for any specifying you wish. There's no corner-coupon here; we want to get into **personal** touch with you. Write us fully **now.**

"Line Your Houses with Linofelt"

UNION FIBRE COMPANY, 21 Union Avenue, WINONA, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

J.E.C.
Run this adv. in Carpenters & Builders' papers just as it stands — it will appreciate it even better than the general public. — F.E.W.

(Note below)

WHO SAID ALL THIS ABOUT CYPRESS?

"THE WOOD ETERNAL"

(*Here's a part of the good things they said:*)

"CYPRESS is put to almost every use as an interior trim for houses.....natural color or stained.....contains little resin.....thus affords a GOOD SURFACE FOR PAINT, WHICH IT HOLDS WELL..... popular.....for kitchens, where it is subjected to dampness and heat..... *shrinks, swells or warps but little*.....For the parts of houses exposed to the weather it serves equally well. AS SIDING IT PRACTICALLY WEARS OUT BEFORE IT DECAYS.....made into porch columns it retains its shape, *holds paint,* and has sufficient strength.....It is placed as cornice, gutters, blinds.....and railing, and *is much used for Porch Floors and steps*..... Much CYPRESS lumber is employed in the construction of *SILOS*..... The FARMER puts the wood to many uses.....ITS LASTING PROPERTIES FIT IT WELL for curbs..... *Resistance to decay* fits it for stable floors and timbers near the ground, as well as for.....gates, and especially for fence posts... .one of the best available woods for picket fences, because it *shows paint well* and holds it for many years, *but lasts a long time without it*.....widely used for this purpose.....in regions remote from its range..... It is PRE-EMINENTLY FITTED for (*greenhouse construction*).....where it is called upon to *resist dampness, excessive heat, and all the elements that hasten decay*.....sash, frames, benches, boxes, and practically all else.....the builder needs.....Agricultural implement manufacturers make seed boxes of it, wagon makers.....for beds.....carriage builders and automobile makers work it into panels for fine bodies..... *Its slight tendency to warp* has caused its employment for incubators.....freight-car siding.....many builders of *gasoline launches* are said to be using Cypress *exclusively* for hull planking.....makes handsome church pews.....Telephone boxes and switchboards of *CYPRESS* are coming into use.....spools.....beehives;.....seine floats;.....tables.. ..curtain poles; .....patterns;.....shelving and counter tops;.....shims;.....tool boxes. CYPRESS has been substituted for white oak for wine barrels....The same....freedom from taste is claimed for it by pump makers, who recommend it for that reason," (etc.)

(*Here's who said it—*) *a reprint from:*

U. S. GOVT. REP., Bulletin 95, June 30, 1911, pp. 44-46.



WHEN YOU BUILD (palace, cottage or pasture fence)
Why not "Stop Depreciation Before it Begins — *Use CYPRESS At First!*"
WHEN "FIXING UP" (big new porch or little back steps)
"Why Replace Rotten Wood *with Wood that Will Rot?*" (*Use CYPRESS, of course.*)



WRITE TODAY for VOLUME ONE of the CYPRESS POCKET LIBRARY, with Full Text of OFFICIAL GOVT. REPT. *Also Full List of 32 Other Volumes.* (FREE on request.)

Let our "ALL ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel
SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY*

The best Carpenters are more and more favoring Cypress because it is easy to work, easy on edged tools and is such a faster that owners are pleased, and that's a good thing for the reputation of the builder who put him to use. — F.E.W.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



KANNEBERG'S NEW METAL TILE

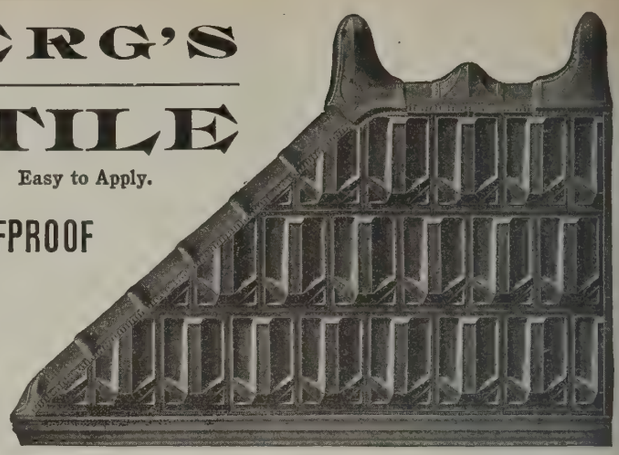
High Lock Joint, No Possibility of a Leak. Easy to Apply.

DURABLE ORNAMENTAL FIRFPROOF

To insure prompt reply address Tile Dept. N.

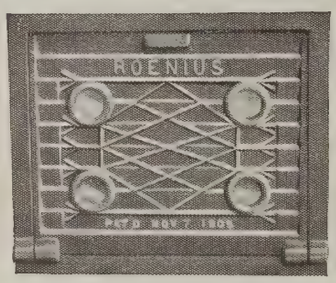
ART
METAL CEILINGS AND SIDE WALLS
Ceiling Catalog DN

The Kanneberg Roofing and Ceiling Co.
Canton, Ohio



METAL TILE WITH RIDGE AND HIP FINISH

Roenius Wood and Coal CHUTES

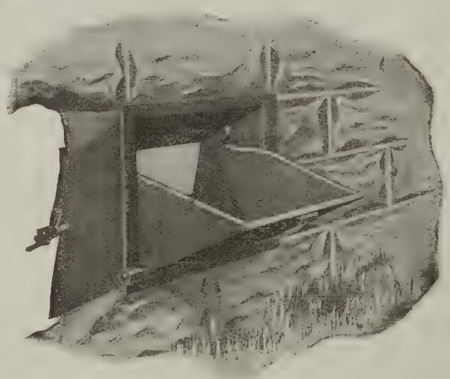


ROENIUS CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY

MANUFACTURERS
Grand Rapids, Wisconsin



HESS Sent on Approval FURNACE

You can buy our furnace direct from our factory AT THE FACTORY PRICE, and test it 60 days in winter weather. If not pleased, return it at our expense for freight both ways, and pay us nothing.

This offer, and lots of good furnace information, will be found in our free 48-page booklet. Ask us for one. A postal card will do.

Hess, 907 Tacoma Building, Chicago



Complete Bath Room Outfits

$38.95 TO $175

Modern Plumbing at ½ ordinary cost

Water Pressure Systems, from $42.00 up. Hot Water and Steam Plants. Save $100 to $250 on a Heating System. Plans free with every plant. Pipe, Valves, Fittings at Lowest Prices. All high grade, strictly guaranteed goods.

Write for Catalogue N—It will aid you in getting the best and at prices which cannot be equaled considering quality of materials

JOHN HARDIN CO.

EUGENE A. HARDIN, Mgr.

Doing Business for 25 Years at the Same Old Address and in the Same Square Old Way of Treating Our Customers

4541-4549 COTTAGE GROVE AVE., CHICAGO, ILL.

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Andrews Hot Water Heating Systems

$198 Average Price

14 Andrew Heaters in one Block

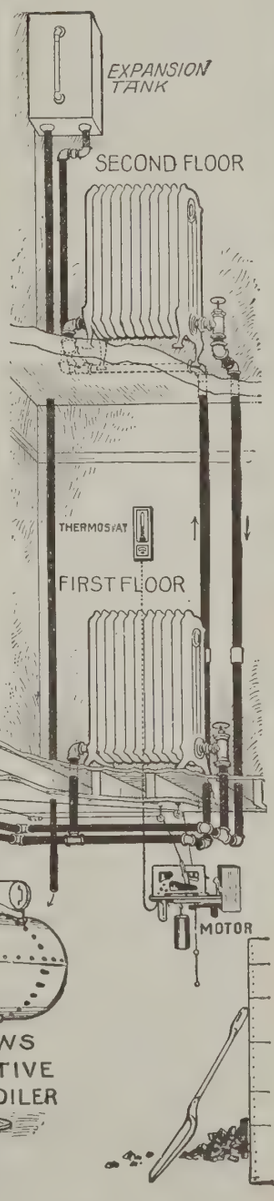




Geo. C. Andrews
The man who does it right in 44 States.

Profit for the Contractor

WE have made lots of money for other contractors who read this paper and we'd like to make some for you. It is a great advantage to you to include **Andrews Heating and Plumbing Systems** in your contracts, and we assure you that there are no systems which give such general satisfaction. They are the easiest for you to handle, too, for we do all the estimating for you and make the plant complete all ready to screw together, so one of your carpenters' helpers can erect it. You can make a nice profit without much work.



360 Days Free Trial

Guaranteed by Bond

We take all the risk of the plant's success. Also the financial risk, providing you want us to bill your customer direct and pay you a commission. Let us give you a free estimate on your next job and you'll see the advantage of doing business with us.



SPECIAL FREE THERMOSTAT OFFER

In order to give your end of the business a good start, we will give you or your customers one of our famous "Hired Man" Thermostats, providing you write us within 30 days and order an Andrews Plant or Boiler during 1912. This Thermostat regularly sells for $20, is guaranteed for life and should be a good inducement for your customers to contract with you right away for their heating plants.

Send for Andrews BIG BOOK

On Heating—Plumbing—Water Supply Sewage Disposal—Gas Lighting

PLUMBING



The Andrews Plumbing line is complete of the very best material. Complete plans and instructions for erecting accompany each order. Pipes are cut to fit, threaded, etc. so that any handy man can easily erect. Write for estimate.

ANDREWS STEEL BOILERS



The two styles of Andrews Steel Boilers, vertical and locomotive, are the highest types of hot-water boilers. They are made of steel-plate like power boilers and their very large fire travel together with the close proximity of fire and water make them heat quicker than any other boilers on much less fuel. A child can clean either style in a few minutes. Average annual cost of coal $3.00 to $5.00 per room. Our catalog also shows cast iron boilers.

SEWAGE DISPOSAL



The Septic Tank is one of Mr. Andrews' own inventions. A small steel tank placed underground just outside the basement treats the sewage in such a manner that it becomes purified and passes off into a drain bed. An almost indispensable device for any home not having sewer connections. Cheap and lasts forever. State size of house and grounds when writing for estimate.

GAS LIGHTING



The very best gasoline gas system made makes finest gas for cooking, lighting and gas-engine use. Entirely safe, lasts a lifetime, easily operated; more economical than city gas and giver more light and heat.

Write for estimate, giving sizes and number of your rooms.

ANDREWS HEATING CO.

1240 Heating Bldg., Minneapolis, Minn.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ORR & LOCKETT HARDWARE Co

Established 1872

Most Contractors and Builders doing business in Chicago or nearby towns know that Orr & Lockett's is the one best place to buy their hardware and supplies. But there are others who do not realize what an advantage it is to have the benefit of our services and long experience, and this advertisement is intended for them.

In the first place any contractor in buying from us is assured of the best and most suitable piece of hardware for each particular purpose. We very seldom fill an order with the goods of any one manufacturer exclusively, but are able to choose those pieces which are acknowledged to be the leaders in each manufacturer's line. Thus the entire order contains only the highest grade articles—not a weak link anywhere.

Then in the matter of packing our goods for shipment we employ only experienced men who sort and label each piece from the specifications so that the workmen on the job lose no time in handling. Any contractor will realize the great advantage in receiving his hardware in this shape.

There are many other reasons why every contractor and builder will find Orr & Lockett's the most satisfactory place to deal, and we shall be glad to give these reasons to anyone interested. Just remember that as we do the bulk of the better class of this business in the Middle West there must be some good reason for it, so let us hear from you.

SPECIAL NOTE for those attending the following conventions:

Illinois Lumber and Builder's Supply Association, Chicago, Ill., Sherman House, February 13, 14, 15.

Fifth Annual Cement Show, Chicago, Coliseum, February 21-28.

Clay Products Show, Chicago, March 7-12.

While you are in Chicago don't fail to visit this store and see our remarkable stock of Builder's Hardware and Supplies, Contractor's Tools, Supplies, etc. You will find that we carry the largest and most complete line in the country. Come in and ask all the questions you wish.

ORR & LOCKETT HARDWARE Co

Established 1872

14-16 W. Randolph St. CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Mullins Sheet Metal Statuary



fulfills every requirement of ideal architectural adornment. Its effect is nothing short of imposing. It is light—withstands the ravages of time. Made from artists' own models, or can be selected from our great variety of exclusive stock designs. Has the hearty endorsement of numerous sculptors of note. The cost is far below that of cast or sculptured work.

We also manufacture Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing, and Sheet Metal Ornamental Work of every description.

Your written request will bring by return mail catalogues covering the line or lines that interest you. Glad to submit quick estimates on architect's drawings. Attractive prices. Prompt service. Special discounts to trade. Write today.

THE W. H. MULLINS CO.

210 Franklin St. SALEM, O.



THIS BOOK FREE

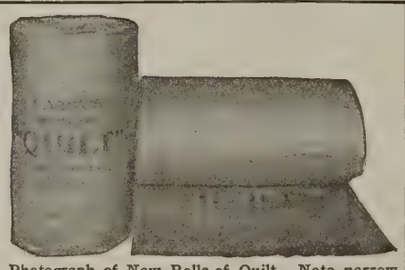
It has been compiled by experts and will show you the one best way to get the best results from every kind of a saw. There is nothing of greater importance than a correct knowledge of the proper care and use of tools, among which the saw; to give the best results, demands the most expert attention. You should write for your free copy today. It will give you a better knowledge of the diseases and proper treatment of saws. Send postal for Saw Points Booklet No. 7.

CHAS. MORRILL

277 Broadway NEW YORK

THE NEW CABOT'S "QUILT"

The Original Scientific Insulator and Deadener
50% Better than Ever Before



Photograph of New Rolls of Quilt. Note narrow space in middle for splitting into 18" strips.

IMPROVEMENTS

Made in 250 foot rolls.

Wonderfully strong, untearable paper.

Fastened stitching that cannot rip.

No creases or lumps.

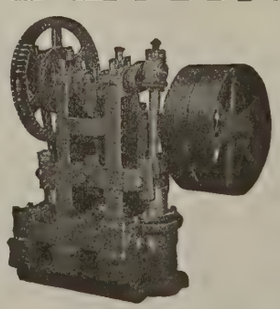
18-inch strips to go between studs.

One layer is warmer than forty layers of common building paper. The only perfect sound-deadener.

SAMUEL CABOT, Inc., Sole Mnfrs., Boston, Mass., U. S. A.

1123 Broadway, New York 350 Dearborn Ave., Chicago

DEMING PUMPS



Belt Driven Deming Triplex Power Pump

May be belt driven or direct connected to electric motor, gas or gasoline engine. Made in all sizes for any service.

Ask for our
Power Pump Catalogue

The Deming Co.

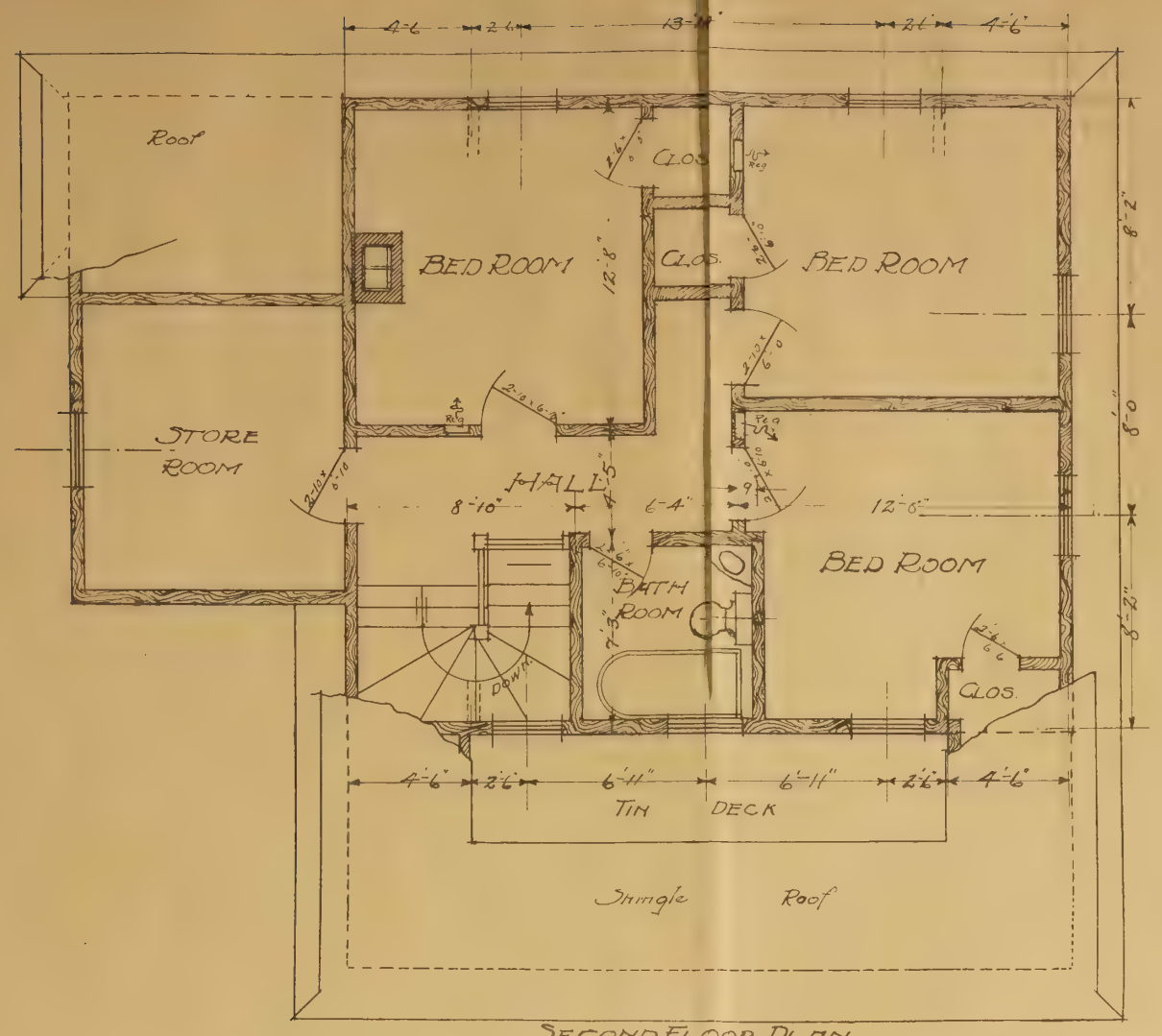
Salem, Ohio

Hand and Power Pumps for All Uses

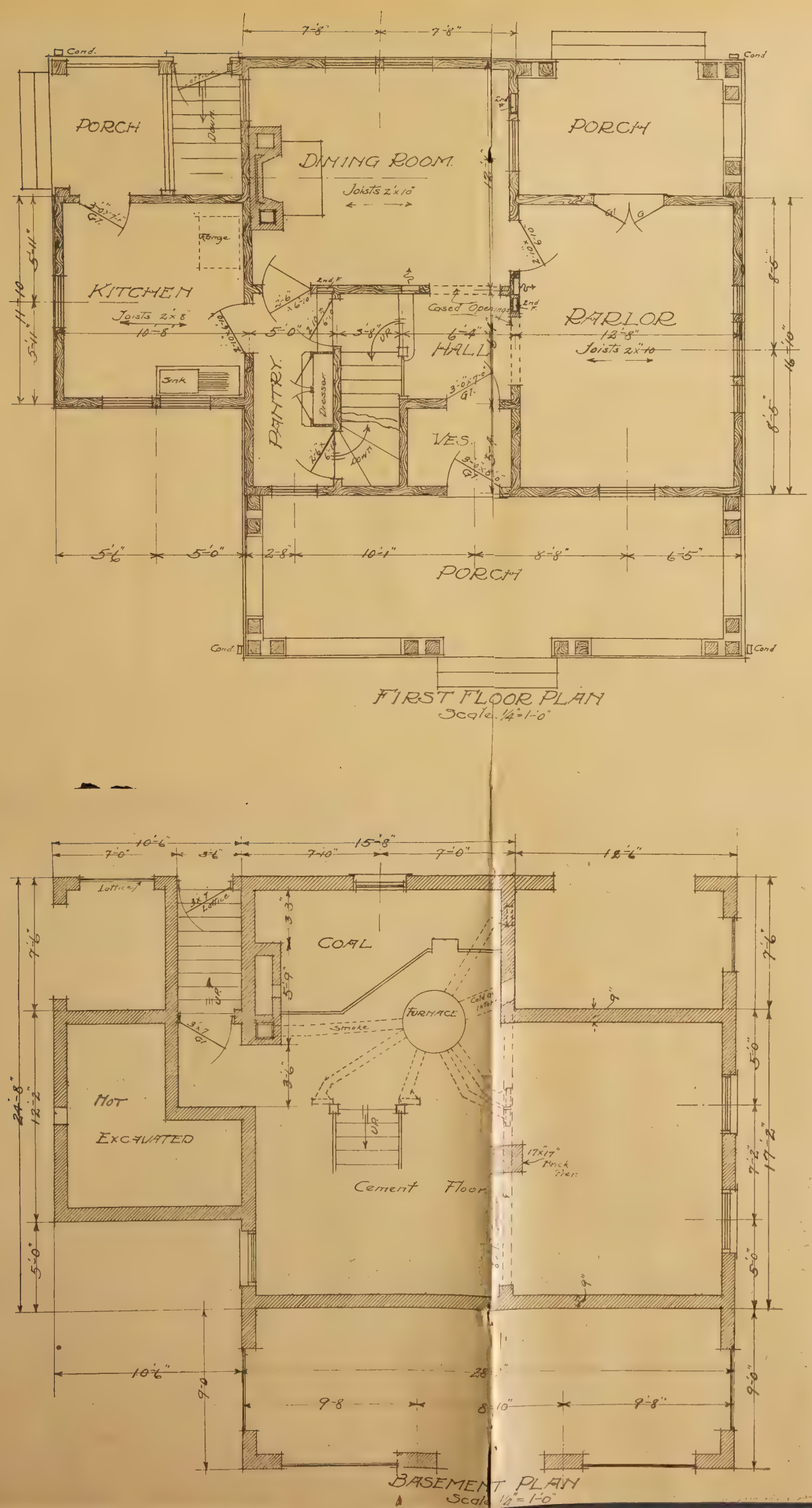
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Other Agencies in All Principal Cities



SECOND FLOOR PLAN.
Scale 1/4"-1-0"



FIRST FLOOR PLAN
Scale 1/4"=1-0"



REAR ELEVATION
Scale 1/4"-1-0"



SIDE ELEVATION
Scale 1/4"=1-0"



FRONT ELEVATION
Scale 1/4"=1-0"

SUPPLEMENT TO

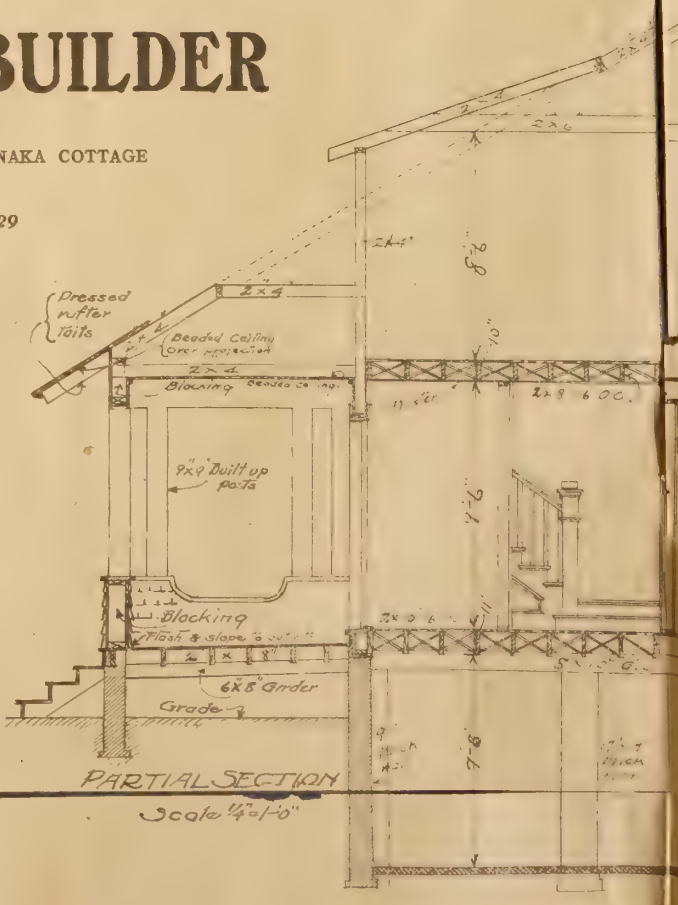
THE NATIONAL BUILDER

FEBRUARY, 1912

NATIONAL BUILDER DESIGN No. 350, THE UNAKA COTTAGE

SCALE, 1 INCH EQUALS 4 FEET

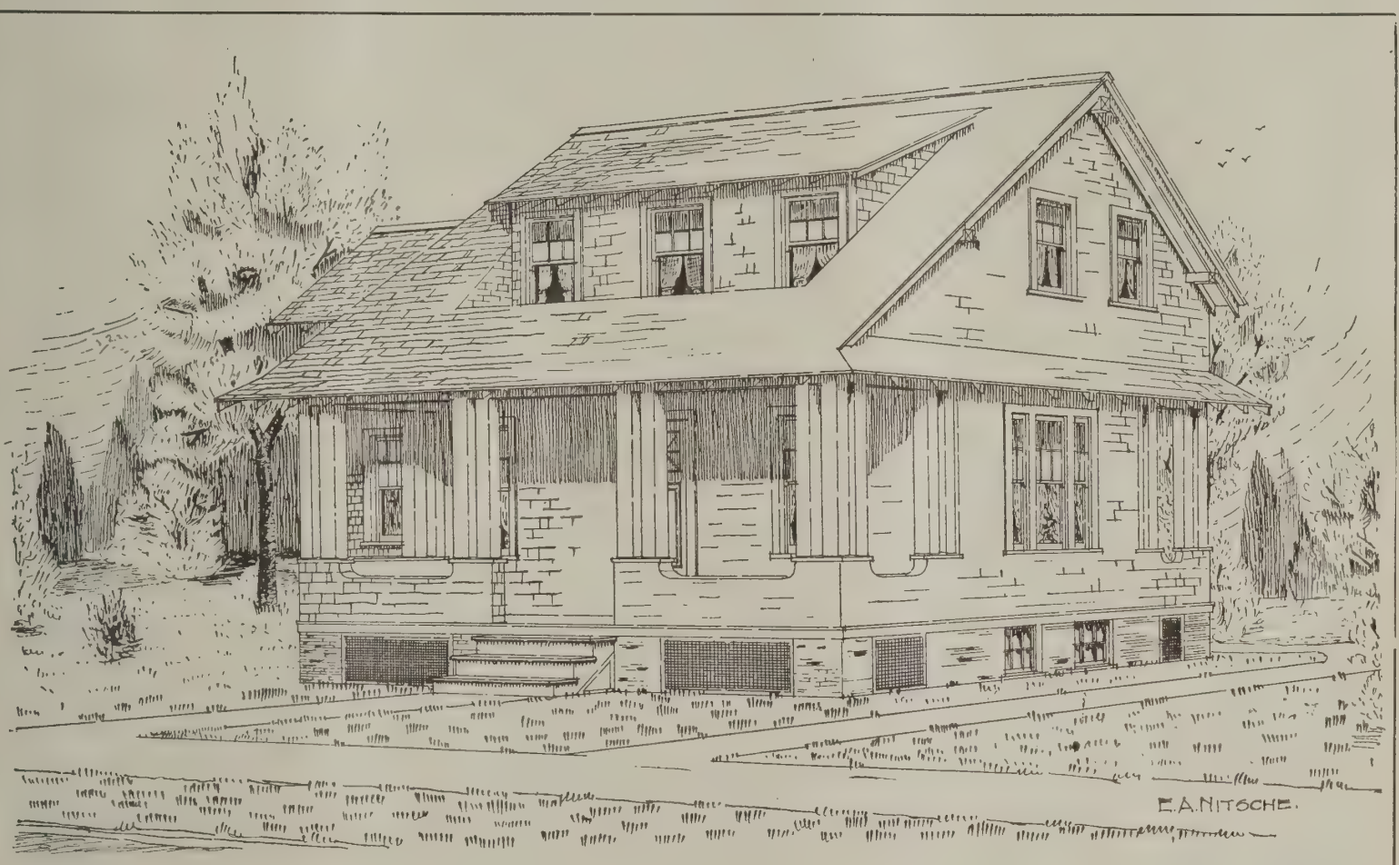
FOR ESTIMATE, SEE PAGE 29



PARTIAL SECTION
Scale 1/4"=1-0"

THE NATIONAL BUILDER

Vol. 53 CHICAGO, FEBRUARY, 1912 No. 2



THE UNAKA CORPORATION RESIDENCE

NATIONAL BUILDER DESIGN No. 350

W. P. R. Pember, Architect, Albany, N. Y.

For Floor Plans and Elevations, see Supplement of this Number. Estimated Cost, Architect's Fees Not Included, $3.117.36

THE UNAKA CORPORATION RESIDENCE

THE house shown on the supplement sheet for this month is one of a number designed for a large building company, and shows the result of careful planning to get ideal results for the small family.

While this particular house was designed for a southern climate, yet it will be noticed that it varies only slightly from the best construction in the northern states.

The people of the South are beginning to realize that to have their houses comfortable they must be protected not only from the cold in winter, but from the extreme heat in summer. For this reason we see houses lined with the various weatherproofing substances, double floors, etc., exactly as in the northern states. The matter of heating is also as necessary as in the North, for while heat is only required for a few months, yet it is just as necessary as in the northern locations.

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

Estimate of the Unaka Corporation Residence*

By I. P. HICKS

EXCAVATING AND MASONRY.	
150 yards excavating, 35c	$ 52.50
60 yards cement cellar floor, 50c	30.00
20 lineal feet chimney breast, $2.25	45.00
14 lineal feet above breast, $1.85	25.90
17,000 brick laid in wall, $13.00	221.00
Total excavating and masonry	374.40

LUMBER BILL.	Ft.
32 2x6x16 ft. sills	512
1 8x10x16 ft. girder	107
23 2x10x16 ft. first floor joists	621
14 2x10x14 ft. first floor joists	322
8 2x10x12 ft. first floor joists	160
24 2x8x16 ft. sec. floor joists	504
14 2x8x14 ft. sec. floor joists	266
8 2x8x12 ft. sec. floor joists	128
12 2x8x12 ft. porch joists	256
22 2x8x10 ft. porch joists	297

11x2x8x18 ft. porch joists	264
10 2x6x14 ft. cellar beams	140
32 2x6x12 ft. cellar beams	384
120 2x4x18 ft. outside studding	1,440
64 2x4x10 ft. first story partitions	416
48 2x4x18 ft. second story partitions	576
30 2x4x16 ft. plates	330
30 2x4x12 ft. plates	240
20 2x4x14 ft. rafters	180
10 2x4x18 ft, rafters	120
36 2x4x12 ft. rafters	324
8 2x4x20 ft. rafters	104
4 2x4x18 ft, rafters	48
6 2x4x16 ft. rafters	66
2 2x8x26 ft. verge boards	70
2 2x8x16 ft verge boards	42
12 2x4x12 ft. porch ceiling	96
22 2x4x10 ft. porch ceiling	143
12 2x4x18 ft. porch ceiling	149
20 2x2x18 ft. furring	120
30 1x6x12 ft. braces	180
20 1x4x12 ft. bridging	60
Total ft. framing lumber	8,660
8,660 ft. framing lumber at $26	$225.16
124 lineal ft 1x10 finish, $45	4.63
60 ft. lineal ft. 1x8 finish, $45	1.80
40 lineal ft. 1x6 finish, $45	.90
126 lineal ft. 1x12 finish, $45	5.67
60 lineal ft. 1⅛x12 finish, $50	3.75
78 lineal ft. 1x4x14 ft. fir flooring, $45	3.51
330 lineal ft. 1x4x9 ft. fir flooring, $45	14.85
72 ft. ⅝x4 in., 14 ft. fir ceiling, $30	2.16
320 ft. ⅝x4 in. x 9 ft. fir ceiling, porches, $30	9.60
550 ft. ⅝x4 in. x 12 to 16 ft. ceiling, cornice, $30	16.50
2,100 ft. 1x10 sheathing, outside walls, $26	54.60
700 ft. 1x8 sheathing, first story, rough floor, $26	18.20
1,900 ft. 1x6 sheathing, roof, $26	49.40
38 m. cypress shingles, $4	152.00
970 ft. ⅞x2¼ face, y. p. flg., first floor, $45	43.65
980 ft. ⅞x3¼ face, star y. p. flg., sec. floor, $30	29.40
Total lumber bill	$635.78

MILL WORK.

23 porch columns, $2	$46.00
2 half columns, $1.10	2.20
33 lineal ft. porch rail, 10c	3.30
10 curves, 50c each	5.00
1,300 ft. 5/16x1⅜ lattice, 50c	6.50
120 lineal ft. 1x4, w. p. finish, $45	1.80
140 ft. 2 inch watertable, 1c	1.40
150 ft. ⅞ cove, ½c	.75
130 ft. 1½ in. bed mold, 1c	1.30
6 corbel brackets, 50c	3.00
4 cellar window frames, 12x14, 3 lt. $1.75	7.00
4 cellar sash, 12x14, 3 lt., $1.25	5.00
1 front door frame, 3′0″x8′0″, nob. 1¾	3.50
1 rear door frame, 3′0″x7′0″, nob 1¾	3.00
1 cellar door frame, 3′0″7′0″, 1¾″	2.75
1 cellar door, 3′0″x7′0″x1¾	4.50
1 twin window frame, 28x24	4.50
1 twin window frame, 32x34	4.80
1 triple frame, 1 wd. 32x24 and 2 wds. 18x34	6.75
1 sash door frame, 4′x7′6″	3.50
1 sash frame, 20x24	1.50
1 window frame, 28x24	2.25
1 window frame, 32x32	2.40
6 window frames, 28x20, $2.25	13.50
3 window frames, 32x24, $2.25	6.75
1 window frame, 32x34	2.25

WINDOW.

3 windows, 28x24, top sash divided, $2.50	4.50
3 windows, 32x34, top sash divided, $3.00	9.00
4 windows, 32x24, top sash divided, $2.75	11.00
2 windows, 18x34, top sash divided, $2	4.00
1 window, 32x32, top sash divided	3.00
6 windows, 28x20, top sash divided, $2.25	13.50
1 sash, 20x24, divided	1.50
2 sash doors, 2′0″x7′6″, $3.50	7.00
2 set jambs, cased openings, 4′0″7′0″, $1	2.00
7 set jambs, 2′10″x6′10″, 80c	5.60
5 set jambs, 2′6″x6′10″, 70c	3.50
1 set jambs, 2′6″x6′6″	.70
1 front door, 3′0″x8′0″x1¾	18.00
1 rear door, 3′10″x7′0″x1¾	6.00
1 vestibule door, 3′0″x7′0″x1¾	16.00
1 set jambs, 3′0″x7′0″	.90
7 doors, 2′10″x6′10″x1⅜, $4	28.00
5 doors, 2′6″x6′10″x1⅜, $3.75	18.75
1 door, 2′6″x6′6″x1⅜	3.50
64 plinth blocks, 8c	5.12
128 ft. side casings, 8 ft. length, 3c	.84
3, 12 ft. side casings, 6 ft. length, 3c drs	9.36
240 ft. side casings, 6 ft. length, 3c wds	7.20
174 ft. head casings, 8 ft. length, 3c	5.22
180 ft. cap mold, 2½c	4.40
170 ft. cap mold, ½c	.85
88 ft. window stool, 2c	1.76
88 ft. apron, 2c	1.76
252 ft. door stop, 1c, 14 ft	2.52
260 ft. window stop, ¾c, 14 ft	1.35
500 ft. base, 5c	25.00
500 ft, floor mold, ½c	2.50
250 ft. picture mold, 11½c	3.75
Main stairs	60.00
Dresser	25.00
Total mill work	$461.28

CARPENTER LABOR.

8,660 ft. framing lumber at $8	$69.28
400 ft. porch floor, $1.50	6.00
942 ft. ceiling, $1.50	14.13
4,700 ft. sheathing, $8	37.60
38 m. shingles, $2	76.00
1,950 ft. finish floor, $2	39.00
1,800 ft. smoothing, $1.50	27.00
350 ft. cornice, 8c	28.00
Setting frames	11.40
Finishing 20 windows, $2	40.00
Finishing vestibule door	4.50
Finishing front door	3.50
Finishing rear door	2.00
Finishing cellar door	2.00
Finishing double acting door	4.00
Finishing cased openings	4.00
Finishing 12 inside doors, $3	36.00
Finishing 500 ft. base, 5c	25.00
Finishing 4 cellar window frames, $1.25	5.00
Finishing front stairs	27.00
Finishing picture mold	3.75
Finishing outside porch steps	6.00
Finishing outside porch rail	4.00
Lattice work	12.00
Pantry work	15.00
Closets	4.50
Inside cellar stairs	8.00
Outside cellar stairs	6.00
Total carpenter labor	$518.66

RECAPITULATION.

Excavating and masonry	$374.40
Lumber bill	635.78
Mill work	461.28
Carpenter labor	518.66
Hardware and nails	52.00
Tin work	27.00
Plastering	199.80
Plumbing	250.00
Electric wiring	45.00
Mantel	85.00
Painting	185.00
Heating	135.00
Incidentals, 5 per cent	148.44
Total estimate	$3,117.36

There are within the walls of this building 19,000 cubic feet, which makes the cost of construction approximately 16¼c per cubic foot.

EDITORIAL NOTES AND COMMENT

The outlook in the building trades is quite encouraging.

* * *

A survey of "Contracts to be let," and work proposed, warrant optimism, and indicates more than usual activity in all branches of trade.

* * *

The financial conditions continue to improve, and there seems to be a decided advancement in the volume of business transactions. While the gain is very gradual and conservative, there is every evidence that the improvement will be lasting. Reports from all over the country show the condition of the national and international money market to be in an easy condition. This general prosperity cannot help but affect the building business favorably as people are coming more and more to believe in investing their money in real estate and in building office and apartment buildings which will bring in an income that will not be subject to the uncertainties of a stock market.

* * *

The unusually severe weather during last month (January), seems to have made things pretty lively for plumbers and firemen, and what with frozen and bursted pipes, forced and overheated stoves and furnaces, people in the northern part of the country were kept in a state of unrest for quite a period. The losses that can be traced directly to the recent "cold spell" will run well up into the hundreds of millions, and yet, as Puck said: "What fools these mortals be," for they still keep on building defective fire and frost inviting structures, the destruction of which often means the loss of millions of dollars.

* * *

That has happened which all men dreaded, the burning of a skyscraper—strange indeed that it has not happened before. Fortunately it occurred out of business hours. Had it been during business hours there would have been a hundred people in it for one who was there. Fortunately the Equitable building is one of the very oldest of the skyscraping class, once the wonder of New York now a pigmy among giants. Being one of the earliest of such buildings it is fair to assume that its fire conditions were among the very worst. The elevators were not running. Whether, if they had been, it would have been any better for the unfortunate victims is matter of surmise. The elevator shaft is a splendid flue for smoke and superheated air, should these develop within reach of it.

* * *

It is said of the more modern buildings that you could build a fire in any part of them, and it would do no more than a local damage. Many people are skeptical as to the possibility of making any building really fireproof. This is a mistake. In Germany, where it is not permitted to collect insurance on the full value of any building in which a fire originates, apartment houses have long been the rule, but no one runs out for a fire in a neighboring apartment. In Italy many old buildings are absolutely fire proof, and such, let us hope, are the majority of these extraordinary buildings, some of which have a population during business hours of ten and twelve thousand, representing, counting those dependent on them, a city full of people. Even in the Equitable building there was evidence of the fireproofings of parts, as witness the preserving of the valuable papers and securities in the vaults. Here were small rooms subjected to tremendous heat, that were fireproof enough to protect the contents of the rooms. This fact in itself is a lesson that might be worthy of serious consideration.

* * *

True, the Equitable Life building was admittedly not fireproof, and therefore its destruction throws no light on the question whether the so-called fireproof buildings are in reality absolutely safe. Neither was the Equitable building a very high one, as New York structures go today, and just for that reason the incidents connected with its burning suggest at least two practical lessons to the civic authorities of towns and cities. One is that no building should be allowed to run higher than three stories unless it is absolutely fireproof; the other is that the maximum height of a building should be determined by the width of the street on which it fronts. No building should be higher than the measure of the width of street it faces, measuring from the base of the building to the building line on the opposite side.

* * *

To allow the erection of high buildings that are not absolutely fireproof, is to put a premium on the destruction of human life. It has often been found in practice that it is difficult for people to escape from a third story of a burning building, and the danger increases in geometrical progression with every additional story. Moreover, as every fire in a high building proves, the narrowness of the ordinary street greatly increases the difficulty of the firemen, and the working of the fire-extinguishing apparatus, and thus adds to the danger of widespread conflagration. It is seldom difficult for firemen to rescue inmates from a second or third story, but it is often a task of great danger to take them out of a fourth; it becomes practically impossible to save them when they are in a seventh or even a sixth. To think of hundreds of helpless men and girls at work in the upper flats of some high building in our cities should be enough to convince members of municipal corporations of the necessity of constraining proprietors to safeguard, as far as practicable, all non-fireproof high buildings, and of preventing the erection of any more structures of the dangerous sort, and these measures should be strictly enforced regardless of circumstances.

* * *

A federal judge has administered a strong and merited rebuke to the grand jury that indicted for kidnapping, the detective who captured the McNamaras and to the state court which arrested him and held him to heavy bail. The state court naturally acted under the state law, which forbade extradition from the state court. This legislation was an assertion of state rights at the expense of public justice. It is pronounced by the federal court to have been beyond the powers of the legislature, as it contravened a federal statute. The passing of it suggests an extraordinary lack of confidence in federal justice or else sympathy with criminals. The action of the grand jury can only be put down to sympathy with workingmen, or the fear of terrorists.

DAYLIGHT

By E. B. BIRKENBEUEL

IT IS AS strange as it is true that the best things in life are the easiest to get, if one only half tries. Since people first saw the sunshine on the earth they have cowered in the shade. Not content with shade, they built houses that were dark as well as warm, and poorly ventilated. Seeing it done every day prevents us from wondering why house builders will insist on shutting out light and air. Dungeon cells of the other days often had but one small window, and sometimes none at all, not merely for security but for punishment. Dungeons going out of style their builders turned house-builders, and now we have windowless houses.

When planning your house, first remember that the primary object is to protect one from the elements. If an especially dark room is wanted for photographic purposes it should be designed with that end in view. If a room is wanted for living, eating, playing, working, or sleeping, or even for a store-room or clothes press, make it have windows; make it have enough of them to let in every ray of light and breath of air that tries to enter. And if the room is not to be used at all, then by all means give it light. Don't enclose any space with four walls and a door, for when you open that door happiness steps out, never to return.

And so it is that the best things we have in life come in at our windows, glass or no glass. So give us plenty, you who plan; give us big ones, you who build, and shadows will scatter, and the musty ghosts of lonesome discontent will vanish with the stirring of the air.

HANFORD, CAL., November 23, 1911.

Mr. Fred T. Hodgson, Chicago.

Dear Sir:—I wish to express my best regards for the really good paper, THE NATIONAL BUILDER. About two years ago I came to this country, customs and language strange to me. By reading, if I could say so then, your valuable paper, I pretty soon became familiar with the different technic and terms used in this country, and I hope to stay a steady, ready reader, even if I go back to my old country.

Yours very truly,

E. FECHNER.

PEARL FOR MARQUETERIE

THE use of mother-of-pearl is a time-honored practice among cabinet makers, and some particulars as to its source and character will be of very general interest to workers in wood. Mother-of-pearl shells are found on the Pacific coasts of North and South America, in the islands of the Pacific Ocean, in the Philippines, on the coasts of Australia and in the adjacent islands, on the coasts of India and in the islands of the East Indian Archipelago, in the Persian Gulf, in the Red Sea, and in Zanzibar. These shells, which form an important article of commerce, are largely used for inlaying furniture, musical instruments, Japanese and Chinese lacquer work, European lacquer, and papier-mache work. In the colony of Tahiti mother-of-pearl shells are found chiefly in the Tuamotu (or Low) Archipelago, which embraces the Tuamotu (or Paumotu) and the Gambier Islands, and extends in a southeasterly and northwesterly direction for 1,000 miles, the greatest width of this belt of islands being 300 miles. With only a few exceptions the eighty-two islands composing this archipelago are now low-lying atolls of coral formation, narrow strips of land forming a chain of islands and islets, in most cases separately by passes of water and stretches of partially submerged coral reefs.

WHERE THE SHELLS ARE PRODUCED.

While shells are produced in all the islands they are found of good quality and in paying quantities in fewer than one-fourth of the lagoons. The time for the opening and closing of the diving season, which usually lasts from May 1st to November 1st, and the names of the islands open for the season are published months in advance in the "Official Journal" of Tahiti, together with the regulations to be observed and the penalties for their violation. The large islands are divided into three sections, only one of which is open during a season, and the small lagoons also are open only once every three years. This year there were open thirteen sections and lagoons, some of the latter being insignificant. Before the opening of the season Papeete merchants send to the islands schooners laden with supplies, which are stored in portable houses built chiefly of corrugated iron.

The shells in the lagoons are regarded as the property of any natives who will dive for them, but as almost all the good divers live in the Tuamotus they reap the profits of the diving season. The schooners transport the divers and their families from other islands to those open for taking the shells. These people carry with them pigs, bread, and other things to give to the islanders, among whom they are to live for some months. The merchants advance supplies to the divers and also furnish them lumber to make their boats, each of which is constructed of three boards of California redwood and provided with an outrigger to steady it in the lagoon. During the season a favorite island presents a lively scene with its encampment of as many as 1,000 men, women and children.

DIVING FOR SHELLS.

The hours for diving are from 9 to 2. The diver paddles his canoe out into the lagoon and anchors it, and, if he happens to hit upon a good place, he may not move his boat during the five hours. A basket to hold the shells is let down by a rope tied to the boat. On the end of another small rope, also tied to the canoe, is a piece of lead weighing from fifteen to twenty pounds. The diver, who wears only a narrow loin cloth, places one foot upon the lead, with the rope between his toes, stretches the rope with one hand held against his chest, utters several loud yells to empty his lungs, refills them quickly with pure air, and descends rapidly, feet foremost, to the bottom of the lagoon. His goggles exclude the water and enable him to see from twelve to fifteen feet. He tears the shells from their supports, usually a piece of dead coral, to which they are firmly fastened. He may fill the basket with thirty or thirty-five pounds of shells at once, and he may have to dive several times to fill it. When his time is up the diver ascends by means of the rope, and immediately wipes himself dry with a towel. He rests and warms himself in the sun from ten to fifteen minutes before going down again. A good diver will go down from twenty to twenty-five times in the five diving hours. As the basket is filled it is drawn up and the shells are emptied into the boat. The man's wife, or some other member of his family, who accompanies him in the canoe, occupies herself by opening the shells, putting the contents in a bucket and washing the shells, from which she also removes the barbs.

A PRECARIOUS OCCUPATION.

This colony has the best divers in the world. They dive all the way from 6 to 120 feet (rarely more) in their work, and remain under water a minute and a half for the average man, two to two and one-half minutes for a good diver, and three minutes for a few exceptional experts. Among the pearl divers of Ceylon the highest record is 110 seconds. Diving for shells is hard and wearing work. Like many other industries, it exacts its toll of human life. At the beginning of each season the nose and ears of the diver bleed when he comes up out of the water, and sometimes he vomits blood. His eyes become affected and paralysis of the arms and legs is not uncommon. He is at his best between the ages of twenty and twenty-five; after thirty he begins to decline and is able to dive less and less as he grows older. Boys who wish to become divers for shells begin to practice soon after entering their teens. Between fifteen and seventeen, when they have not yet learned the limit of their capacity, they occasionally stay down a little too long, and give out before the boat is reached by the rope. It is said by those well informed that half a dozen men usually lose their lives in this manner during each season.

More than thirty diving machines were imported from the United States and used during the seasons of 1903 and 1904, but the authorities feared that the supply of shells might be depleted and the use of machines was interdicted before the merchants realized any net profits from their use.

CHARACTER OF SHELLS PRODUCED.

Mother-of-pearl shells are the calcareous covering of the bivalve pearl oyster Melcagrina margaritifera. This mollusk thrives best in lagoons where it is protected from heavy seas and shifting sand. It is necessary for it to have some sort of support, such as dead coral, stones, or wood, to which it may attach its shell by means of its byssus. The shells produced in this colony are of the black-edged variety and are the best of the kind found in the world. As they are brought to Tahiti for exportation they are known in the markets of the world as Tahiti black-edged shells. The dark edge is from a half to three-fourths of an inch in width. The rest of the inside is of a bright pearly appearance, with iridescent hues around a wide border, including the dark edge, the play of these shifting rainbow colors being extremely beautiful as the shell is moved in the light. Many fine large specimens of these shells may be seen in Tahiti homes, where they serve as ornaments. The smaller ones would make attractive desert plates. The outside of the shells is quite rough, but it also takes a fine polish and then reflects iridescent hues as effectively as the bright inside does.

EXPORT OF SHELLS.

Local schooners bring the shells in bags or in bulk to Papeete, the commercial center of the colony. The work of assorting the shells according to size and quality is done chiefly by native women, who also help men to pack them in strong boxes with a capacity of about 225 pounds each. Nearly all Tahiti shells are shipped by way of New Zealand to London, which is the world's greatest market for this particular article of commerce.

AN ODD FIND

THE discovery of garnets and gold in blasting away rock for the foundation of the Hotel McAlpin, at Herald Square, New York City, is regarded by Mr. Frank M. Andrews, president and architect of the world's largest hostelry as an unusually lucky omen, spelling undoubted success for his enormous enterprise, and Mr. Andrews is so impressed by this find that he has decided upon a novel scheme to put the precious ore and gems to some practical use. Gimbel Brothers have been conferred with for the construction of an artistically finished round top marble pedestal, fifteen inches in diameter which is to be inlaid with garnets and gold taken from the McAlpin excavation. Gimbel Brothers' expert jeweler, who has charge of this curious undertaking, declares that the execution of this contract is quite possible and Mr. Andrews' representatives are now engaged in mining the quartz and mica in order to secure enough garnets and gold to carry out this project and a beautiful artistic effect is promised. The pedestal will probably be one of the features of the McAlpin reception room and will be considered by Mr. Andrews as a mascot of his largest and most important architectural feat. It is hoped that the pedestal will be finished within the next four months, when it will be placed on exhibition in Gimbel Brothers' jewelry store.



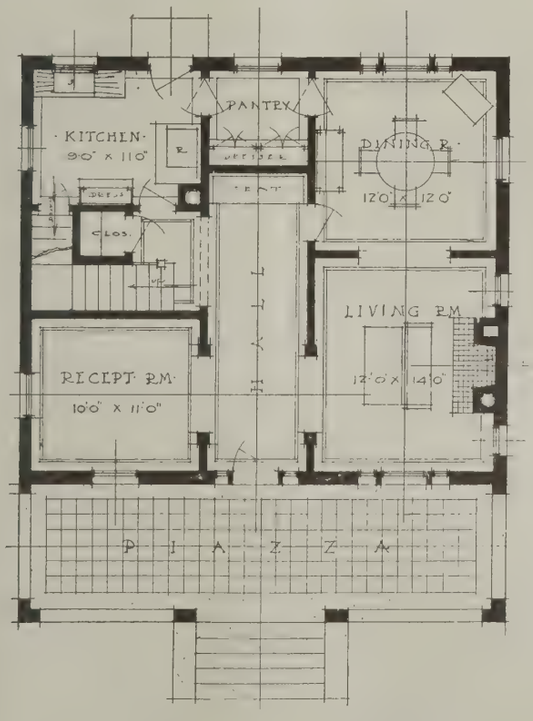
Frederick P. Stafford, Architect.

A CONCRETE RESIDENCE

By FREDERICK J. MESEKE

Herewith is presented an attractive two-story house at Ossining, N. Y., as designed and built by Mr. Frederick P. Stafford of Briarcliff Manor, N. Y. The house being plain and straightforward, an excellent example of concrete construction, is therefore most adaptable for the suburbanite.

A piazza extending the entire width of the house has been



FIRST FLOOR PLAN

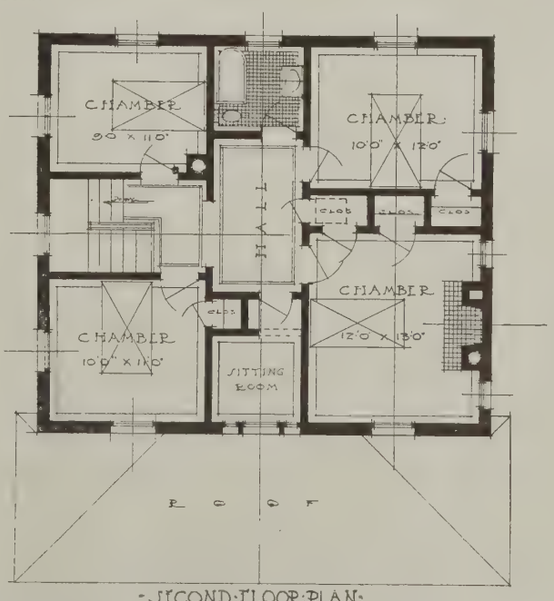
arranged for enclosure during the winter months, thereby affording a luxurious sun parlor.

The foundations, 9 inches in thickness, extending below the frost line where not excavated, are of reinforced concrete. The cellar is well ventilated and lighted by ample windows. The floor is of concrete with cement finish.

The exterior walls above grade are of reinforced concrete 6 inches thick, furred 4 inches on the inside with the rough lumber that was used in the forms, then lathed and finally plastered, as is the entire house. The furring has been done to avoid any possible dampness striking through the plaster. This scheme provides a warm house in winter and a cool house in summer.

The partitions are of 3-inch concrete blocks. The floors are of 5-inch slabs and have all necessary beams and girders.

The stairs, with the exception of the cellar stairs, which have a cement finish, are entirely of concrete covered with wooden treads and risers.



SECOND FLOOR PLAN

Concrete has been used for the entire fireplace.

The exterior finish is slightly rough and the roof is covered with tin.

The entire cost of the house, including the plumbing, heating and lighting, was but slightly more than $5,000.

Another way to finish the exterior of such a house would be obtained by using small pieces of brick or warm-colored stone or marble in the aggregate.

EXTENDING THE FIELD OF THE POWER SAW

By J. CROW TAYLOR

GRADUALLY the planing mill and the builder are getting closer together, or to state it more specifically, there is a gradual extending of the field of power-driven woodworking tools into building operations itself.

Some of this extension is obtained by way of doing more of the work in the planing mills before it is sent out, and another extension of it is in taking machinery right on the job to do lots of work that heretofore was done by hand.

Especially is the power-driven saw extending more and more into building operations. It is not really robbing the hand saw of any of its prestige or usefulness. It is simply coming on to help out. There are probably more hand saws being used today than ever before and more work being done by them, yet they do a much less share of the total work.

The work required has been increased wonderfully and many new factories have entered. For one thing the preparing of false work for concrete calls for so much ripping and cross-cutting that the power-driven equipment is really essential. Moreover, the greater quantity of heavy work to do and the necessity of helping out hand labor in some way so as to accomplish it has brought the power-driven rip-saw into the building operations in several forms.

There is the rip and cross-cut saw table proper, and there is the band saw, which is used both for ripping and shaping and, accompanying this is the pony planer sometimes. However, it is the power-driven saw that is extending its way wonderfully into what was formerly a field of hand labor in building operations and the up-to-date builder must take cognizance of it and keep step with the times if he would get his share of the work and obtain a fair profit therefrom.

It is not merely the cutting of stuff for false work and the cutting, with power appliances, of bridging and other small items of which great quantities are needed, but we are getting to the point where much of the framing and cutting of rough lumber itself can and should be done by power-driven saws.

Some of it, as stated, can be done by the planing mill or in the shop at home by having plans and specifications laid out so thoroughly that all the dimensions can be framed. That is only one end of the work, however. The other one is bringing right on to the work itself power saws, either electric power or gasoline, depending on which the local conditions favor.

It is found that a power-driven saw is not only convenient in cutting and shaping regular stock, but now and then while one is at work on the job there is wanted a special width or shape that calls for ripping or sending back to the mill or somewhere to get it. Here is where the power-driven saw comes in handy and really helps pay for itself. One can rip not only straight lined square edge stock of any width that may be desired, but also rip at various angles by using jacks and cut tapering strips and do a wonderful lot of work that formerly had to be done laboriously with a rip-saw, hand-axe, and plane.

In fact, the power-driven saw is such a convenience that notwithstanding the use of power-driven machinery in the carpenter's and builder's shop at home it will be a part of the tool equipment of the future on the job. There will be portable power-driven saws to do lots of the work formerly done by hand saws. Hand saws will still be carried on the job and used perhaps as much as ever, but we must remember that there is lots more work being done than formerly, and it would be practically impossible to get help enough to do all that was formerly done by main strength and elbow grease and that the cost of lumber has gotten to the point where one must economize in its manipulation by the use of labor-saving devices of this kind.

Cleaning Stained Marble

If the marble is polished you do not want to use any cleanser that will injure the polish. Hence use this: Take equal parts by weight of ox gall (fresh from the beef if possible), pulverized soap, and pipe clay, to which add a little turpentine. Apply a heavy coating of this to the marble and let it become perfectly dry, when it may be rubbed off and the part washed with soft warm water. A second treatment is sometimes necessary.—Master Painter.

GOTHIC ARCH OF DOUBLE CURVATURE

By JOHN Y. DUNLOP

THE introduction of the arch as an architectural form led through the Basilica to the construction of those glorious Gothic Cathedrals, which were erected in the middle age. At this time, the Gothic masons were exhausting the possibilities of stone as a building material. They heaped it up in towers that rose on open archways through the lofty roofs of the surrounding naves and tapered away in shell-like spires, embroidered in all the fret work of Gothic tracery.

Later in the Thirteenth Century the Gothic spirit, taking account of mechanical forces, employed material at hand according

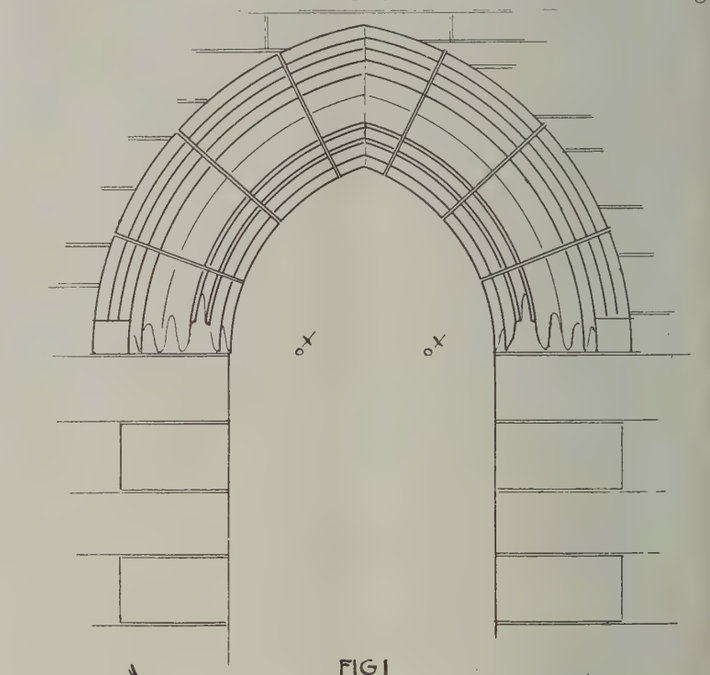


FIG 1



FIG 2

to their nature: it sought for those laws of elasticity and equilibrium, which were to be substituted for those of inert stability, the only laws known to the Greeks and Romans.

They also studied very closely how to economize material, because it was the force to elevate human labor from being the mere carrier of material to the highest form of technical art and skill.

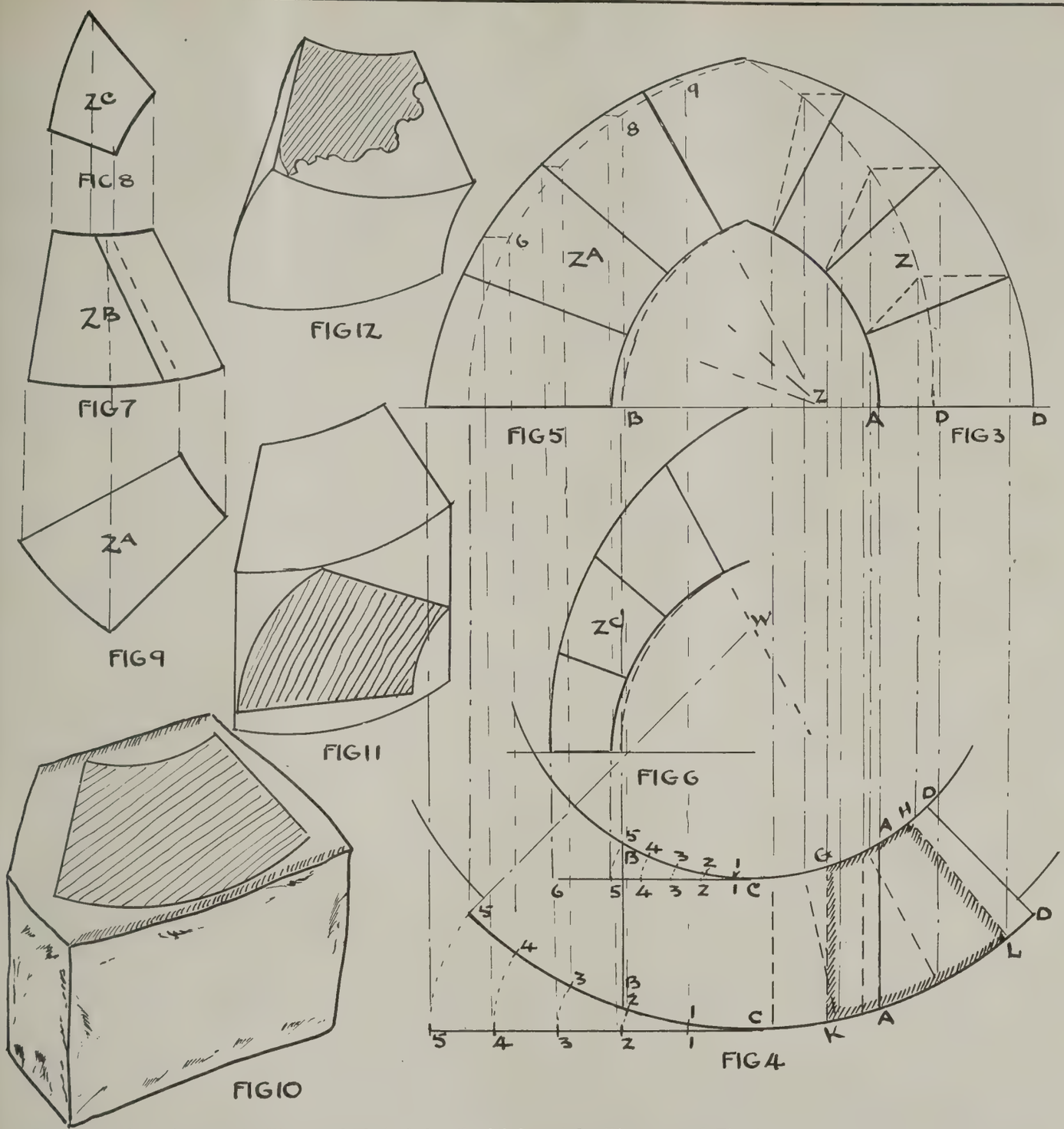
Amongst the early Gothic architects, the arch absolutely determined the form of the support. The arch again determined not only the structure, but the form which it took, and the architecture was dictated solely by the arch. Thus, the material through the form which it dictates may be said to influence architecture in this period.

It should also be observed that the Gothic architects of western Europe had at hand stone that was strong and hard, but which split in thin pieces—they had not at their disposal either the marbles of Pentelicus nor the blocks of granite which the Romans procured from Corsica and the East. Thus, they were compelled to erect considerable building with thin courses of stone, whereas other nations erected small buildings with large blocks of marble.

Figure 1 shows the elevation of a Gothic doorway circle or plan, the wall of the tower being built with irregular coursed rubble.

Figure 2 shows the plan of the opening, with the moulded soffit of the arch intersecting on the circular jamb.

To set up the elevation for the face moulds:



Draw the plan of the arch, Fig. 4, which includes the label moulding and the elevation, Fig. 3.

Set off the joints on the face and back of the arch and proceed to develop the left half of the face.

Set off the straight line C5 and develop the face of the arch C5 on to it.

Set off ordinates from the developed line and take projector across from the points 6, 7, 8 and 9.

Describe a quadrant through the points obtained.

Develop the curve on the soffit in the same way and draw the radiating points to pass through Z.

To obtain the development of the concave side, develop each circle on the back of the arch. C6 shows the development of the line C5 into a right line—the rest of the drawing is similar to that adopted for the face arch and will be easily understood.

Figure 6 shows the complete development.

The moulds required for the working of each arch block are a bed mould and two face moulds, one for the face of the block and the other for the concave side.

The face moulds are now obtained, but required to be separated. Figure 8 and Fig. 9.

Figure 4 shows the bed mould of the second stone in the arch GHKL, and ZA and ZC is the face mould of the same stone, and Fig. 7 the mould for the same stone on the opposite side.

To work the second arch stone:

The stone for the arch block should be large enough to work the bed mould square through Fig. 10. If there is a broken corner in the rough block, it should be arranged for the corner where the stone has to be cut away.

Work the two beds, bottom and top, parallel to each other and of the height of the face mould.

Scribe on the bed mould, Fig. 10, on both ends. Next, work the concave and the convex faces through.

Now scribe the face mould, Fig. 11, on the convex face and the mould ZC on the concave face. Next, work the arch joints, which are winding or warped surface, and should be worked similar to the soffit of a winder step.

Cut the soffit and the outside of the arch block.

To complete the block, scribe on the joint mould of the arch and cut the soffit moulding through.

PLANNING A PLANING MILL

By CHAS. CLOUKEY

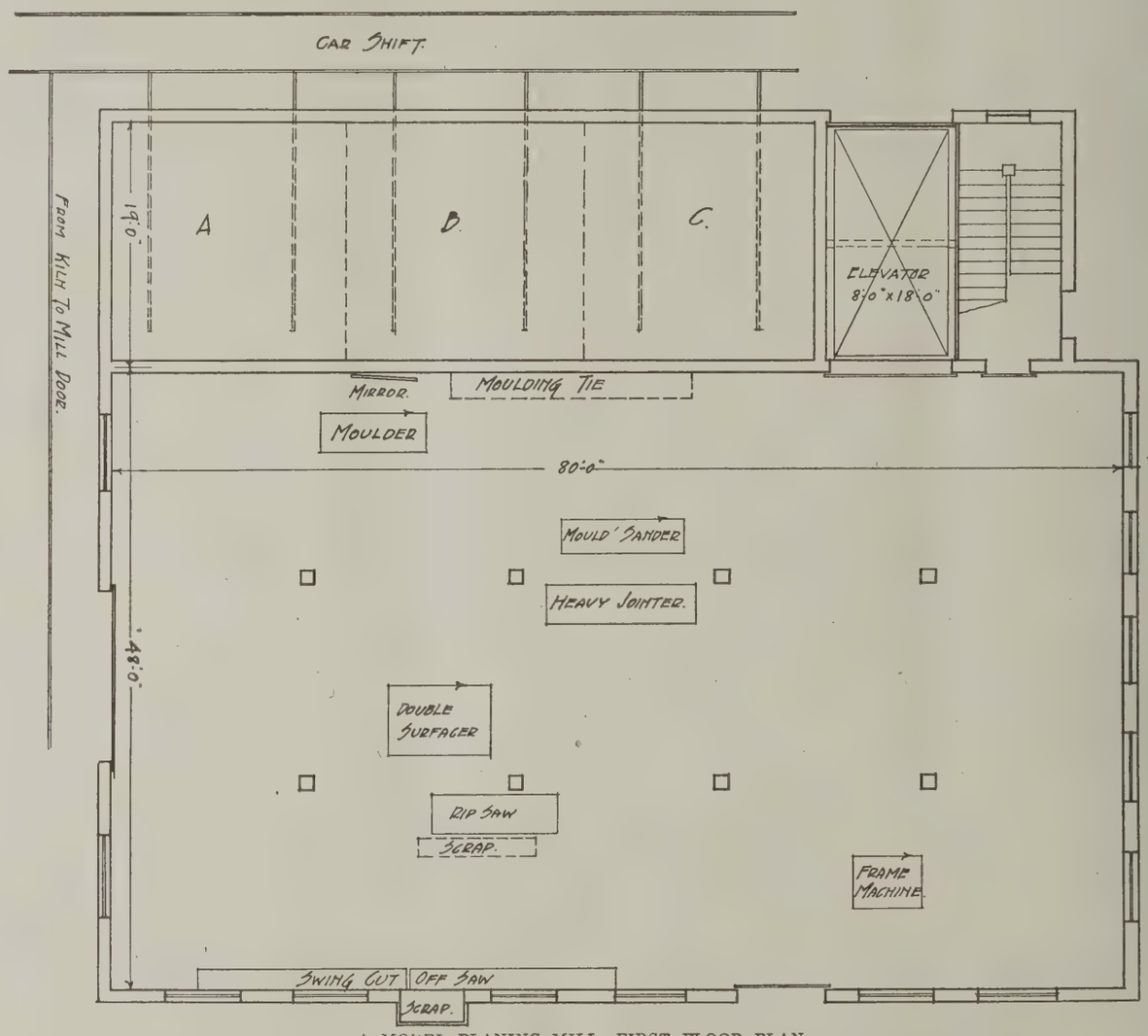
When about to take up the important task of making plans for a small planing mill there are so many things to be considered besides the necessary or desirable machines, that it is almost necessary to know the location of the proposed site before anything definite can be offered.

As this request comes to me in a general way and is desired to embrace the salient points of a common want in small planing mills, including certain provisions for enlarging by and by, I am offering the two floor plans with their respective arrangements of machines, which I will take the pains to explain at some length.

The term "planing mill" as used here means a factory for the manufacture of sash, doors, and the general run of building mill work. By a small planing mill is meant one having but one set of the necessary machines, and to plan it so as to build on later to advantage, means that few if any of the original machines must be moved in order to accommodate the larger business. It also means that some extra expense must be put into the original plant, but this lies mainly in making the building more substantial. In the item of dry kiln as shown in this plan, it is larger than would be needed for the size of factory planned, but when the capacity of the mill is doubled, the kiln would not be too big. However, it is not a waste of room to use part of the original kiln for storage of dry lumber or completed mill-work, and it would not be necessary to pipe the whole kiln until it was needed for drying purposes.

In the beginning of this subject, I wish to lay down a few fundamental principles of factory practice, and while they seem simple and perhaps of little consequence, they are really so far-reaching in their importance as to make the difference between a struggle for existence and the smooth working of a profitable business.

In the first place there must be a route of progress from the lumber sheds to the loading of the finished product. This naturally means that the planer, rip saw, jointer and cut-off saws must be placed in the end of the mill nearest the lumber yard. And when I say in the end of the mill, it means that one of the most important features of a mill like this is to have the course of progress lengthwise of the building. This is necessary on account of trucking the material and also on account of building on to the end of the building away from the lumber yard and sheds.



A MODEL PLANING MILL—FIRST FLOOR PLAN.

The plan here given contemplates building the addition on to the end of the old building near the elevator, and if it is necessary to build it in any other position, the plan would have to be modified to suit. But in all the planning we must not lose sight of the fact that the material is to pass through the building lengthwise.

To return to the trucking feature, it cannot be emphasized too much, that very little material in a factory like this should ever touch the floors. The floors should be stout and smooth no matter of what material made. Perhaps the worst material to put in a factory floor is common soft wood of any kind having large or small knots in it. If it is to be wood, maple is good and so is edge grain yellow pine or western fir. If it is concrete so much the better for the trucks and for the fire risks.

A careful study of the plan submitted will show that the posts supporting the second floor and the roof are about 16 feet apart each way, and that the machines are drawn and located in proportion to those distances. It will also be observed that on the lower floor the scheme of handling the material on trucks can be carried out with ample room if the stuff is kept on the trucks so as to be moved with facility.

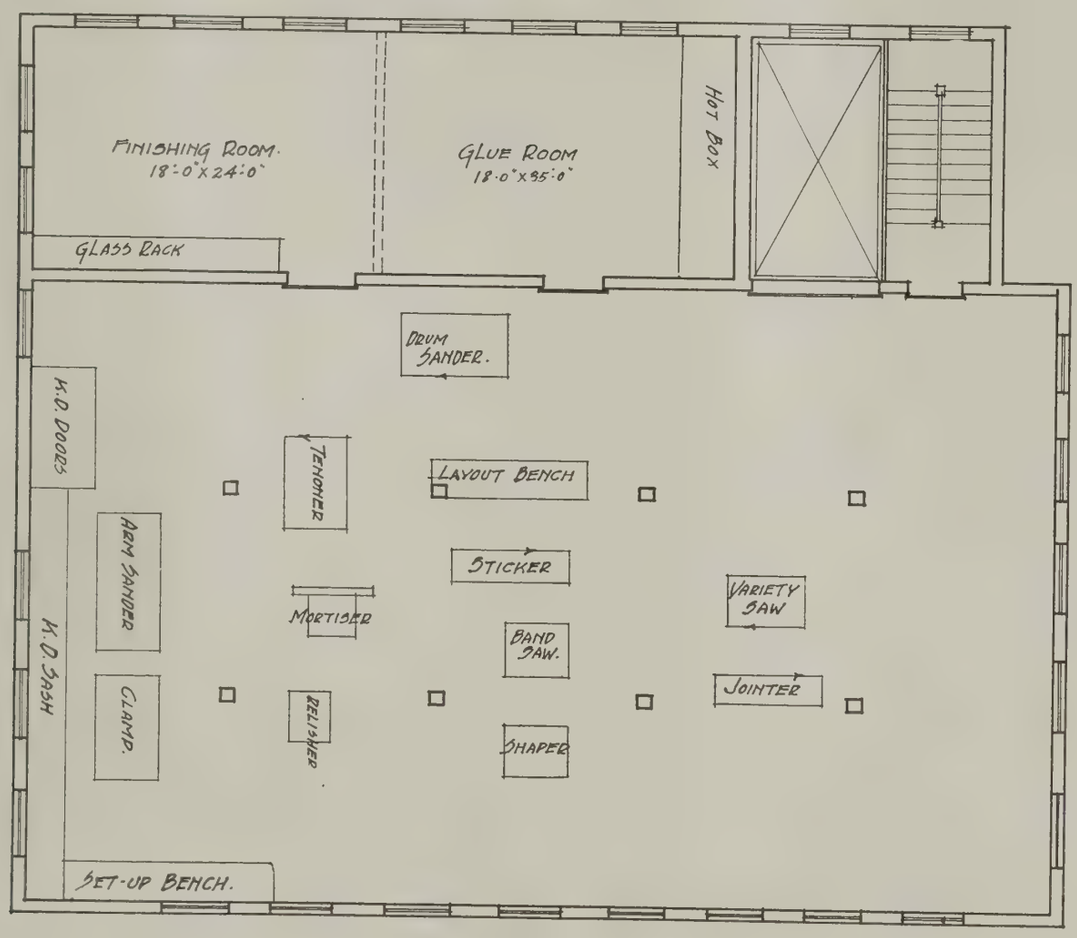
By the side of the rip saw should be kept a truck for strips

and edgings as the room here is somewhat limited, but the trucks may be shifted out by the side of the cut off saw or in front of the planer, as there will be room between the planer and the material to be put through it if properly piled or if placed on trucks.

The moulder is placed on the left hand side of the room, and in case of extension, another machine may be placed immediately beside it. The moulding sander is located by the side of the jointer but feeds toward the back of the building, while the jointer feeds toward the planer. Perhaps a small factory would not need the moulding sander, and if not, there would be all the more room for the storage of loaded and empty trucks in the space between the jointer and the moulder. There must be plenty of trucks. In a mill of the size indicated here, there should be at least two trucks for every man employed in the mill. Material piled on the floors in the way and men and boys handling stuff over and outside elevator door may be hung on weights to slide up, or it may be hung on a track and slid under the stair platform, provided the space in the stairway is as wide as the door.

It will be noticed that there is a fire wall between the dry kiln and the factory, and that this extends to the top of the building. The elevator and stairway are included in one fire wall space and all of the doors are sliding doors. These doors should be covered with sheet iron with asbestos sheathing underneath.

I have not indicated just what the dry kiln should be except as to size, and that it is divided into three compartments. The partitions in the kiln may be made of brick or they may be made of heavy canvas to be rolled up in case it is desirable to open the kiln all into one room. The kiln cars should be designed so as to run out onto a truck on the shift track so as to be shifted from one compartment to another or run around to the mill door without



SECOND FLOOR PLAN.

carrying it about a few pieces at a time will soon pay interest on a hundred trucks. They not only save on the stuff with which they are loaded, but they save by not having that same material piled on the floors in the way of other material to be handled. Have plenty of trucks. The best size is 2 ft. wide by 4 ft. long with removable stakes.

Another feature almost as important as the ones already mentioned, is that of having the elevator big enough. It is not so important just how big a load it will lift, as it is to have the platform big enough to acommodate the material likely to be carried on it. As in most factories of this kind, I have planned to have the drum sander on the second floor, and this makes it necessary to take a good deal of long stuff up on the elevator. The platform should be long enough to accommodate 18 ft. boards, and the frame of the same should be open to a height of 8 ft. This may call for a little extra expense in the elevator itself and in the housing for the same, but it will be blessed many a time when there are large fixtures to be taken down.

Also, the elevator should open out upon the yard as shown, or upon the street as the case may be, so as to be able to stop on the level of the wagons. This makes easy and quick work of loading, and that is a saving not to be despised. When loading out car lots the factory trucks may be run from the elevator on to the wagons and hauled to the car without a separate handling. The unloading. However, this feature can be dispensed with in the beginning and installed when the factory is enlarged.

The fire wall next to the kiln shuts off light from the outside, but plenty of light can be had for the moulder by placing a mirror on the wall so as to reflect the light from the windows to the working parts of the machine.

At the swing cut-off saw will be seen a scrap box built out from the main wall of the building with a door on the outside. As it is necessary to build out for a saw recess, it will not cost very much more to add enough room to make the scrap box, and it is mighty nice to not have any of this scrap piled inside of the mill.

The back end of the mill is intended for both machine and bench work on window and door frames, for it is better to not have this work taken to the second floor if there is room below. As this department has but one or two machines all of its own, it can be easily moved to any convenient location.

Considering the second floor, we find the variety saw and jointer facing each other, and as they are used so much in conjunction, it is a real saving to have them located this way. The band saw seems to be somewhat crowded, but as a band saw table is higher than the other machines, they will not interfere seriously with its operation.

The three sash and door machines that come first in the regu-

lar course of the work are placed in a very convenient relation to each other. After the stock goes through the sticker it has to be sorted, part of it going to the relisher and the stiles and checks ready for the bench or the stock racks. From the relisher the stock is right at the set-up bench and next to this bench is the clamp, and then the arm sander. If the stock is anything else than check-rail stuff it will be taken across the room to the drum sander.

The drum sander is the only machine which has a questionable location, and for a small mill this is not so bad. If the mill should be enlarged a better place might be found for this machine. The only objection to its location as shown here is that it would obstruct the doors to the finishing room and glue room more or less while it is running. However, in a small mill the several classes of work may be accommodated to each other without serious loss of time. The position of the sander will permit the running of any length material desired.

It will be seen that special care has been taken to locate the machines so that they will not interfere with each other, and that they will also accommodate work of unusual length. For instance, the tenoner is set so that extra long stuff may extend into the door to the finishing room; feeding room is clear from the arm sander to the sticker; stuff 25 ft. long can be ripped on the variety saw; the mortiser has a clear space of 16 ft. on one side and 30 ft. on the other; and material from the drum sander may pass out of the window directly behind the machine.

The matter of windows has been treated in rather an off-hand way, but a safe rule for factory windows is to put them in as large and as close together as can be done without weakening the walls of the building. So much depends upon the neighboring buildings, that local conditions must necessarily prevail in the number, size and location of windows. If considerable light is cut off from the sides there should be built enough skylights to make up the deficiency.

The plan shows the k. d. sash rack in front of three windows, but in reality the racks are built around the windows, leaving the window opening through the racks.

The finishing room is planned to serve as a glazing room as well, but in case the mill was increased in size it would probably be necessary to move the finishing room to some other location and use the whole room for glue work.

All the wall space from the set-up bench clear around to the elevator may be used for cabinet benches, and should accommodate at least ten bench men.

I have not given a place to a jig saw, as a small mill can easily get along without one, but if it were to be put in there is room between the shaper and the relisher. If the small mill must be very economical in the way of machines to start with, it may cut out the moulding sander, jointer and frame machine down stairs, and the relisher and drum sander up stairs, but if the builder expects to do a good business he will be able to earn a very satisfactory interest on the investment as planned here.

This factory as planned can be run at a small profit with ten good men if the business handled is capable of a fair margin according to the best manufacturing standards, and the same mill, without any additions can easily use 40 men if the work is distributed to all departments so as to keep a man at each machine most of the time.

A distinctive feature of this mill is that there is truck room between all the machines and between the machines and the posts, and if the most is made of this privilege, a large amount of material may be worked through with little confusion and delay.

The machines are so grouped as to be driven from a single line of shafting crosswise of the building, and if the mill should be extended in length, another lineshaft farther down the room would take care of the new machinery unless an electric installment was made.

It would be a waste of time and gray matter to make a plan for the belting and shafting for this mill, or for the exhaust pipe system. If individual motors were used and not directly connected machines, some of the machines might have to be moved a little from the positions shown, in order to use the proper length of belts.

The plan does not deal with the lumber sheds nor with the power plant if there is one, as they are things better figured out according to the lay of the available ground. I will say, however, that the lumber sheds should be close to the front or planer side of the mill and should slope considerably from the sheds to the door of the mill so as to make easy work of carting in lumber.

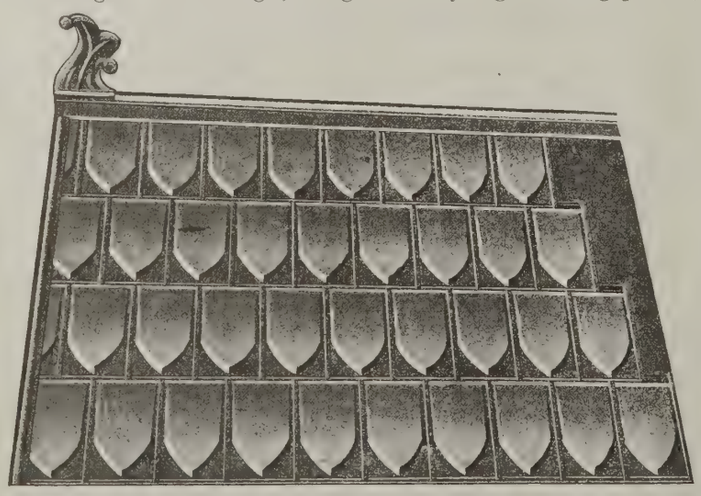
Perhaps from the suggestions herewith submitted, those who are contemplating the building of small mills may cull some ideas of value and so get first off some of the benefits which have come to others as the wage of heart-breaking toil and discouragement.

METAL SHINGLES

By H. M. SANDERS

IT IS claimed, we believe, that the first successful metal shingle for a roof covering, was introduced by a man by the name of Cooper of Jersey City, N. J., in 1885.

This may be true as to the introduction of a metal shingle called a galvanized shingle, being coated by a galvanizing process,



dipped in tanks of molten zinc or spelter, which secures a plated metal called galvanized iron. But it is also on record that three (3) years prior to this date, 1885, and in the year 1882, tin shingles were made and introduced by a Mr. Walters of the same city—Jersey City, N. J., so that it would appear that metal shingles were first introduced on the market twenty-nine years ago, or at least since 1882.

Like the introduction of other material for a specific purpose, the inception of the idea grew partly at least and primarily, perhaps, out of the condition of the times. This being the case, it presents the question of the whys and whyfores of the change to other material for that purpose. What is the object by so doing, and what is the advantage to be gained in making the change? If it be an improvement on the wood shingle, it must be a material which will not warp or crack, and measureably speaking, will act as a protection against fires. In other words, be an incombustible material.

The metal shingles seem to meet all these requirements, and have stood the test of endurance for a quarter of a century or more. For an ornamental roof finish, the ornamental shingle is perhaps the most attractive, and will not warp, crack or break. But the nature and character of the metal shingle, being a thin, light metal, it needs to be stiffened and made rigid by means of raised surfaces, in order that it may show a good outline finish as a roof, and at the same time act as a preventative in stormy weather under the changing climatic conditions, against leaks in the roof.

Shingles of this character cannot be safely used on roofs where its pitch is less than a quarter pitch; that is, three inches in twelve inch pitch. A third, or steeper, pitch is better.

In the illustration herewith given, we have shown but one of the many ornamental patterns of this metal shingle now on the market, with its method of construction and application.

Fig. 1 shows the point of the roof at which to commence laying the metal shingle roof, at the lower left hand corner. It also shows five full and one-half shingle in position, the second course breaking joints with the first, each layer or course commencing with a full shingle, being followed with the alternative half slate. This, when completed, forms the more finished roof, as shown in Fig. 2.

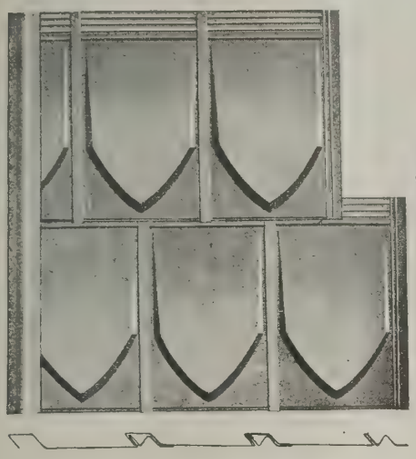
Fig. 3 shows pattern of valley lining into which the shingles are locked after being cut to the proper angle.

Fig. 4 is a section of the hip mould, with a socket on each side to receive the top end of the bracket.

Fig. 5 is a sectional view of a deck mould, and Fig. 6, a sec-

tion of the hip with its receptive socket for the shingles the same as the ridge mould as shown in Fig. 4.

In Fig. 8 we come to a constructive feature in the metal shingle, the interlocking of the side seams of the shingles. We call attention to this one especially, as we believe it was the first method introduced, and dates back to 1882. It will be noted that the lower shingle is nailed through flange as shown in Fig. 8. Two nails on each shingle, one near the top and the other about three inches from the bottom of the shingle. At the time this method of construction of the side of the shingle was introduced, its use was only anticipated for the shingles. Three years later in 1885, a





Mr. Cooper, already spoken of, conceived the idea of using galvanized shingles instead of the tin, and also introduced the interlocking device for the side seams of the shingle, as shown in Fig. 8. Apparently there was no great change in the bottom or top finish of the shingles, except so far as to meet the change in the style of the ornamental face of the shingle.

Fig. 9 shows method of attaching the bottom of shingle to the eaves of the roof, in this case to a metal gutter with the top of the back edge of the gutter turned out one inch, and the bottom edge of the shingle locked on to it.

Fig. 10 gives us an idea of how the top edge of each shingle is finished, with ribbed sections across to top from one side to the other, also showing how the bottom edge of the next course of shingles laps down closely over the lower rib to prevent driving storms from driving up over the ribs. These ribs across the top of the shingle, as will be observed by referring to Fig. 1, extend only to the locked edge on each side, allowing for the side, interlocking edges to extend the whole length of the shingle.

These shingles, whether of 1C tin or galvanized iron, are first cut to size, 7x10 or 10x14, as the case may be, out of the black sheet and then tinned or galvanized. This process gives a better finish to the face of the shingle, as malleable heat can be applied to the metal before stamping the same.

The weight of a metal shingle roof is very light as compared to other roofs, varying per square (100 square feet) from 95 to 110 lbs., while the weight of a shingle roof per square is about 400 lbs.

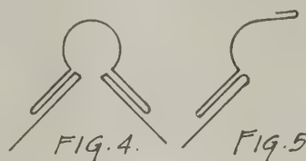


FIG. 4. FIG. 5. FIG. 6.

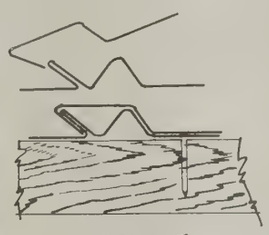


FIG. 7.

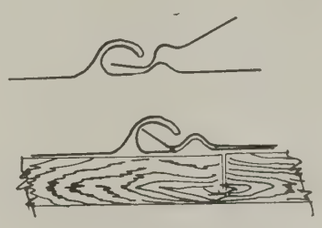


FIG. 8.

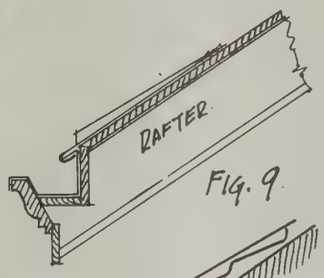


FIG. 9.

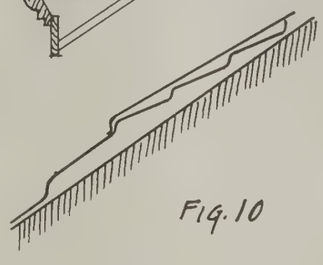


FIG. 10

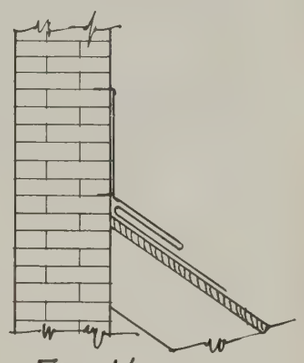


FIG. 11.

Thus, it can be readily seen that the metal shingle permits a much lighter construction of the frame of the roof than the shingled roof. Some of these roofs of metal shingles that were put on twenty-five years ago are in a fairly good condition today. This applies, we believe, to the tin or galvanized shingle.

The roof should be covered with a layer of roofing felt before putting on the shingles, and the shingles should be painted both sides and well dried before laying. After being laid, give it a coat of Metallic Paint—the sooner the better.

THE MOST DURABLE PAINT

By A. ASHMUN KELLY

The paint that proves durable to the utmost possible in one place, may fail entirely when used in another place or for a different purpose. Hence the question as to what constitutes a durable paint hinges upon this consideration, What is it to be used for? For instance, a paint that is durable on general upright exterior work will not prove durable on a porch floor, nor will it answer for a tin roof. Metals require certain paints that will not do so well on wood, and vice versa. In brief, each part of the structure requires its own specific paint.

The most durable paint for a tin roof is that made from a good and very finely pulverized oxide of iron paint, thinned with pure raw linseed oil, adding also a small portion of good brown japan driers. At certain seasons of the year the paint will be made more durable by the omission of the driers. Linseed oil is a natural or self-drier, and will dry in a certain number of hours, although brown oxide is not a self drier, and needs usually some help in this direction, say in cold or threatening weather.

The most durable paint for the exterior of a house and similar structures is composed of such pigment material as may be best adapted for the locality and climate. Thus ordinarily white lead and raw linseed oil and a little drier form a durable paint. The addition of most color-matter tends to make it more durable. The less driers used the more durable the paint.

The most durable paint for a floor, whether inside or outside, will be made from pigments that are not soft, and we find yellow ochre of the best grade the most useful pigment for this purpose. Its color, when added to white lead and some zinc, may be changed by the addition of other pigments, and the addition of some red lead tends to harden the paint, while some add a little good hard gum copal varnish, but a good formula may be made up as follows: Equal parts of white lead and zinc white, color as desired, and thinned with a mixture of raw linseed oil and half as much turpentine, with a liberal addition of driers.

The durability of any paint will depend to a great extent upon certain conditions of climate, weather, material to be coated, and manner of application, so that it does not rest solely upon the paint itself. It is well to bear this fact in mind. Damp weather, unseasoned lumber, lack of skill in the application of the paint, these factors will largely determine the durability of a paint, for no matter how excellent the paint, it will not prove durable in spite of adverse circumstances. A rather poor paint in the hands of a skilled painter will give better results, as a general thing, than a good paint will in the hands of an unskilled painter. The good workman will begin at the foundation, and build up to a good finish. (To be Continued.)

OUR FEBRUARY COMPETITION

One of the hardest things to do is to decide between the merits of a number of articles on different subjects.

In this competition we have decided to give the $10 prize to Mr. Zimmerman on account of the illustrations and the business-like way in which he has built up his reputation from a small start.

We believe every reader of THE NATIONAL BUILDER will be benefited by reading his article.

HOW TO KEEP BUSY IN WINTER

By DEWIT C. ZIMMERMAN

A carpenter to keep busy in winter should have a shop. It is also necessary that the shop be in a good location to get work. Then the carpenter should have the ability to handle a shop with machinery—we are not all adapted to machinery. In addition

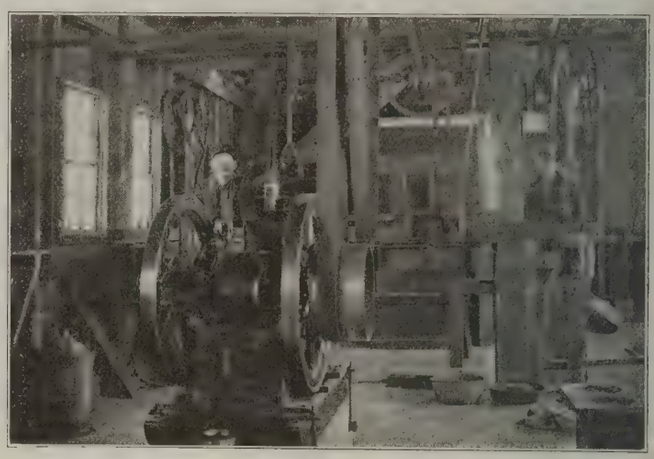


THE SHOP.

to this, he must have the ability to get work—to go after it and when he does get it, to leave his customer satisfied. That is the best way to advertise.

Some of my experiences: The day following the blowing up of the battleship Maine, I built my first shop, 8x12x8 feet high, with just room enough for a bench, a little stove and a grindstone. I then built a windmill to run the stone, which worked all right when the wind blew. As I was good at grinding tools, I began looking for such jobs as sharpening knives, lawn mowers, scissors, etc., and made a good day's pay out of this work every week. The customers that came were satisfied and sent me others. That was a great lesson to learn—others were advertising my work!

Remember, I am a carpenter and doing this work on the side on such days as we were unable to work on the job. The grinding business increased so that I felt obliged to get power more reliable than a windmill, so I bought a second-hand 3 H. P. steam engine, and the 8x12-foot shop then being too small, I put on an addition, 8x8-feet, making my shop 8x20-feet. Later, I made some fly screens for myself, which so pleased my neighbors that they wanted screens too. This produced a complication: I had lots of screens to build and no machinery to do it with; my steam engine was too slow—it took too long to get up steam; my shop was too small to keep much lumber on hand. So I cut the shop in two, moved it apart and built in between, mak-



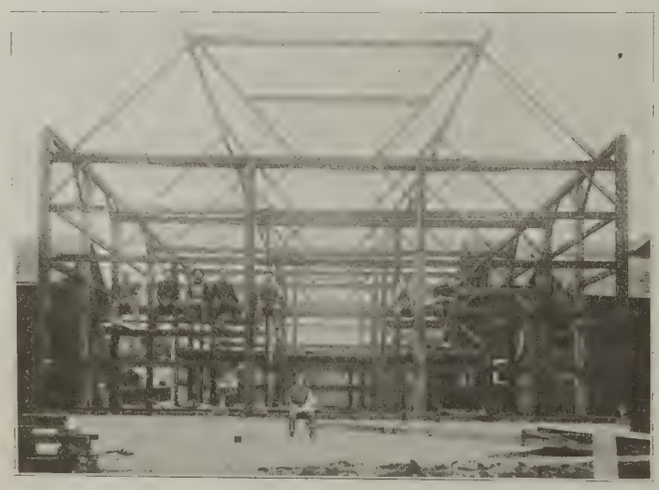
FIRST FLOOR OF SHOP.

ing my shop 14x20-feet, and determined to have the best power I could get, I bought a 4 H. P. gasoline engine built by the International Harvester Co., which I believe is the best engine on the market today. I then took my old steam engine, which was



SECOND FLOOR OF SHOP.

an upright, turned it upside down, raised it from the floor about five feet and made a mortise machine out of it, which works fine. Then I bought a piece of shaft 1½ by 3 feet long, had a ½-inch hole drilled in the end with a set nut to hold a drill



PHOTOGRAPHS OF WORK UNDER CONSTRUCTION AID IN OBTAINING MORE WORK.



USING NEW BUILDINGS FOR JUDICIOUS ADVERTISING.

chuck. After mounting this on a frame with an adjustable table attached, I had a boring machine. I then rigged up a bandsaw and began to build screens.

My shop soon became the attraction of the whole town. I had to work nights until quite late, and couldn't keep up at that. One day when I had laid off from my regular job to get caught up with my orders a man came in my shop with two saws to have filed. He said: "Why aren't you working on the job?" I told him I had so much work of my own that I had to lay off and catch up with my work. He said he was going to build a house and wanted to know if I would do the job and called my attention to the fact that, having a good shop, I could do a lot of the millwork there. I took the job and built all my window and door frames in the shop, but finding the shop was too small, and having a chance to buy a building 20x40-feet, I bought it and remodeled it, putting in a cement floor down stairs, and now have a shop.

I am in the building business today. At this writing I have two houses on the go and over five hundred screens to build by spring, and not one of those screen orders did I solicit. I am going to send you a photograph (Fig. 1) of my first house under construction. The photograph is not a good one, but it will show you how I began to advertise, and before that house was finished, I had a job to build one of the best and largest barns in this part of the state. This barn was built of old car timbers that had some nails in, and the carpenters when framing would often cut into a nail. I had my gasoline engine and my old grindstone on the job, and maybe they didn't help some. A photograph of that barn under construction is shown in Fig. 2.

My shop today is 20x40-feet, two stories high, equipped with a 6 H. P. gasoline engine, my boring machine and mortiser. I made a turning lathe, cutoff and rip saws, hand saw, and my old grindstone is still there. My tools are always sharp. It takes five gallons of gasoline to run my shop eight hour good hard running. I also have a wood worker. I do a great deal of my millwork; for instance, I take rippings—good lumber that some would throw on the woodpile—and make screen moulding out of them that otherwise would cost one-half cent per foot.

About those brothers that are out of work in winter, tell them for me to put up a shop. If they are not able to build a fair-sized one, put up a small one. It will build a larger one for them and may be the means of building them.

SOME WELL DESIGNED FLOWER GARDENS

By IDA D. BENNETT

(Continued from January.)

PLAN "C"—A ROUND GARDEN.

May be constructed in almost any situation, in the center of a lawn, at the side or rear of the house or anywhere where one finds a convenient space for it and may be as ornamental in character, according to its accessories and planting, as one may wish.

The plan is a simple circle with four straight walks extending from circumference to circumference, but broken in the center by a smaller circle which may be utilized as a place for a water-pool, a summer house, surrounded with turf, a beautiful tree—often the possession of a notable tree on the lawn will suggest the plotting of a garden of this sort about it and a most charming result will be achieved.

A sun dial may be effectively displayed on such a circle of turf or a lawn table with gay colored Japanese umbrella and encircling seats will furnish a delightful place for afternoon tea or the sipping of iced drinks on a hot day.

In laying out a garden of this sort it will only be necessary to find the exact center of the plot and with a garden line first mark off the inner circle. If this is to be surrounded with a paved walk of any kind, a second circle three feet wide should be drawn about this and other circle should mark the outmost boundaries of the garden.

The laying out of the beds will be accomplished by simply drawing four straight lines across the circle at equal distances apart and marking off, on each side of these other parallel lines as the boundaries of the walks; these should, for convenience be about three feet wide, the resulting beds will be quite narrow at the start, but will widen rapidly until, in the rear, they assume quite dignified proportions.

Where a bed of this sort occurs in the midst of a lawn it will be best to fill the beds with low-growing plants of uniform height, but where it occurs at the side or rear so that only one side debouches upon the lawn a different and much more interesting treatment is possible. It will be possible to plant those beds directly in front with low-growing annuals or with roses, or annuals may be used in the two front beds, roses in the beds on either side, perennials in the outside beds of the rear division and shrubbery in the last two. In planting these rear beds the taller shrubs and perennials should be massed towards the rear and center of the beds, the lower growths towards the front and sides, this gives graduated masses of foliage and bloom that is much more effective than uniform height.

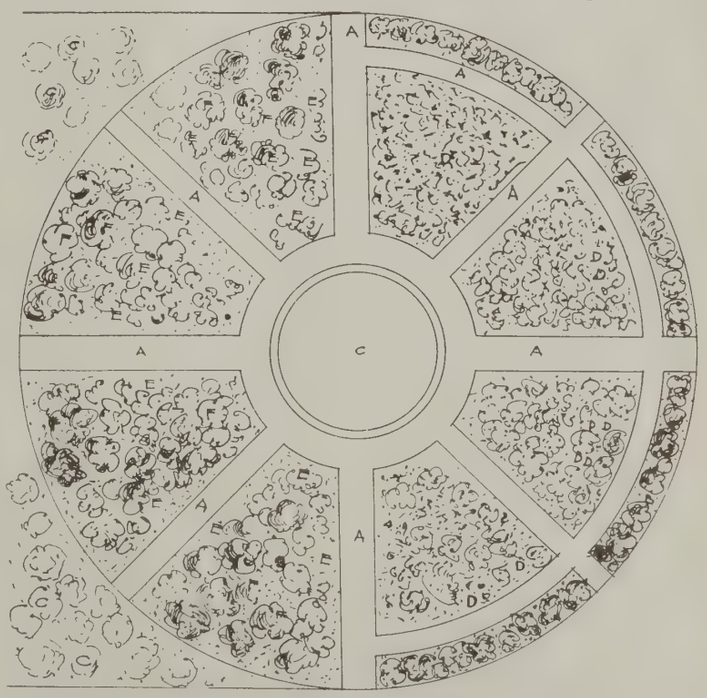
It will be noticed that a narrow circle is cut off from the front part of this design and this is again separated from the main plot by a still narrower circle. The idea, here, is to make a narrow bed of some low-growing flower, preferably pansies about the front of the garden and to separate it from the rest of the plot by a narrow walk. A circling bed of pansies against the green of the sward is the most effective manner of growing these lovely flowers and so varied are the colors that they may be found to harmonize with almost any color scheme—or lack of it, that may be decided upon.

Other low-growing flowers—as sweet alyssum, dwarf nasturtiums, verbenas, phlox dromundi, heliotrope and the like may be substituted for the pansies with good effect, but nothing, in my opinion, is quite so lovely as these.

If one wishes the rear of the garden to be square, then a straight line across the rear will accomplish the result and the resulting triangles may be filled with flowering or ornamental trees or with evergreens, using lower-growing shrubs for the beds and so retaining the outline of the circle.

If roses are a feature of any part of the planting, then a summer house covered with ramblers will be appropriate for the center.

The walks here may be constructed of cement, laid in brick, of gravel or even of hard coal ashes and cinders, which last makes excellent, hard, clean walks, always dry in the morning or after



a rain and springy and easy to walk on; best of all they cost practically nothing and furnish an easy disposition of ashes. In laying paths of this material it is best to have the ashes sifted and if this has not been done in the cellar as they were used it may be done as the paths are laid by aid of a mason's gravel sieve. A few feet of rough ashes may be laid on the path to start with and raked smooth; then the sieve should be placed in front and the ashes thrown through it, the screened ashes falling on top of those already placed and the cinders at the foot of the screen where they should be spread out, the screen moved in front of them and ashes sifted through to cover them. In this way a very even, smooth path results which the first hard rain will pack even and hard. Such a path is far pleasanter to work on than one of gravel or expensive brick or cement.

BUILDERS' REFERENCE TABLES

By J. GRANT ROBINSON, Architect

(Continued from January, 1912.)

The formulas for strength are used as follows, both giving the same results:

(A) Safe load in pounds $= \frac{2b \times (D \times D) \times C}{L}$

(B) Safe load in pounds $= \frac{2a'' \times D}{L \times C}$

Note: a is area of joist in square inches,
b is breadth of joist in inches,
d is depth of joist in inches,
C is coefficient for the different woods as given below,
L is length between supports in feet.

No. 3. The value of C and C :

Long leaf yellow pine	C = 120
Long leaf yellow pine	C = 100
Short leaf yellow pine	C = 90
Texas yellow pine	C = 90
Oregon pine	C = 90
Spruce	C = 70
Hemlock	C = 60

Explanation of formula as per A: Desired to find the safe load in pounds a 2x12 spruce joist will carry, $2 \times 2 = 4 \times (12 \times 12)$ or $144 \times 4 = 576 \times 70 = 40{,}320 \div 20'0'' = 2{,}016$ pounds safe load that the joist will carry, or a trifle over 75 pounds for each square foot of floor.

Note: To find the safe load of a joist (beam) spaced 16" per square foot of floor, divide the total safe load by 4 and multiply by 3, then divide the result by the length of the beam.

Formula to find the width of a joist (beam) when the depth and length and load are given:

$$\text{Breadth in inches} = \frac{\text{Span in feet} \times \text{load}}{2 \times \text{square of depth} \times C}$$

Note: Desired to find the thickness of a joist 12" deep by 20'0" long and a load of 2,016 pounds, $2{,}016 \times 20 = 40{,}320 \div (2 \times 144) = 288 \times 70 = 20{,}160$; now $20{,}160 \div 40{,}320 = 2''$ thick.

Note: The ends of joist (beam) should rest 4" on a wall or girder when possible, but never less than the safe load of the wood used in compression for cross-grain. (See note for girder.)

Rafter inclined: The tables can be used for rafters also, by taking the lengths in the tables for the horizontal length of the rafter for the span; the same formula is used as for a level joist or beam.

STIRRUP IRON OR JOIST HANGERS

Below is a table of sizes of iron that should be used in stirrups:

Size of Joist.	Size of Iron.
2x 6 in. to 2 x12 in.	¼x2 in.
3x 8 in. to 3 x12 in.	¼x2½ in.
4x 8 in. to 4 x12 in.	⅜x2½ in.
6x12 in. to 4 x14 in.	½x3½ in.
8x12 in. to 6 x14 in.	½x4 in.
8x14 in. to 10x14 in.	⅝x4 in.

Girders: See tables No. 6, 7 and 8; Plate I: A girder carries a much greater load than a joist or beam and the length alone does not determine the load area it supports. First, to find the area of floor supported by a girder, we take the full length of the girder between supports and half the distance on each side to the next nearest wall or girder. Note: Suppose a mill building was 36 ft. 0 in. wide and had two rows of columns and girders, equally spaced from each wall and spaced 12 ft. 0 in. center to center, and the girders ran from column to column, then the girders would be, say, 12 ft. 0 in. apart and 12 ft. 0 in. from each wall, and 12 ft. 0 in. long; we find in that case that each girder has to support $12 \times 12 = 144$ square feet of floor.

Note: Desired to carry a live load of 150 pounds and a dead load of 50 pounds, or a total load of 200 pounds per square foot of floor, or $200 \times 144 = 28{,}800$ pounds in all. Now to find an Oregon pine girder to safely carry the above load, the girder is 12 ft. 0 in. long and we will assume 14 in. deep; by looking in table No. 7 on Plate I, under 14 in. and 12 ft. 0 in. long, we find 2,940 pounds. Now $28{,}800 \div 2{,}940 =$ not quite 10 in., so we will take a 14x10 in. stick to carry the load.

Floor joist and beams for mill and all houses can be computed in the same manner, no matter how spaced; on tables No. 6, 7 and 8 you will find two sets of figures in the same spaces; the bottom figures are for strength, the top are for stiffness, and sometimes called deflection, and should be used as stated in tables, and in January notes.

Formula for stiffness:

$$\text{Safe load} = \frac{8 \times \text{breadth} \times \text{cube of depth} \times e}{5 \times \text{square of span}}$$

or

$$\text{Breadth of beams} = \frac{5 \times \text{load} \times \text{square of span}}{8 \times \text{cube of depth} \times e}$$

The value of e, 1/30 in. and for 1/40 in. per ft. span:

Long leaf yellow pine	137	103
Oregon pine	110	82
Short leaf yellow pine	110	82
Spruce	100	75
Hemlock	80	60

The tables in Plate I are figured for 1/30 of an inch per foot of span.

For the safe compression strength of timber across grain, see table below:

No. 6.

For white oak	600 pounds per square in. of cross section.
Long leaf yellow pine	500 pounds per square in. of cross section.
Short leaf yellow pine	450 pounds per square in. of cross section.
Texas yellow pine	450 pounds per square in. of cross section.
Oregon pine	400 pounds per square in. of cross section.
Spruce & Norway pine	250 pounds per square in. of cross section.
Hemlock and cypress	200 pounds per square in. of cross section.
California redwood	175 pounds per square in. of cross section.

NOTES ON STIRRUP IRONS AND WALLS.

The end bearing of a girder on a wall, post, cap or stirrup iron should be large enough not to exceed the safe load as given in the table above.

Desired to determine the end bearing of 8x12 in. yellow pine girder carrying a load of 36,000 pounds. Each end will therefore support one-half of the load, or 18,000 pounds; divide 18,000 by 500, the safe load for square inch = 36 sq. in. bearing. As the girder is 8 in. wide, the bearing must be $36 \div 8 = 4\frac{1}{2}$ in. wide, and 5 in. wide would be the right width to use. To find the least thickness, we will divide the 18,000 pounds by the safe strength of iron in tension, which is 12,000 pounds per square inch of metal, so $18{,}000 \div 12{,}000 = 1\frac{1}{2}$ square inches = ⅜ inches thick; but the stirrup should be made ½x4 inches. Where a girder rests on a wall it should have a bearing at least 8 inches and if the thickness of wall permits it should be up to 12 inches for very heavy loads, and should have a steel or cast iron plate or stone template under the end to distribute the load over a sufficiently large surface of the wall to safely carry the loads.

As the strength of masonry varies largely according to the quality of material used, workmanship, and age, it is impossible to give absolute figures for safe unit pressure for all classes of work, but the values given below are believed to fairly represent those for the usual kinds of ordinary architectural masonry. To compute the size and thickness of plates, it is necessary to use the bearing strength of masonry per square inch of surface.

SAFE LOADS FOR MASONRY.

Common brick laid in lime mortar	160 pounds
Common brick laid in Portland cement mortar	250 pounds
Portland cement concrete	250 pounds
Rosendale cement concrete	200 pounds
Stone work in lime mortar	110 pounds
Stone work in Portland cement mortar	150 pounds

Desired to find the size of thickness of a cast iron plate under the ends of a yellow pine 8x12 in. girder, resting 6 in. on wall, carrying a load of 36,000 pounds, bearing on a brick wall laid in Portland cement mortar; now each end will have a load of one-half or 18,000 pounds, so 18,000 pounds $\div$ 250 = 72 square inches. Now the girder bears 6 in. on the wall, will make the plate $72 \div 6 = 12$ in., and the projection each side of girder will be $12 - 8 \div 2 = 2$ in. (To be continued.)

PLATE 2. STANDARD I-BEAMS TO BE USED AS FLOOR BEAMS AND GIRDERS.

Compiled by J.G. Robinson, Architect.

Tables giving the uniformly distributed safe loads in pounds per lineal foot

Notes on the use of these tables.

Figures above the heavy lines are based on coefficient of strength as given by Carnegie hand-book. Fibre stress taken at 16000 pounds per sq. in. Figures below heavy line based on deflection just under 1/30 in. per foot of span

Example— What 7" beams, spaced 4'0" on centers, and 14'0" span, will carry a total load of 140 lbs. per square foot of floor. The load per lineal foot is 4 × 140 = 560. Follow across the 14 ft. line to the 7" columns. A 7"/15# I will carry 564#, and should be used.

Length in feet.	9" I Beams				8" I Beams				7" I Beams			6" I-Beams			5" I Beams.			4" I Beams				3" I-Beams.			Length in feet.
	21#	25#	30#	35#	18#	20.5#	23#	25.5#	15#	17.5#	20#	12.25#	14.75#	17.25#	9.75#	12.25#	14.75#	7.5#	8.5#	9.5#	10.5#	5.5#	6.5#	7.5#	
5	8050	8720	9670	10600	6075	6470	6880	7300	4420	4780	5150	3100	3410	3725	2065	2323	2588	1272	1356	1440	1524	704	765	828	5
6	5590	6060	6720	7370	4220	4400	4780	5075	3070	3320	3575	2150	2370	2588	1434	1614	1795	883	942	1000	1060	488	531	576	6
7	4110	4450	4930	5410	3100	3300	3510	3730	2255	2440	2630	1583	1742	1900	1053	1184	1318	648	692	735	778	312	338	363	7
8	3150	3410	3780	4140	2370	2530	2690	2850	1726	1868	2010	1210	1334	1456	806	907	1010	497	530	562	596	209	226	243	8
9	2490	2700	2990	3270	1875	2000	2126	2252	1365	1476	1590	957	1053	1150	637	718	798	354	378	398	419	147	159	171	9
10	2013	2179	2415	2650	1517	1616	1720	1825	1104	1194	1280	775	853	931	516	581	646	257	275	287	305	107	116	124	10
11	1663	1802	2000	2194	1254	1336	1420	1510	913	988	1063	641	705	770	392	441	492								11
12	1396	1512	1675	1838	1053	1123	1194	1267	764	830	894	538	592	647	301	338	378								12
13	1190	1290	1430	1568	898	958	1011	1080	654	707	762	426	469	512	236	266	297								13
14	1026	1110	1232	1352	775	826	878	932	564	610	657	342	377	411											14
15	894	968	1074	1178	675	719	765	812	461	498	537	277	305	333											15
16	787	852	945	1035	593	632	672	713	380	410	442														16
17	697	755	837	917	498	530	564	598	317	343	369														17
18	622	673	747	817	418	446	475	503																	18
19	531	575	637	700	356	379	403	428																	19
20	456	495	547	600	305	325	346	367																	20
21	394	426	472	518																					21
22	343	372	412	472																					22

Length in feet.	15" I Beams													12" I Beams						10" I-Beams				Length in feet.
	42#	45#	50#	55#	60#	65#	70#	75#	80#	85#	90#	95#	100#	31.5#	35#	40#	45#	50#	55#	25#	30#	35#	40#	
8	9820	10130	10740	11360	13540	14130	14730	15360	17700	18200	18800	19400	20000	6000	6330	7480	7940	8430	8320	4075	4475	4880	5290	8
9	7760	8010	8500	8980	10710	11160	11630	12140	13970	14370	14880	15330	15800	4740	5010	5900	6270	6670	7050	3220	3540	3865	4080	9
10	6283	6482	6875	7262	8661	9046	9438	9830	11319	11630	12023	12415	12807	3837	4058	4781	5079	5392	5706	2605	2863	3124	3385	10
11	5190	5365	5680	6020	7165	7430	7800	8120	9370	9620	9930	10260	10600	3170	3350	3950	4200	4460	4720	2153	2368	2586	2800	11
12	4361	4500	4770	5050	6020	6275	6550	6825	7870	8080	8350	8620	8900	2665	2815	3320	3530	3745	3965	1810	1990	2170	2850	12
13	3714	3832	4070	4310	5130	5360	5580	5820	6700	6880	7120	7350	7580	2270	2400	2830	3005	3190	3380	1542	1693	1850	2005	13
14	3205	3310	3510	3710	4425	4620	4820	5020	5780	5930	6130	6340	6530	1957	2070	2440	2592	2750	2910	1330	1460	1595	1728	14
15	2790	2880	3060	3230	3850	4020	4180	4370	5030	5170	5340	5520	5700	1704	1802	2121	2255	2394	2540	1157	1270	1388	1505	15
16	2451	2532	2688	2840	3390	3530	3685	3840	4425	4550	4700	4850	5000	1498	1584	1866	1986	2108	2230	1018	1118	1222	1323	16
17	2171	2245	2377	2514	2996	3130	3260	3400	3920	4030	4160	4300	4450	1327	1404	1654	1756	1866	1975	902	990	1081	1172	17
18	1938	2000	2125	2245	2672	2792	2910	3030	3500	3590	3710	3830	3955	1185	1250	1475	1567	1665	1763	804	884	965	1045	18
19	1740	1795	1905	2010	2400	2508	2610	2720	3135	3220	3330	3440	3550	1063	1123	1324	1406	1494	1582	722	793	866	938	19
20	1570	1620	1720	1816	2167	2260	2355	2455	2830	2910	3010	3110	3200	960	1014	1194	1270	1348	1426	652	716	782	847	20
21	1424	1470	1560	1650	1966	2050	2140	2230	2570	2640	2730	2820	2908	871	920	1083	1152	1223	1295	566	622	678	735	21
22	1296	1338	1420	1502	1790	1868	1946	2030	2340	2405	2480	2568	2647	793	837	987	1049	1114	1178	492	542	591	640	22
23	1187	1225	1300	1374	1636	1707	1784	1855	2140	2200	2270	2348	2424	725	767	903	960	1018	1078	432	474	518	560	23
24	1092	1126	1194	1263	1504	1570	1637	1706	1966	2045	2090	2155	2228	667	705	831	882	938	993	379	417	454	493	24
25	1006	1037	1100	1174	1385	1446	1510	1574	1810	1864	1924	1990	2050	592	628	738	784	833	882					25
26	931	960	1016	1075	1282	1338	1394	1454	1675	1722	1780	1836	1895	527	558	658	698	742	785					26
27	862	888	943	997	1188	1240	1294	1347	1553	1596	1650	1704	1757	472	499	587	623	662	702					27
28	802	827	877	929	1105	1153	1203	1254	1444	1483	1534	1585	1634	422	447	527	560	593	629					28
29	747	772	818	863	1030	1075	1120	1170	1346	1385	1430	1475	1523	380	402	473	503	534	565					29
30	698	720	764	808	963	1005	1047	1092	1256	1293	1335	1380	1425											30
31	636	657	697	736	878	916	956	995	1147	1178	1216	1256	1296											31
32	578	595	633	669	798	833	870	905	1040	1070	1106	1143	1178											32
33	527	544	577	610	727	758	792	825	948	976	1008	1040	1074											33
34	481	497	526	557	663	692	723	753	866	891	921	950	981											34

Length in feet.	24" I Beams					20" I Beams								18" I Beams.				Length in feet.
	80#	85#	90#	95#	100	65#	70#	75#	80#	85#	90#	95#	100#	55#	60#	65#	70#	
12	12880	13300	13820	14250	14700	6664	9050	9420	10870	11170	11540	11900	12270	6550	6930	7260	7580	12
13	10980	11410	11770	12160	12530	7380	7710	8020	9270	9520	9840	10140	10440	5575	5900	6180	6470	13
14	9475	9840	10170	10470	10800	6365	6650	6920	7980	8220	8480	8760	9025	4810	5090	5330	5580	14
15	8250	8570	8850	9125	9420	5540	5780	6020	6960	7160	7390	7625	7850	4180	4430	4650	4860	15
16	7260	7540	7775	8025	8275	4870	5080	5290	6125	6290	6500	6700	6910	3680	3900	4080	4270	16
17	6420	6675	6880	7100	7330	4320	4510	4685	5420	5570	5760	5930	6120	3265	3450	3620	3780	17
18	5730	5960	6150	6330	6530	3850	4020	4180	4830	4970	5130	5300	5470	2910	3080	3230	3370	18
19	5140	5340	5520	5680	5870	3450	3610	3750	4335	4460	4610	4750	4900	2610	2768	2895	3028	19
20	4630	4820	4975	5135	5290	3120	3255	3390	3920	4025	4160	4280	4420	2355	2493	2613	2730	20
21	4220	4375	4520	4670	4810	2828	2950	3070	3550	3650	3770	3890	4010	2140	2265	2370	2480	21
22	3830	3985	4120	4240	4375	2574	2690	2800	3230	3320	3430	3540	3650	1945	2060	2160	2255	22
23	3510	3648	3760	3880	4000	2352	2455	2560	2960	3040	3140	3240	3340	1780	1885	1975	2066	23
24	3228	3350	3460	3570	3680	2168	2260	2350	2720	2795	2880	2980	3070	1636	1730	1815	1900	24
25	2970	3090	3186	3288	3390	1996	2085	2170	2508	2575	2660	2750	2830	1508	1596	1674	1750	25
26	2750	2853	2948	3040	3130	1845	1927	2008	2320	2385	2460	2540	2615	1394	1476	1547	1618	26
27	2548	2645	2730	2815	2905	1710	1786	1860	2148	2208	2280	2350	2420	1293	1367	1434	1500	27
28	2368	2460	2540	2620	2700	1587	1660	1730	2000	2050	2120	2188	2250	1203	1270	1333	1393	28
29	2208	2295	2366	2445	2516	1482	1548	1610	1862	1914	1977	2040	2105	1120	1187	1243	1298	29
30	2060	2145	2210	2284	2352	1388	1446	1505	1740	1790	1846	1906	1965	1046	1108	1162	1213	30
31	1932	2010	2070	2135	2206	1298	1354	1410	1628	1676	1730	1785	1840	981	1037	1087	1135	31
32	1810	1884	1943	2005	2068	1217	1270	1320	1527	1570	1628	1673	1726	922	973	1022	1065	32
33	1704	1770	1826	1885	1946	1146	1194	1244	1437	1475	1526	1574	1623	867	917	961	1003	33
34	1605	1668	1722	1776	1832	1080	1125	1172	1353	1392	1438	1483	1530	816	863	904	945	34
35	1514	1574	1622	1675	1728	1017	1060	1105	1277	1314	1355	1398	1444	770	814	854	891	35
36	1433	1488	1534	1584	1635	982	1004	1045	1206	1242	1283	1323	1365	728	770	807	842	36

THE CONTRACTOR AND THE AUTOMOBILE



PIERCE-ARROW WITH TRAILER.

The time is already past when the question with the contractor is whether or not he should have an automobile or auto truck. The facts which have been shown by the various tests and use of cars and trucks of various styles readily convinces one that the contractor who has use for two horses, has use for an automobile or truck. One of the reasons for using a truck is that of humanity to the horses. How often we see in slippery weather horses pulling even a small load entirely incapacitated, and an object of pity, while the automobiles with far greater loads turn out to go by. On the ground of efficiency, there is no question but that even the smaller delivery wagons will do the work of a number of teams, and do it far more economically and satisfactorily. Very often, there is call for material to be delivered on the job when the men are standing around, waiting, and where a saving in the delivery



INTERNATIONAL-HARVESTER "COMMERCIAL" CAR.

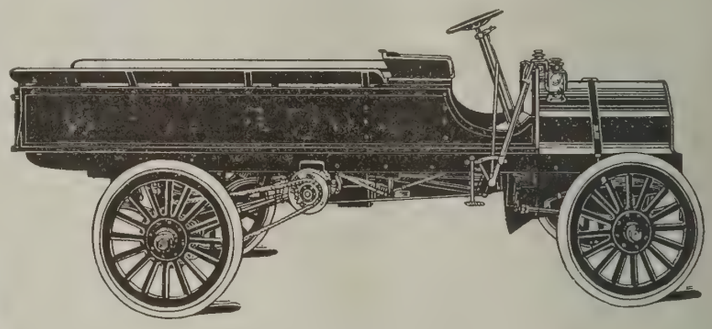
of a load of material means a saving of the time of possibly a dozen men.

Trucks and cars for the use of the contractor vary greatly. For the contractor of limited means, an open delivery wagon costs little more than a good team, and has the advantage of always being ready and of being able to go over ground where horses cannot. From the standpoint of price, the motor vehicle is recognized today as the best and cheapest, whether it is to be used for business or pleasure—unfortunately with many contractors the matter of pleasure cuts but a small figure, their idea being to get from one job to another in the shortest possible time and getting their material on the job with the least loss of time and labor.

As a matter of fact, an automobile not only economizes in a matter of horse flesh, but it makes the owner himself doubly useful. In his car, he can take care of several times as many jobs as by any other means of transportation, and he can keep in far better touch with all the work under his jurisdiction.

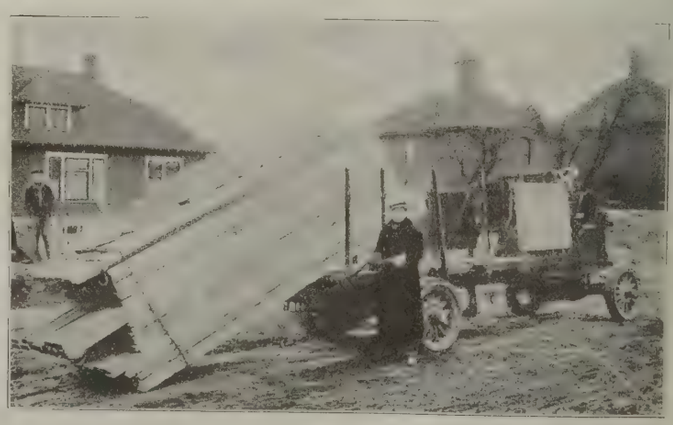
The fact that the car only takes up half the space of a horse and wagon further increases its utility.

While American ingenuity has been responsible for a great deal of the development in automobile circles, other countries are equally alive to the importance of better vehicles. It is probably in this country that the motor truck has received more attention than in any other country on account of the conditions under which



CHASE DELIVERY CAR.

they must operate. Here we have towns far apart in which a contractor must work, and we also have roads none too good over which the cars must travel. Horse drawn vehicles are at a great disadvantage in places of this character, as the power is applied so far from the wheel base that a great deal is lost in transmission. With the automobile, the power can be applied as required directly under the load, and the turning action of the wheels lifts the car out of a bad spot, as well as carries it forward. Where the roads are good, the contractor can frequently double up and carry two loads with one motor, as shown by the cut at the top of this page.



UNLOADING LUMBER FROM A SAMSON TRUCK.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

NOW that the student has finished the copying of a set of building plans, we will give him suggestions whereby he may draw a set of original ones. If he has thoroughly understood all that has gone before, he will have little difficulty in working up these next few plates; but if there are points which arise that confuse him, he should review the previous lessons.

In Figure 22, we have a conventional floor plan of a one-story bungalow. The location of each room, closet, porch, etc., is shown, the size of each and a number of other points. In Figure 23 is given a rough perspective sketch of the exterior of the bungalow. It is required of the student to make a set of working drawings from these figures, properly dimensioned. When he has finished them to his satisfaction, he should take them to some architect,

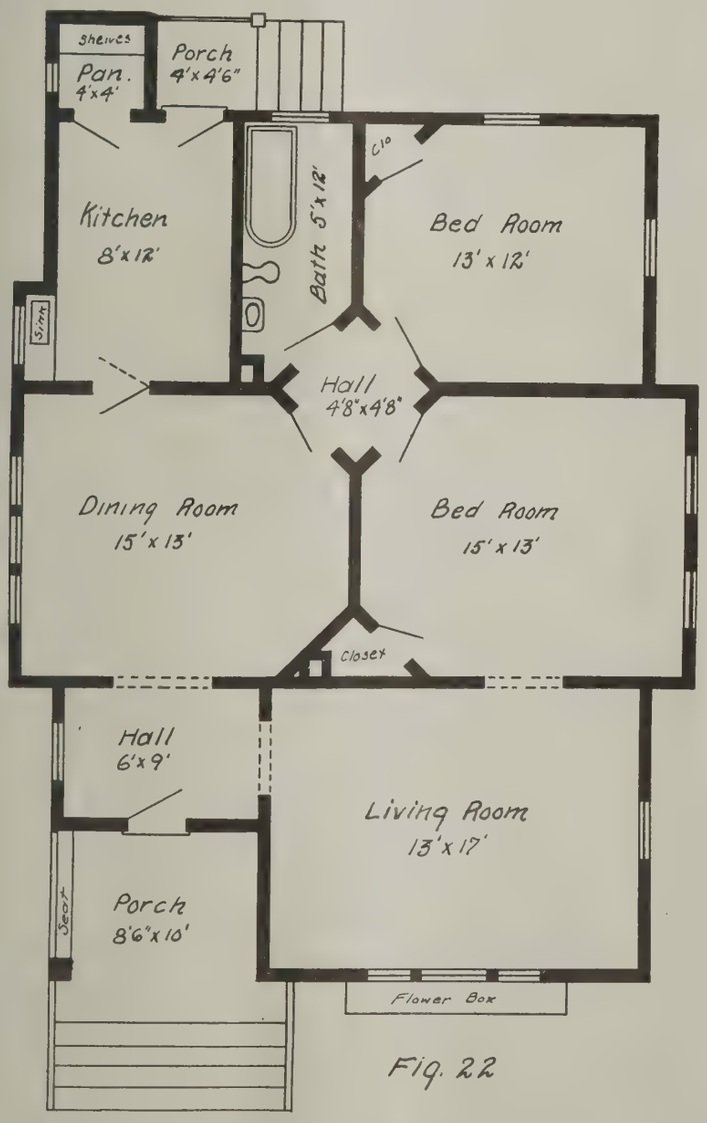


Fig. 22

contractor, or other person engaged in building lines, and let them be criticised. In this way he will find out his weak points, or he will have the satisfaction of knowing that he is capable of drawing simple house plans.

PLATE XXVIII. FLOOR PLAN.

Lay the plate out with a 10x15 inch margin. The drawing should be made with a scale of one-fourth inch to one foot. Lay out all the wall lines, 6 inches thick, paying no attention at first to doors or windows. There are no stairs to plan, which greatly simplifies the work. Put in all the doors shown 2 feet 8 inches wide. There are three openings, shown by dotted lines, which do not require doors; these are wider than the door openings. Next locate the windows. Consult Figure 23 while doing this. Plan in



Figure 23.

the chimneys and closets next, then the bath fixtures, the sink and pantry shelves. Complete the drawing with the porches and steps, using a 10 in. tread on the latter. Put in all dimension lines, and dimension fully. Remember, if you experience any trouble, consult the work given with Plate XVIII. Plates XXIX to XXXV are not shown, as they are to be entirely drawn by the student.

PLATE XXIX. FOUNDATION PLAN.

The foundation plan will be very simple as there is no cellar. Use a 12-inch concrete wall, running well under ground, with a substantial footing. Locate the pier supports for the porches and chimneys, the girder and the plumbing pipes.

PLATE XXX. PLAN OF ROOF.

The roof shown is a common hip, with a wide cornice. Be sure to locate the chimneys and the toilet room vent.

PLATE XXXI. FRONT ELEVATION.

It will be in the drawing of the elevations that the draftsman will find his first hard problem. Here he may use the sketch, Figure 23, to good advantage. It shows no foundation, the siding running down to the ground line. Up to the first floor window sill line is shown wide siding, 8 inches to the weather. The rest is narrow stuff, so each board need not be shown on the drawing. Do not forget to show the vertical section on this drawing.

PLATES XXXII AND XXXIII.

RIGHT AND LEFT SIDE ELEVATIONS.

An idea of the appearance of the left side may be gleaned from the sketch, but the student will be forced to rely upon his own ability to draw the right, which is much the simpler one.

PLATE XXXIV. REAR ELEVATION.

After the other elevations have been completed, the rear will work up easy, as no new problems are here presented.

PLATE XXXV. DETAILS.

One plate of details will suffice on a simple problem such as this one and it may include both interior and exterior details.

In these plates the student should remember he is drawing a set of plans from his own ideals. An owner would probably want many changes, such as different size for the rooms. It is a good plan to rearrange the rooms, etc., changing the dimensions more or less and locating the doors and windows differently. Several complete sets of plans can thus be drawn without varying greatly from the above dimensions.

(To be continued.)



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without cnarge, and any questions or experiences will be given proper space.—Editor.]



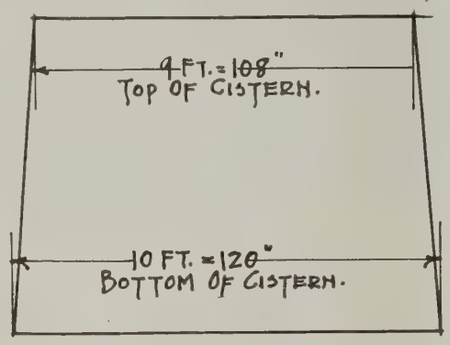
ANSWERS

A WOODEN CISTERN.

From J. E. T., Eagle Lake, Texas.

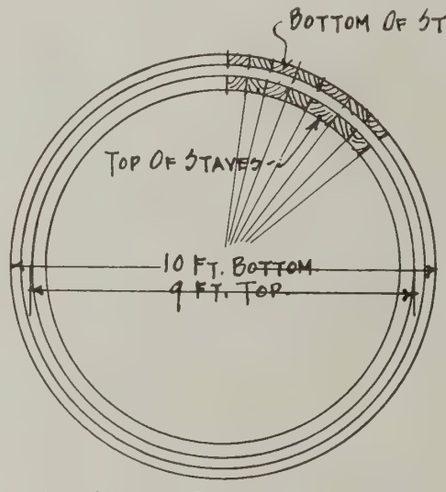
The inner circle shows diameter of top of cistern; the outer circle shows diameter of bottom of cistern. The darkened spaces between the radii show relative or comparative width of top and bottom of staves.

If C. H. B., Alice, Texas, will strike the circles, as here suggested, on a smooth floor and draw the radii as shown, he will easily



be able to determine the width of both top and bottom of staves, whether wide or narrow, also their exact bevel.

To determine length of hoops, multiply any given diameter by 3.1416, or in other words, multiply the diameter of cistern at any



point where he wishes to place a hoop by 3.1416, which will give length of hoop.

For instance, the bottom is 10 ft.; 3.1416 × 10 = 31.416 = 31 ft. and nearly 5 in.; 31 ft. and 4 in. will be long enough. The top is 9 ft.; 3.1416 × 9 = 28.2744 = 28 ft. and nearly 4 in.; 28 ft. and 3 in. will be long enough.

HANDY TOOL BOX.

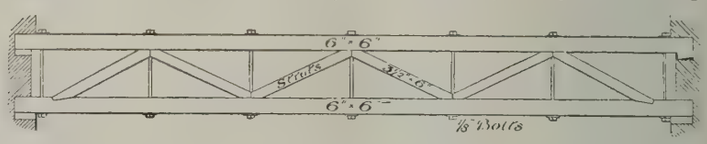
From "W. W. B.," Shingle House, Pa., answering the question of how to construct a tool box:

In building a tool box from which it will be easy to take out certain tools without disturbing the others, make a frame for the chest with corners 2x2 rabbited to receive rails for panels. Make the whole front panel separate from the rest and hang it to the bottom of the chest, which must be strong, with strap hinges. To support the front of chest, put in a ¾-inch board 8 inches deep. For planes and saws, put a ⅜-inch rod through a groove in board clear through the whole chest, also one through under bottom. Then make three drawers grooved in ends for guides so that the drawers can be close together. Put your small tools in drawers and you can just simply drop the front panel and there are your tools right at hand. My chest has aso a hollow cover with a separate lid and lock for maps and drawings. I have carried this chest for over thirty years in several states and have had it copied several times as the handiest chest out.

ROOF TRUSS.

From "Builder," Green Bay, Wis.:

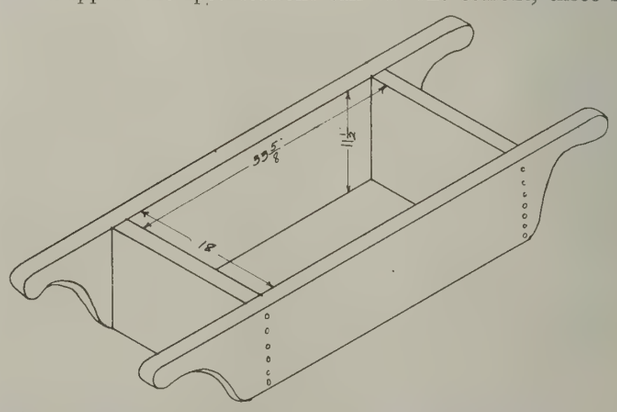
In reply to the query of "A B. C.," Marcus, Wash., I would suggest that he build up beams or girders of two by twelve-inch stuff, the whole length of the width of building—forty feet. If the long stuff is unattainble, use shorter stuff and make good butt joints and be sure and have no two joints opposite each other. Plane the planks and lay them flat on each other—it would be better to have a beam twelve by twelve inches, and your building



would require at least eight of them, the end walls—with plates laid in mortar and bolted would serve for receiving ends of roof joists. Joists would, of course, run lengthwise of building, on one girder: in other words, the joists should break joints, and should be well herringbone bridged throughout. I send you diagram of a truss, Fig. 1, that may be used in place of girders as written, but, while much better, are much more expensive. Many trusses that would be well suited for this work have been illustrated in back numbers of THE NATIONAL BUILDER.

BOX FOR MIXING CONCRETE.

This box contains four cubic feet, equal to one barrel or four bags of cement. To use, the box is filled even full with sand and then lifted up, as many times as the specifications call for, leaving the sand on the mixing board. The stone or gravel is then measured in the same manner and four bags of cement added. Suppose the specifications call for one cement, three sand

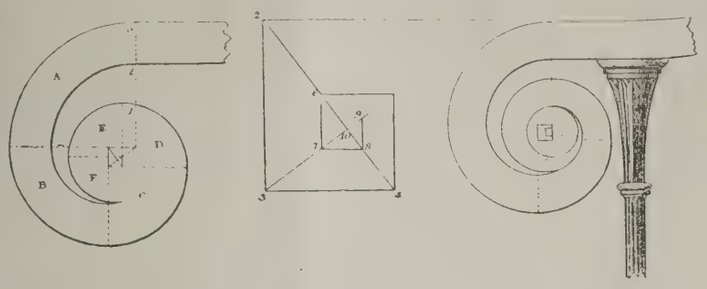


and six crushed stone. Fill the box three times with sand and six times with stone and use four bags of cement. The quantity of cement can be measured by filling the box in the same way. Every contractor should have one or more of these on every job, as it will then be easy to convince the architect or inspector that the right proportions were observed. These quantities will make practically one yard of concrete.

STEP SCROLL.

From "Stairbuilder," Keokuk, Iowa:

For the information of "Student," I submit the following methods for drawing scrolls of several kinds: In Fig. 2 is shown a very simple manner of describing a scroll. Take the width of the rail in the dividers, and repeat it three times on the line 1-2-3, which gives the first or greater radius for the quadrant. A.



Refer now to Fig. 3, where the scheme of centers is drawn out at full size. Draw 1-2 at right angles to the first line, and make it equal to two-thirds the width of the rail. Draw 2-3 at right angles to 1-2; make it equal to three-fourths of 1-2, and join 3-1; through 2, and at right angles to 3-1 draw the line 2-4; then draw the line 3-4 at right angles to 3-2, the line 4-5 at right angles to 3-4, or parallel to 3-2, and so on with the other lines, always squaring from the one last drawn, and thus the centers are obtained, from which the quadrants B, C, D, E, F, in Fig. 2 are drawn.

Fig. 4. This shows a vertical scroll, sometimes used for terminating a hand-rail when space cannot be afforded for a horizontal scroll. The method of drawing it is so obvious as to need no description.

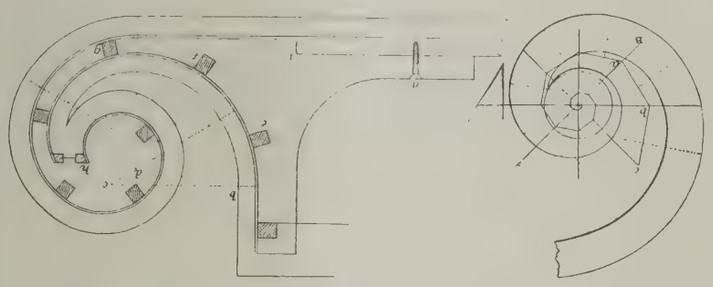


Fig. 5 is a scroll step suitable for a scroll of a rail. The centers of the various arcs are found as in Fig. 6, the same centers being used for the line of balusters and the line of nosings; then to describe the block and step, take the length of the radius of one of the arcs in the rail mold from its center to the center of the rail, and from its corresponding center in the block, which will extend the compasses from the center of the curve to the inside of the baluster, and describe from each center in succession, to produce the interior curve of the block. The width of the block at its neck, that is, at g, should always be commensurate with the size of the baluster, as there shown; from this place, the outer or convex line of the block is determined, and is struck round from the same centers as before, which are also used for the nosing line, thereby showing the size of the step board. At a is shown what is usually called the tail of the block. It is secured by a screw to the thick part of the riser. At i is shown the shoulder of the riser; from this point the riser is reduceed to a veneer, which is carried round the convex portion of the block as far as the point h, where it is secured by a pair of counter-wedges, there shown in section. On the back part of the step is a line indicating the position of the second riser of the stairs, and the section of the baluster on the second step is shown; from this baluster to the next, at e, should be equal to half the going of one step; and, in spacing the balusters round the scroll, it is desirable that their distances from each other should gradually diminish as they approach nearer to the center of the scroll, and that the balusters of the inner revolution should be as near as possible in the center betwixt those of the outer revolution; otherwise they will look crowded and irregular.

HEAVY TIMBER FRAMING.

From a "Reader," Grand Rapids, Mich.:

"Carpenter" should purchase "Hodgson's Heavy and Light Framing," Price, $1.00.

BALL ROOM FLOOR.

From "Contractor," Detroit, Mich.:

A good springing floor may be built by laying two tiers of joists side by side. The upper joists should be two or three inches narrower than the main or lower joists, and should stand up above the lower ones an inch and a half, at least. That would allow the floor to spring that much. The ends of the top joists should not be fastened or anchored into the walls.

BROKEN PLASTER CEILING.

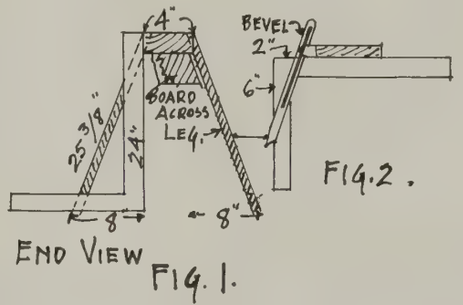
From "Thos. De. Brau," Sheboygan, Wis.:

"General Reader," of Middletown, N. Y., may make good use of the made-up plaster boards to repair his damaged ceiling, with advantage. Write to one or more of the dealers who advertise prepared "plaster board," for particulars, prices, and directions. You will find them informing and of benefit. It would be a good idea to nail strips of lath, about half an inch thick, onto the lower edge of the joists before putting on the board, as the strips would hold up the old plaster, and give a good nailing hold for the Compo or other board at the joints—an important matter.

SAW HORSE BEVELS.

From "A. A. S.," Chicago, Ill., in answer to "T. T. D.," Wichita, Kan.:

Brother, I think I can enlighten you as to your saw horse. Bevel figures on the steel square. There are many ways of building these "Bronchos," but suppose the top, 2x4 inches lays flat.



The bevel you speak of all depends on length of leg, and distance apart at lower end. Make a rafter problem of it. If horse is 2-feet high, that the run, if legs are 20-inch spread, 4-inch out for top leaves 16 inches, that's rise, 8-inch pitch by 24-inch run—See Fig. 1. Reduce, and set bevel on square as in Fig. 2. You know how to apply. If you wish leg to stand the other way 2 inches, lay square on edge of top at gain, 2 inches and 24 inches, and you have pitch mark. If you wish horse higher, or any more pitch to legs, use same method. You will find 4 to 5 inches to 1 foot run the most convenient pitch for saw horse legs. Illustration ought to give idea, and use judgment as to size wanted.

QUESTIONS

TIMBER FRAMING.

From "Jas. McI.," Chicago, Ill.:

I am about to leave this city for the Canadian Northwest, where I am informed a good framer can get steady and remunerative employment—and where I intend to take up land on the great wheat belt, if I can find some small town or village near a timbered district; and I would like to ask some of your readers, who may know of such places, to kindly name them in this department, and also advises me as to what kind of framing tools I would be most likely to require up there for houses, barns, stables and bridge work.

A BRICK CISTERN.

From "J. B.," Lancaster, Pa.:

I wish to build a cistern to hold rain for washing purposes only. I want it five feet in diameter, deep enough to hold twelve barrels of water. I want to build it of brick laid in cement mortar.

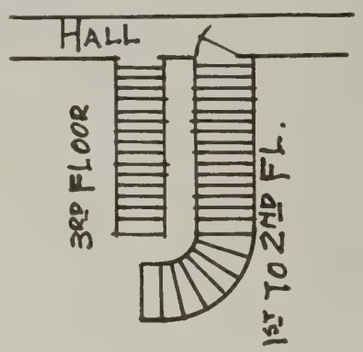
How deep must this cistern be to hold twelve barrels? Will a four-inch wall be sufficient or will it require nine-inch? What

proportion should the cement mortar be mixed and how should the inside be finished? Would be thankful for an approximate cost.

A GATE AT THE STAIRS.

To the readers of THE NATIONAL BUILDER:

I would like if some one would help me out a little. I want to put gate of some kind at head of steps, second floor, to keep



children from falling down. I want it so, when open, it will be clear of passage way. Here is the sketch of where I want it.

COST OF WORKING "KIT" OF CARPENTER TOOLS.

From an "Apprentice Boy," South Bend, Ind.:

My brother made me a Christmas present of a year's subscription to THE NATIONAL BUILDER, and on the first of this year I made a contract to serve as an apprentice to the carpenter's trade. And now I want to buy a working "kit" of tools to use at home—and I would like to know about the cost of them, if some kindly-disposed person would let me know through this column I would be thankful.

A CONCRETE BARN.

A. O. Peterson, Eastwood, Minn.

I am making a concrete barn 34x62 outside dimensions, with a basement for manure, and I want to make a concrete floor for the horses and cattle, and would like to know how thick to make the floor and size of beams and posts, also distance apart, arrangement of reinforcements as I want no steel girders. I want everything out of concrete. Any information on this will be greatly appreciated.

From Carpenter, Ocean City, N. J.

In reply to W. A. H. in November issue, had I received such an order, I should have given him a sash 18 inches x 42 inches x 1⅜ inches thick, with leaded glass inserted in same. To be more precise, I would have said casement sash instead of single sash.

SCREENED SLEEPING PORCH.

From B. H. O., Pontiac, Mich.

I am about to build a porch screened in for sleeping purposes in summer time. It will be sided up about 3½ feet above the floor; the remaining space, which will be about four feet to the ceiling, will be screened in. I would like some ideas from readers on placing light and substantial doors or blinds of some sort to be closed during rain storms, etc., or would a waterproof ducking of some sort be advisable? Would also like to know of a good cement, strictly waterproof, to be placed around chimneys in place of flashing.

DAMP BUILDINGS.

From T. L. C., Mulvane, Kans.

A remedy for the following would be greatly appreciated: Various houses around here are very damp, paper is soaking wet, more especially in closets. Houses are old and new, boxed and plastered with cement plaster. Others are not boxed and plastered with lime or cement. All are damp and disagreeable. Everybody here burns gas.

BONDING NEW BRICK TO OLD.

From C. V. L., Indian Springs, Tenn.

Will some reader please give me a good method of bonding new brick work to old?

PORCH ROOF DESIGN.

From "H. J. J.," Russell, Kan.:

Can anyone give me an idea as to how to build a porch roof that would be watertight with only four inches fall to ten feet? I finished the house last fall and expect to build the porch this



spring. The building is 40x40 feet and the porch will be built on three sides with two circle corners, cement floor and stone railing of about 3½ feet high. This is a country home, seven miles northeast of Bunker Hill, Kan. I enclose photograph and shall appreciate the views of other readers on this subject.

LOUVRE AND FRAMES.

From "Willis B.," Middletown, N. Y.:

I would feel obliged if some brother reader would send you for publication a circular louvre and frame, with diagram showing slats and giving lines for their bevels and formation. Anything on this subject, in your next issue, will be much appreciated by one of your younger readers.

From M. A., Northampton, Mass.

What is meant by the square root of the square? What is the best and quickest way to find the run of valley and common rafters? What is meant by the total span of a roof?

POWER MACHINES FOR THE CONTRACTOR

THE general use of machinery by the builder is of comparatively recent origin. The earliest kinds of building, as shown by the hieroglyphics or word pictures of the early ages, shows all the work being performed by the hardest kind of manual labor, with the exception of the roller which can scarcely be called a machine, and the pick and crow-bar. The main dependence of the contractor was in numbers of men. In one way this was just as well, probably, as the materials available did not readily permit of the labor saving machines which we have today. The mortar in use in ancient days, although remaining in perfect condition at the present time, did not set rapidly enough to permit rapid construction. The lifting of heavy stones, if performed by a machine, would call for machinery as heavy as the heaviest we have today, and would either call for special machinery in special places to take the place of what was accomplished then, and could be now, by mere force of numbers, and just as we have devised labor saving machinery for the production of materials, so we have devised machinery which saves actual labor of construction. The use of handtools is far in advance of what it was comparatively a few years ago, but it is in the realm of machinery that the greatest advance has been made, and which can be taken advantage of by the contractor of today.

In the choice of power, we have for many years had steam. This furnished ample power for most purposes, although deficient in some respects. For instance, the outfit of an engine and boiler necessary to do certain work was bulky and heavy, which gave the machinery a lack of portability. With the advance of electricity much of this loss was obviated, as a small motor took the place of a heavy and cumbersome engine and boiler. The power, too, was immediately available, it being only necessary to connect up

the wires. The use of electricity is somewhat limited, owing to the companies which furnish the current not having extended their lines so as to be available. The lack of uniformity in voltage and current frequently causes annoyance and expense when a contractor takes his plant to another section of the country. There is probably no more ideal source of power when it can be cheaply obtained, but unfortunately in new buildings the electrical wires are almost the last thing to be permanently installed.

We are, therefore, led to believe that the use of the portable gasoline engine is the ideal motor for the contractor's use, as it is always available at a moment's notice and can easily be adjusted to the same frame and special machinery which it operates. Its weight is a great feature in its favor, being much lighter than either the steam engine or the electrical motor. The variety of gasoline engines meet the demands of every machine and an engine can be selected perfectly suited for the particular purposes for which it is to be used. In this regard there are two and four cycle engines which come in one to six cylinders, and a contractor can readily select from the work in hand which style of engine will promote his work the best. The cheapness of these motors frequently permits each individual engine to have its own motor, thereby greatly simplifying the selection.

The number of places in a modern building where power can be used to advantage, and should be used for economy, are limited only by the size of the operation. Where a vast amount of excavating is to be done, a good shovel or excavating machine can be used. Machines of this character will do the work of many men with teams. In connection with the excavating of buildings of any size or depth, an excellent plan is to arrange a hoist to assist the teams to get out of the hole. By the use of a comparatively small engine the load for each team can be practically doubled, as the hardest part of the entire trip with the excavating material is in first getting to the street. A hoist arranged in this way will save its cost in the first few thousand yards taken out.

In many places a contractor is obliged to work under severe disadvantages. In the cut shown at the top of this page is shown one such incident. In this part of the country it was necessary to construct a concrete wall close to a lake in a sandy soil, which permitted the water to readily fill the trenches. By the use of a gasoline engine the pumping out of the trenches can be kept up and the work proceed rapidly.

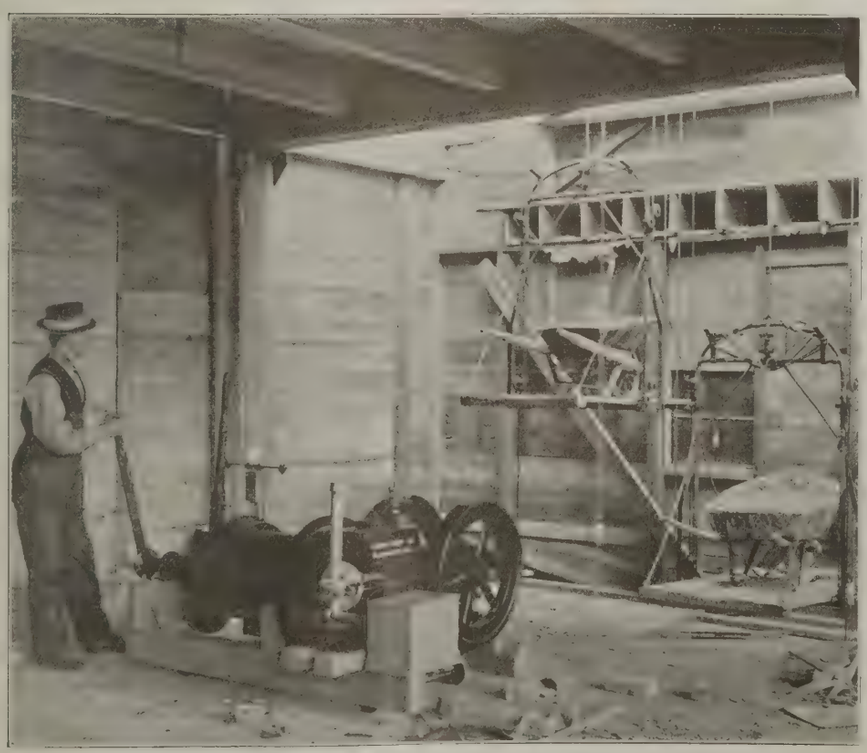
The extended use of reinforced concrete calls for a vast amount of sawing and cutting for forms, braces, etc. Figure as we will, it is still necessary to cut and dress a large amount of material. Nothing is handier for this purpose than a portable saw rig, such as we have shown in the illustration. As will readily be seen, these rigs can be moved not only from job to job, but from place to place about the building. During the first part of construction



it may be necessary to leave the machine out in the open, while later during the work it can be carried from floor to floor, thus the machine is brought to the work and the work performed with the greatest possible saving of time, labor and material.

With the increase in the height of structures, it has been necessary to perfect means for getting the material from place to place. Many contractors rig up a hoist similar to that shown on this page for the purpose of taking up material for the various doors. The writer has seen in an eight-story building the cumbersome chain hoist pulled up by man power, in which from two to four men were constantly employed to raise the material for a dozen or more men above. The same work could have been easily performed by one man and a small engine. The contractors of today are alive to the situation and are obtaining machines for this purpose, as well as for the many other purposes about a building, such as mixing concrete, crushing stone, polishing floors, etc.

The question of preparation enters so largely into every job that the contractor must be prepared at all times to start a job in a hurry and carry it forward with the greatest possible speed and efficiency, and it is the contractors who have the labor saving machines on hand who are first called upon to take the rush jobs, for the money is sure and large in proportion to the actual work performed, and being prepared for large work is the best method of getting it.







RAFTER WORK

By A. A. STAFFORD

In the December issue I gave a simple method of finding the backing lines for hip rafters by illustration. At this time I will show by illustrations a section of a 10-inch pitch roof with hip and jack rafters. The building being eighteen feet wide, all that portion of rafters that are outside and above the corner of the plate must be made to suit the building they are for.

I will endeavor to show how these lengths and cuts can be gotten by the use of the steel square and pocket rule. Fig. 5 shows the side cuts, length by run for common rafter. Remember first, that one inch on either square and rule equals one foot. Remember second, to take total lengths so you do not have to multiply and make a mistake. In this case, 9 ft. is run of common rafter, Fig. 3, 9 inches on blade of square, now 10 inches for every foot run,

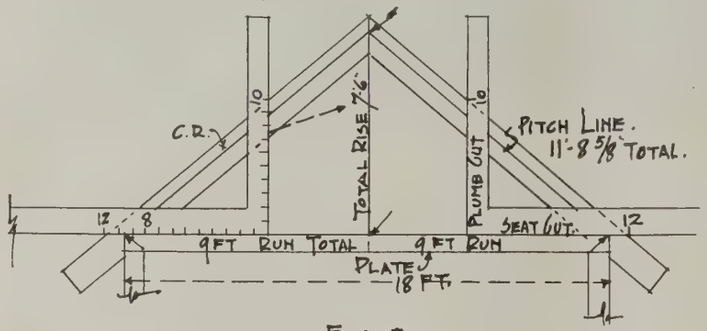
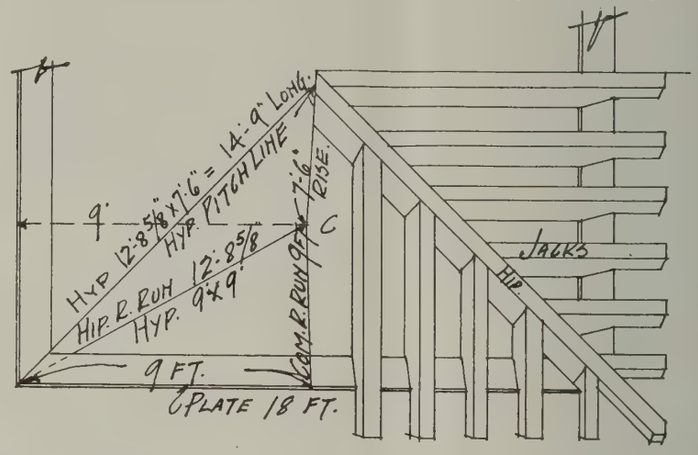


Fig. 3.

9 in. x 10 in. = 90 ÷ 12 in. = 7 ft. 6 in.—use 7½ in. on tongue of square, measure 9 in. x 7½ in. with rule, read on rule 11 23/32 in. Now let's see what part of 1 ft. this fraction is. ½ in. = 6 in., ¼ in. = 3 in., ⅛ in. = 1½ in., 1/16 in. = ¾ in., 1/32 in. = ⅜ in. Count it out on your rule, 11 23/32 in. reads 11 ft. 8⅝ in., for the length of common rafter. Taking the length and run, 9 in. x 11 23/32 in., gives the side cut of jacks as shown in Fig. 4. Always cut on the larger number. Of course, most every carpenter has a code of rules for 8 in., 10., and 12 in. pitches, but many of them when they get away from these three pitches are lost. Study these figures carefully and you won't be lost on any pitch if you do the measuring across the corner of your square correctly and apply figures properly. Now lets see about that tedious hip that so many nearly get and then chop off the rest with a hand ax. Look at point C, Fig. 4, this being plumb line to top of hips 7 ft. 6 in., and 9 ft. from the plate edges. The lines on the drawing are not to be scaled on account of view. Now measure across the corner of the square to find the run of the hip. The hypotenuse 9 in. x 9 in., or 9 ft. x 9 ft., reads on rule 12 23/32 in. or equals 12 ft. 8⅝ in. run for 7 ft. 6 in. rise, now having these two, lets measure again. The hypotenuse of 12 23/32 in. x 7 ft. ½ in. reads on rule 14¾ in., or equal 14 ft. 9 in., which is the length of the hip rafter. The length and run, 14¾ in. x 12 23/32 in., gives the side cut. Simplify fractions by using 15 in. x 13 in. For side cuts, you must cut off enough more to allow for one-half thickness of timber the rafter leans against. If a jack



was cut just right to fit pitch line, see Fig. 4, and the hip rafter was 1¾ in. thick, then you have to cut off a piece ⅞ in. thick from jack so it would set in place.

Notice in Fig. 3 how the squares set on top of the plate for the cuts for top and seat of common rafter, and the reading 12 in. run 10 in. rise for pitch. Now, if you slide square on run to read 9 in., you will find top to read 7½ in., so it is plain to see

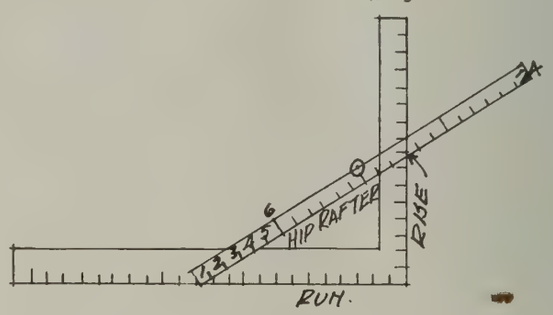


Fig. 5.

that 9 in. x 7½ in. cuts 10 in. pitch, same as 12 in. x 10 in. By using the slide rule, and being accurate in your readings, you will have more convenience many times in roof framing.

THE THINNEST VENEER

The thinnest veneer made in commercial quantities and in a general commercial way is the veneer made from Spanish cedar into stock for veneering cigar boxes. There are used in this country approximately 5,000,000 feet of Spanish cedar annually for the making of cigar box lumber and cigar box veneer. Approximately 500,000 feet of this is cut into veneer of which it takes 100 sheets to measure an inch in thickness. Some of it is cut so thin that it takes 110 sheets to make an inch in thickness. Here is an interesting problem for those who like to figure out things, to take a pencil and figure out how many feet, surface measure, of veneer cut in this thickness with a rotary machine can be made out of 500,000 feet log measure of Spanish cedar.

Even what is called the thicker cigar box lumber is as thin as the average thickness in veneer. About a million feet of Spanish cedar per year is cut into ½ inch in thickness and between ¼ and ½ a million is cut 3-16. These are the standard thicknesses for cigar box lumber taking the industry as a whole. When it comes down to the real thin stock this is getting it down pretty fine and this thin stock in veneer cut 100 to 110 to the inch is used for covering poplar and gum cigar box lumber so as to make it have the appearance and some of the aroma of Spanish cedar. The finished stock then is about ⅛ or 3-16 in thickness. No big hydraulic presses are used for this veneering either. The veneer is simply spread and brushed out and the stock piled up one on top of the other to dry.—Lumber Review.

REPAIRING CONCRETE FLOORS

There is a popular and widespread fallacy to the effect that a concrete floor once chipped or cracked is practically at the end of its usefulness. This is undoubtedly due to the results of unskilled workmen attempting to repair a damaged floor. Unless proper care is taken and the workman engaged on the job has sufficient knowledge of concrete, a repair job is most unsatisfactory.

In this connection, says 'Concrete,' the practice of a Boston firm is worth noting. In certain of the concrete buildings erected by this firm floors have been chipped in particular places because of some phase of the industry which gave rise to dropping heavy materials in one place, as, for example, the winding rolls in a paper mill. When a floor has become chipped out in some such manner as this, the proper method of repairing is to chip out with mallet and chisel a recess usually square, of sufficient depth to reach to the bottom of the deepest break in the concrete surface. The rough surface resulting from this process is then treated with acid to bring out the solid aggregate, or else a stiff brush is used to remove all the loose dust, and the recess washed out by sluicing out with a hose. When all the dust particles have been removed the recess is grouted with cement and before this has set the granolithic finish is applied and leveled up with the rest of the floor. Repairs made in this manner are just as permanent as the remainder of the floor, as the bond between the new and the old concrete will be perfect if all the loose material has been carefully removed.

Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago. Corrected by J. H. Touchstone	New York, N. Y.	Los Angeles, California, by Courtesy of B. & O.
Dimensions, Hemlock Lumber	M ft. BM S 2 S	M ft. BM Rough	M ft BM R G
2"x4" to 8" up to 16', No. 1	yp $20.00	yp. $30.00	op $22.00 to 24.00
2"x4" to 8" up to 16', No. 2	16 00	*	21 00
2"x6" to 8" 18 & 20', No. 1	21 00	30.00	23 00
2"x10" up to 16', No. 1	21 00	34.00	24 00
2"x12" up to 16', No. 1	22.00	34.00	24 00
2"x14" up to 16', No. 1	24 00	38.00	25.00
Each 2 ft. over 20 ft., add per M	1.00	For	1.00
Select stock as above, add per M	5.00	Dressing 3.00	10.00
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
1"x3" to 1"x8", No. 1	yp $30 00	wp $45.00	rw $35.00
1"x10", No. 1	35 00	cyp 58.00	36.00
1"x12", No. 1	40 00		37.00
1¼"x3" to 1¼"x12", No. 1	42 00		50.00
1½" and 2" same as above	42.00		52.00
1" drop siding, No. 1	25 00	wp 45.00	26.00 to 30.00
½" lap siding, No. 1	18.00	cdr 30.00	18.00 to 20.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft. BM S Rough	M ft. BM D 2 S
1"x4" to 1"x8", No. 1	yp $18.00	s $32.50	op $25.00 to 30.00
1 x8" to 1"x10" No. 1	18 00	1x6 27.50	25.00 to 30.00
1"x10", No. 1	18 00	1x8 28.00	30.00 to 35.00
1"x10", No. 2	15.00	1x10 30.00	25.00 to 30.00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM. D 4 S.	M ft. BM D 4 S.
⅛", T. & G. Flooring No. 1	yp $30.00	yp. $32.00	op $40 00
⅛", T. & G. Flooring No. 2	25 00	26.00	35 00
Add for ceiling per M	1.00	wc 9.00	1.50
Add for partition per M	2.00	wc 9.00	2.50
⅝"x6", Ceiling No. 1	25.00	wc 25.00	27.50
	100 ft. run	Flooring	100 ft run
4¼" Moulded Casing	yp $1.80	yp No. 1 $32.00	rw or op $3.00
4¾" Moulded Casing	2.10	yp No. 2 26.00	3.50
7¼" Moulded Base	3.25	Maple No. 1 52.00	6.00
⅞"x9¼" Moulded Base	3.75	" No. 2 46.00	8.00
1⅛"x4½" Moulded Window Stool	3.00	Oak No. 1 65.00	7.50
		Oak No. 2 52.00	
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	re $3.50	rc $5.75	rw $2.75
Shingles, No. 2	3 00	cdr 4.00	1.75
Shingles, fancy	5.00	cyp 11.00	rw 3.75
Lath, 4 ft., No. 1	yp 3 60	4.25	4 50
Lath, 4 ft., No. 2	2.75	*	3.50
Pickets, 1"x3"x4' 6", dressed	40.00	*	25 00
Pickets, 1 x3"x4' 6", rough	*	*	20.00
	Piece.	Piece.	Piece.
6"x8' Post split	Cdr $0.13	.28	re $0.30
8"x8' Post split	.20	.32	.40
8"x8' Post whole	.44	.50	.50
6"x8' Post whole	.25	.45	.40
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3 50	$2.25	$3.00
Nails, cut, common	4 00	2.10	3.10
Nails, wire, fine finishing	1.60	2.50	3.50
Sash Weights, cast iron	1.50	New 1.50 S. H. .90	1.60
Tarred Felt Paper, best 2-ply	Roll. *	Roll $1.25	Roll *
Tarred Felt Paper, 3-ply	*	1000' 0.95	*
Red Rosin, Atlas brand	.90	1000' 1.15	*
Red Rosin, durable brand	.75	Per lb. .02¼	*
Black Neponset		250 ft. 1.15	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	$6.50	$9.00
Brick, blue, at kilns, No. 1	*	6.00	6.50
Brick, blue, at kilns, No. 2	7.50	Pressed 22.00	6.00
Brick, white, delivered, face	7.00	" 25.00	*
Brick, red, delivered, backing	7.00	14.00	*
Brick, delivered, dry pressed	18.00	25.00	*
Brick, vitrified, dry pressed	*	18.00	*
Lime, best gray	bbl. $1.30	bbl. $1.40	bbl. $1.80
Lime, best white	1 40	145 to 190 Atlas-	2.00
Cement Portland	0.95	1.50 pr bbl. in wood	2.15
Plaster, calcined	2.40	(In bags $1.80 per	2.25
Hair, 8 lb. per bush	.25	bbl., 4 bags to bbl., with rebate of 7½ per bag.)	0.48

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

BUILDING TRADES' INTERESTS IN THE COURTS.

Prepared for the National Builder by George H. Murdock, Newark, N. J.

As a general rule the master is bound to use ordinary care to furnish the servant with a safe place to work.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

Where the employer provides a scaffold for masons to work on, it is his duty to use ordinary care to see that it is safe, and failure so to do will make him liable for resulting injuries.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

Where a mechanic's lien statement, when read as a whole, is sufficient to enable an interested person to locate the property with reasonable certainty, it is sufficient as to description of the land.—American Bridge Co. v. Honstain, 128 N. W. (Minn.) 1014.

Where temporary structures, erected to complete a main structure, are put up by the same workmen as are engaged on the main structure, the workmen who have put it up assume the risk of such structure being unsafe.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

A bricklayer, having no duty to erect scaffolds as a place to work, such structures being furnished by the master and erected by carpenters separately engaged, is not a fellow servant with the carpenters.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

Where a bricklayer has discovered the danger that a scaffold would fall, and immediately after and before he could protect himself from injury by the use of ordinary care, the scaffold fell, he did not assume the risk of injury.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

A bricklayer who has discovered that the scaffold on which he is to work is in immediate danger of falling cannot wait thereon for it to be repaired, unless his conduct in so doing is that of an ordinary prudent man.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

Where a bricklayer goes upon a scaffold as a place of work, the scaffold having been built by carpenters engaged in the same general employment, he has the right to assume that the master has performed his duty to provide a safe place to work.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

If a bricklayer goes upon a scaffold, and there discovers it is in immediate danger of falling, and without using proper care to protect himself from injury remains thereon, waiting for another division of workmen to repair it, he assumes the risk of his position.—Texas Co. v. Strange, 132 S. W. (Texas) 370.

Even if a flat building built for rent was not completed for a month after the time provided by the contract, refusal of interest to the contractor prior to the filing of the lien, a month after the completion and delivery of the building, was ample damages for the delay, there being no evidences of application for rooms before the completion and delivery.—Jones v. Nelson, 112 P. (Wash.) 88.

A surety on a building contractor's bond for performance of the contract, executed after the time fixed in the contract for the completion of the work, is put on notice of the granting of an extension of time for the completion of the work, and he cannot escape liability on the ground that prior to the execution of the bond an extension had been granted.—United States Fidelity & Guaranty Co. v. Means & Fulton Iron Works, 132 S. W. (Texas) 536.

Where the obligee of a contractor's bond did not extend the time for the completion of the work, but permitted the work to continue after the time fixed for completion, the surety on the contractor's bond was not thereby discharged from liability, since the acquiescence of the obligee in the continuance of the work by the contractor did not result in injury to the surety.—United States Fidelity & Guaranty Co. v. Means & Fulton Iron Works, 132 S. W. (Texas) 536.

Where a building contractor's bond for performance of the contract was executed several months after the time for the completion of the work, the surety was put on notice that for some reason the contract had not been complied with so that, if he desired information, he must make inquiry, in the absence of which the silence of the obligee was not fraud precluding a recovery.—United States Fidelity & Guaranty Co. v. Means & Fulton Iron Works, 132 S. W. (Texas) 536.

Where a contractor, who took from a subcontractor a bond conditioned on the faithful performance of the contract and stipulating that no liability should attach to the surety unless in case of default the contractor should promptly on knowledge deliver to the surety notice thereof, relied on the assurance of the subcontractor that it would properly remedy a defect in the work and supposed that the defect had been remedied until the contractor discovered the contrary after the collapse of the work, it was not incumbent on the contractor to notify the surety of the defect.—United States Fidelity & Guaranty Co. v. Means & Fulton Iron Works, 132 S. W. (Texas) 536.

A contract for work which stipulates that, if the architect shall certify to the neglect of the contractor to prosecute the work, the owner may, after notice, provide labor and materials and deduct the cost thereof from any money due or to become due to the contractor, and if the architect shall certify that the neglect is sufficient ground for such action, the owner may terminate the employment of the contractor and complete the work, gives to the owner the option, on default of the contractor, either to terminate the contract and stand on his legal rights, or to terminate the contractor's employment and proceed to complete the work.—Steiger v. London, 126 N. Y. S. 256.

Plaintiff, a carpenter, was employed in erecting a house. A scaffold for the work was built in sections. Two planks laid side by side rested on cross-pieces, one end of a cross-piece being nailed to the house, and the other end to an upright. As the work progressed the scaffold was raised, the planks being put on cross-pieces higher up. While plaintiff was doing this, one plank being placed on the higher cross-pieces and he being on the other, the one on which he was walking broke from a defect therein. Held, that the scaffold was one used in erecting the building and furnished by the employer for that purpose, within Labor Law (Consol. Laws, c. 31) §18, so as to make the employer liable, and that plaintiff was not merely changing the scaffold, and not using it as such.—Jones v. Gamble, 126 N. Y. S. 143.

BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

DR. GRANT'S SYSTEM OF HANDRAILING SPIRAL STAIRS.—Being an exceedingly simple solution of this hitherto unsolved problem. By C. C. Grant, M. D., of Red Deer, Alberta, Canada. Consists of 38 pages and 8 full-page plates.

This is somewhat of a new departure in the science of handling, based on the system known as the "Sectorial," with this difference, that Mr. Grant makes use of a temporary cylinder to wrap his rail around, while in the "Sectorial" method two-hinged board as employed to lay out the wreaths and pitches. The cylinder method, is of course, much simpler than the "Sectorial," but is more costly as a new cylinder must be constructed for each change in diameter of well-hole. "A system for rails of an elliptic nature was evolved by Nicholson," says the author, "and later was simplified by Riddell, which endeavored to furnish a face mould, a joint on each end of a crooked chunk of wood, with a line on the face of each joint. All modern works on railing are founded on Riddell, and merely attempt to simplify his methods. The result is that spiral stairs have not become general."

This work will be quite interesting and instructive to rail-builders, old and new. We may have more to say of it at a later date. The work can be obtained from this office.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for THE NATIONAL BUILDER by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,013,109. Machine for mixing concrete, etc. Chas. E. Bathrick, assor. F. C. Austin, Chicago.

1,013,475. Appliance for molding concrete walls. Theo. H. Brown, assor. N. J. Blomgren, Minneapolis, Minn.

1,013,534. Floor-surfacing machine. H. W. Cheney, Norwood, O.

1,013,536. Concrete block machine. Chas. E. DeForrest, Lima, O.

1,013,553. Latches for double doors. Ben. W. Johnson, Grafton, Pa.

1.013,322. Ventilator. Fred J. Schumacher, San Francisco, Cal.

1,015,025. Sliding door construction. Jno. R. Hussey, Indianapolis, Ind.

1,015,289. Attachment for corrugrated roofing. Thos. G. Brawley, Arcanum, O.

1,015,332. Flexible fire resisting shutter and slat therefor. E. H. McCloud, Columbus, O.

1,015,646. Sliding door fastener. Jno. H. Simonton, Brighton, Tenn.

TRADEMARKS.

84,717. Waterproof sheathing and building papers. Barrett Mfg. Co., New York City.

CATALOGUE AND MATERIAL REVIEW

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NORTHERN PINE.

While there are some thirty-seven species of pine grown in the United States, no one state grows all of the species, nor, on the other hand, is there any state which does not grow one or more. Some of the varieties, such as Loblolly Pine of the South and White Pine of the North and East and the Western Yellow Pine, occupies large regions in considerable abundance. Others are so scarce that few either use or recognize them. No variety, however, is found in the United States which has not been used in some way to serve man's needs.

During recent years, nearly fifty per cent of the total lumber output of the United States was pine. The Southern varieties of long leaf practically furnished more than any other single species, and was closely followed by White Pine. Western Yellow Pine has recently furnished vast quantities of lumber, and other western varieties are ranking high in production. In the South four varieties are generally classed as Yellow Pine, the general appearance of which is similar, but the characteristics vary considerably. These varieties grow practically all the way from Chesapeake Bay to Texas, with the exception of Southern Florida.

White Pine grew originally in practically all of the states above the latitude of North Carolina, and the cut of this wood has probably exceeded that of any one of the species. While some timber trees have a wider commercial range, White Pine has been the leader in the market for 250 years. Even today, although the original forests are reduced to mere fragments of what they once were, the second growth is meeting heavy demands. In Massachusetts the cut in 1908 was 238 million feet, practically all of second growth. It is probable that approximately the same cut will be made every year without exhausting the supply. This requires a growth of about twenty-five feet of wood per acre growth each year, so it will be seen that the supply of White Pine lumber need never fail in this country, provided a moderate area is kept producing with proper care.

During the last thirty years, the largest cut of White Pine has come from the lake states, Michigan, Wisconsin and Minnesota. The quantity from the virgin forests is rapidly decreasing, and much dependence is now placed upon the second growth. This country will probably never again see the large sticks of lumber which were formerly cut as they came from trees centuries old, and it can hardly be expected that forests of second growth will be permitted to attain that age or that the owners will wait for the trees to attain a height of 150 feet and a diameter of 4 or 5 feet.

The estimates which have been made from time to time can only be regarded as approximate. Lumber cruisers profess to be able to estimate closely through large areas in an incredibly short space of time, but the amounts which have been cut are vastly larger than the timbermen have considered the area was capable of bearing. Of course, much of this is due to the fact that the cutting out of the larger trees allows the smaller ones to mature, and so keep up the supply, but the fact remains that there are still immense quantities of White Pine in the United States.

The early lumbermen depended entirely upon the rivers to carry down the logs. The saw mills were built upon the rivers, so that the logs could be floated direct to them. As time went by, it was found that it was necessary to build railroads into the forests, where the teams could not reach them, and haul the logs to the rivers. The expense of this, added to the cost of getting out the lumber, to a certain extent has created the impression that the supply was fast failing.

As fast as areas available for farming were cleared of lumber, a large acreage was taken up for this purpose and so cannot be counted as being available for continuing the supply. There is, however, a vast amount of timber growing upon the settled farms in pasturage, woodlots, etc., all more or less available.

No industry is so full of romance or human interest as that of White Pine. The first frosty days of winter seem a sign for getting ready for the big woods. The hands all work from daylight to dark, breakfast being prepared and eaten by lamplight and the teamsters and cooks frequently working far into the night. The work proceeds in the cold atmosphere with tireless energy, camp competing with camp to secure the highest output, the first run down the river, and prestige along other lines. Pages have been written upon the work in the woods—the breaking of jams and the dangerous drives. Riding the logs over the rapids was frequently a part of this work, and the more perilous the work, the more willing the men seemed to carry it on.

On the uses of White Pine, there is little can be said except that few woods compare with it for all general purposes. One of the first uses to which it was put was shipbuilding, its lightness being a valuable quality. For many years it was the wood used for masts and spars the world over, enormous quantities being shipped to Europe during the reign of the masted ships.

Bridge building owes much of its development to White Pine. While it is not as strong as long leaf Yellow Pine, there are still many places its use is preferred. The fact that it was not subject to atmospheric changes with very little shrinkage or swell made it especially useful. The timber stood, too, for years without paint, immune from decay.

In house building, White Pine has been and is the favorite wood for both rough construction and outside finish, as well as for the inside finish. Where the woodwork is to be painted, it is extremely valuable and no wood excels White Pine for this purpose. As it is easily worked, the expense of putting it in place is much less than the harder woods.

White Pine is also used largely in furniture, especially for furnishing cores and backgrounds upon which the finest veneers are applied. The same is true in its use in doors, where a white pine core is built up of the proper size, so that the expensive veneer of mahogany or other wood can be applied.

For a wood so widely known as White Pine, the diseases and injuries to which it is peculiarly liable have very little effect upon it after it is grown. Where once the seed has sprung up, nothing seems to stop its ultimate growth; a moderate forest fire kills the young trees, but new growths immediately start up.

The Northern Pine Manufacturers' Association, 1119 Lumber Exchange, Minneapolis, Minn., have prepared booklets showing the many other advantages of White Pine, and request that contractors, builders and others interested write them and ask for "Why—When—White Pine Book." It will be of interest to everyone .

RED GUM VENEERS.

In 1910, as in the three previous years, red gum was much more widely used for veneer than any other wood, and in each of the four years constituted approximately 30 per cent of all wood used. The large increase in consumption over other woods is explained by the fact that it is considered an ideal wood for the rotary machine and that the stumpage is more easily obtained than that of any other wood, except yellow pine. The tendency of red gum to check and warp when used as lumber is overcome by converting it into veneer. It cuts well, especially in the rotary process, and with improved driers is easily kiln dried. Furthermore, for the manufacture of built-up lumber red gum is especially adaptable because it takes glue readily and because it can be used as either face wood or filler. More than two-thirds of the total increase in the amount of wood used for veneers in 1910 over the amount used in 1909 is due to the greater use of red gum.

The total quantity of wood used by the 563 veneer manufacturing establishments in the United States reporting in 1910 amounted to 477,479,000 feet, log scale, which was about 10 per cent more than the consumption in 1909, according to the annual Federal report on the statistics of forest products.

The widening range of uses for veneer largely accounts for the increased production. Formerly veneer making was confined to a few hardwoods selected for beauty of grain and used as an exterior finish for high-grade furniture and cabinet work. With the improvement of veneer machinery and methods of drying there has developed a large demand for veneers cut from cheap woods and used for packing boxes, berry cups, fruit baskets, veneer barrels, drawer bottoms, filling in three-ply lumber, glass backing, and novelties, such as butter dishes, wooden plates, and fancy confectionery packages.

On account of the constantly increasing price of hardwood lumber used for making furniture, fixtures, and cabinets, built-up lumber, which is usually made of three-ply veneer, is being extensively substituted. For manufacturing this built-up material, it is possible to use woods which heretofore have been but rarely used, owing to their tendency to twist and warp when sawed into lumber.

KIND OF WOOD.	WOOD CONSUMED IN MANUFACTURE OF VENEERS (M FEET, LOG SCALE).			
	1910	1909	1908	1907
Aggregate	477,479	435,981	382,542	348,523
Domestic:				
Total	460,945	411,431	362,524	336,879
Red gum	158,157	129,930	119,485	102,932
Yellow pine	40,324	48,143	42,342	32,450
Maple	39,471	35,444	27,886	28,175
Yellow poplar	33,812	28,826	22,898	28,764
Cottonwood	33,149	30,842	33,904	33,174
White oak	33,005	28,742	20,700	23,872
Birch	27,633	24,643	17,769	18,079
Tupelo	26,548	18,476	16,442	15,097
Elm	17,272	16,254	12,714	12,615
Basswood	11,003	13,715	11,609	13,561
Beech	10,550	9,950	8,515	4,367
Red oak	9,769	6,661	4,449	4,629
Spruce	6,271	4,111	5,413	6,060
Walnut	2,724	2,400	5,176	3,952
Sycamore	2,548	4,404	5,279	3,554
Ash	2,356	2,703	2,490	2,818
Douglas fir	2,006	1,111	333	90
Chestnut	1,736	1,577	1,138	400
All other	2,611	3,499	3,982	2,290
Imported:				
Total	16,534	24,550	20,018	11,644
Mahogany	8,773	16,057	11,487	6,722
Spanish cedar	5,099	5,140	6,558	3,922
All other	2,662	3,353	1,973	1,000

Table 1 shows the quantities of the different kinds of wood consumed in 1910, 1909, 1908, and 1907.

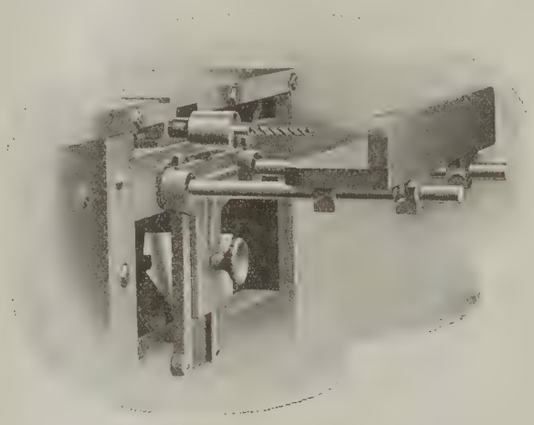
Next to the red gum yellow pine is the most important wood in respect to the quantity used in the manufacture of veneer. It stood second in 1910, 1909, and 1908, while in 1907 it stood third, cottonwood occupying the second place. The consumption of yellow pine in 1910 was less than in 1909 or 1908. The importance of yellow pine and cottonwood in the manufacture of veneers is explained by the extensive demand for cheap veneer products. Yellow pine is used for fruit and vegetable packages, while cottonwood is converted into trunk boxes, veneer boxes and cases, drawer bottoms, and mirror backing. During each of the past two years maple, yellow poplar, white oak, and birch have shown increases in consumption, while each of those woods showed a decrease in 1908. Less basswood, sycamore, and ash are reported for 1910 than for any one of the three previous years. The adaptability of Douglas fir for making veneers is becoming more widely recognized, as indicated by the fact that the quantity reported in 1910 exceeds the combined quantities for the three previous years.

The quantity of imported woods reported as used in the manufacture of veneer in 1910 was less than that reported in either 1908 or 1909. Veneers manufactured in foreign countries and imported are not included in the figures given in the tables.

THE EVEREADY SAW RIG.

The Oshkosh Manufacturing Company, 414 South Main street, Oshkosh, Wis., have for several years been well known as manufacturers of woodworking machines, more particularly adapted for the larger saw mills, lumber camps, planing mills, etc.

The great success which has met the introduction of their Eveready Portable Saw Gig for Contractors has given them considerable reason for gratification. On this page we are able to show two of the adjustments which are included in the rig equipment of the Eveready. As will be seen by the first cut, the boring outfit is adjustable within wide limits and can be used while another man is using the saw. The long gauge on the adjustment insures correct work and the machined dovetail joint will also take up the work incident to long use. The bit socket in this boring adjustment is designed to take the regular standard size bits, which may be obtained at any hardware store.

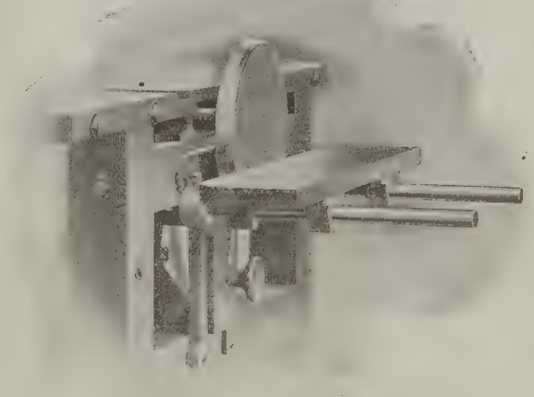


BORING ATTACHMENT.

We also show the sander, which can be readily attached in place of the boring outfit. The same action which does the boring supplies the power for the sander and allows the borer to be used independently of the saw.

A novel arrangement is used for changing the paper and economizes in the consumption of the same. The use of the sander under these conditions easily convinces one of these improvements on the woodworker.

The engine used in the Eveready is specially designed for this machine. It is a 2-cycle, valveless type developing four actual horsepower. The extra large water hopper and ribbed cylinder head insures ample cooling capacity during the most severe working conditions, and the working parts of the engine as well as of the entire woodworker are protected from the dust. It is of interest to know that the governor on the engine is very sensitive, keeping the motor running at even speed at all times. With the various work which is required of a woodworker, this is an important consideration.



SANDING ATTACHMENT.

The Oshkosh Manufacturing Company are very proud of this machine and believe that the simplest guarantee is the best. Their guarantee is simply that if it does not suit, it can be returned at their expense. Under these considerations any responsible contractor can obtain the saw rig and try it out on his highest contract. His opinion will determine whether or not he will keep the machine. The Oshkosh Manufacturing Company are anxious to hear from every contractor interested in a machine of this character.

KORELOCK DOOR DESIGNS.

The Paine Lumber Co., Ltd., Oskosh, Wis., has prepared for distribution to the architects and builders a most complete catalogue showing many designs, finish, etc., which are obtainable from their immense plant. It is probably the most complete book ever issued on the subject of hardwood doors, and its careful makeup allows it to be used as a reference book on doors, being classified under architectural subdivisions. In this manner anyone interested in something in a colonial house, can, by referring to the index, clearly locate the complete array of colonial designs and make such selections as will fit his particular building. Another feature, not generally included in the makeup of a catalogue of this character is a unique index which appears on each page. By the use of this index, anyone considering any particular door and wishing further information as to glass, sizes, layout, standard sizes, designs, etc., can readily turn to the further information. In this way the designer will save a great deal of time in finding all the information on any subjects which he wishes.

Several pages are given to door sections, showing details of construction. On the Colonial door page, it is possible for the architect or designer to select exactly the moulding which appeals particularly to him, or are suited to the particular work in hand.



KORELOCK DOOR WITH BIRCH VENEER, SHOWING INLAYING OF HOLLY AND EBONY.

Often we see Gothic mouldings used where the classic orders should be preserved, and often we see modern mission trim clashing with the colonial details. This section also shows the best methods for using panels, glass, mirrors, etc.

A great many times we have been asked if there is any published list of standard door sizes, showing the width of rails, stiles, etc., for various styles of doors. The list given in this catalogue is the most complete we have ever seen, and will be of great value to the designer in making up his details. The doors are classified as solid mould doors, and also raised and flush panel doors.

Many of the designs in the book show glass panels of various designs. Some of the front doors have a full-sized glass panel, while some mission doors have only small panels at the top. A table shows the regular sizes in which doors of this character are detailed and made.

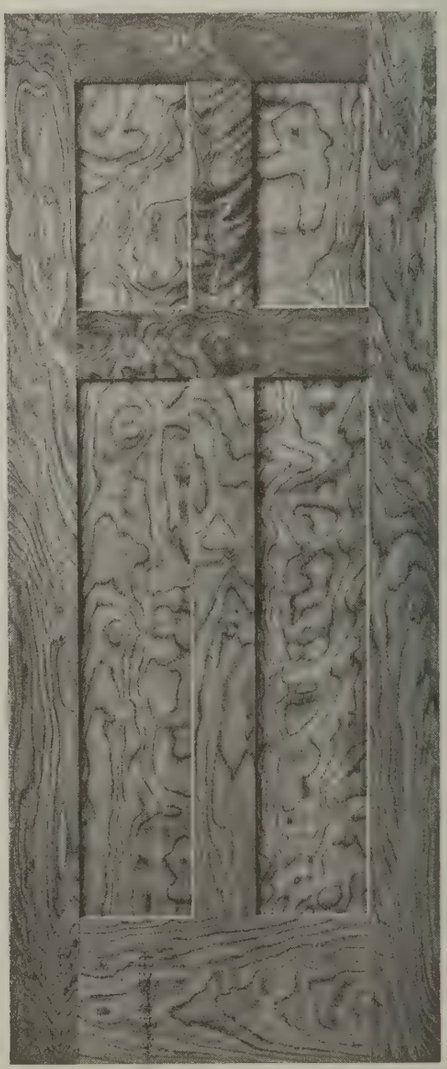
In the list are suggestions for finishing. This gives in great detail the various methods in which Korelock doors can and should be finished. Various paints, oils, shellac, fillers, etc., are described, and their use fully explained. While it would be presumptuous to suggest that a novice could finish the doors from these instructions alone, still they will give the ordinary mechanic or owner an excellent idea how the work should be done.

One of the styles of doors which is attracting considerable attention at present is the perfectly smooth or "Sanitary" doors, on which there are no moulding to catch the dust or harbor disease germs. The Korelock construction is particularly adapted to doors of the character, as the veneer has a permanent foundation to build upon.

The matter of inlaying is attracting a great deal of attention upon the finer grades of work, many doors, such as in hotels, offices, and the higher classes of residences being constructed in this manner. A light line of wood contrasting in color with one of the panel is inserted as a narrow ribbon, giving the appearance of a panel, while doing entirely away with mouldings, etc.

The designs that can be obtained in inlaying are practically unlimited, and the wood used in the narrow penciling includes white holly, ebony, mahogany, rosewood, tulip, satin wood, etc. Combinations of these in inlaying produces beautiful and artistic effects. Where one is so inclined, the address or monogram can be inlaid, making the door or panel individual works of art.

This permits the widest display of originality on the part of the architect and shows the individuality of the home owner at practically



FOUR PANEL KORELOCK DOOR IN CRAFTSMAN DESIGN.

little or no difference in cost. As each home owner desires to show his friends something new and which can be seen only in his particular house, the advantage of this style of ornamentation can be easly seen. The cuts shown herewith show some of the patterns, but give only a slight idea of the extent to which the inlay may be carried. Different combinations of wood in different widths and patterns, when combined with glass panels of the various styles of doors, add greatly to the artistic beauty of the house. It must be remembered that the doors are practically the only part of the house which can be moved and the action of the light in playing upon the finish of the surface gives a pleasing variety of color and tone. In this way the doors closely approximate the value of furniture as an addition to the appearance of a finished room.

As the home builders in general are going to appreciate the fact that doors of the highest quality, such as Korelock, are really no more expensive than doors of inferior finish, every architect and contractor and home owner should have this book for reference. We are advised by the Paine Lumber Co. that THE NATIONAL BUILDER readers can obtain this beautiful book without cost, and we trust many will take advantage of the opportunity.

The NORTHWESTERN TERRA COTTA COMPANY

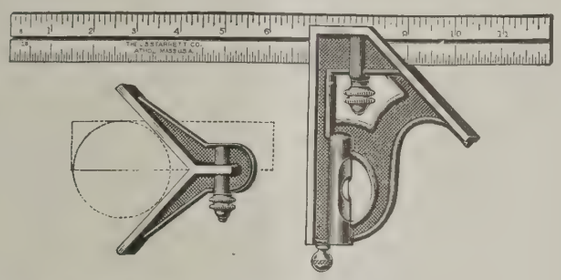
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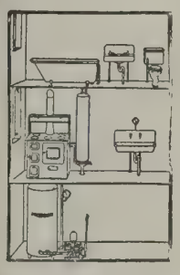


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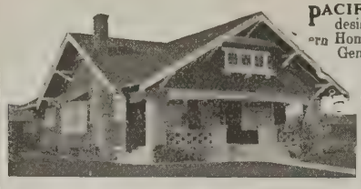
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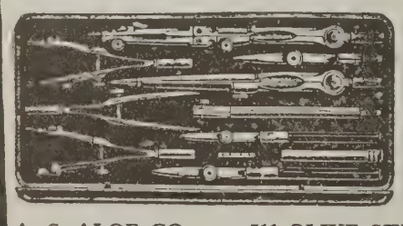
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THE CARE OF THE SAW.

How many carpenters have saved a few cents on the price of a saw and too late realize it was costing them many times that amount to use it day after day. The practical carpenter has learned that the truest economy is to buy the best saw which he can, as the saving in time and power will soon make up any small difference. Moreover, the saw of good quality will outlast several poor saws, not only in the time between filing, but also in the actual length of life. When it comes to cross-cut saws and wood saws, we have the additional fact that two men were employed on a saw, and the loss in labor is doubled. It is very easy to see that the time lost in using a poor saw is real money and that the first importance is to buy good saws and the second, to take care of them.

In the selection of saws, there are a number of things to consider outside of the actual quality of the saw: The use to which it is to be put, the hard service it is to have, whether the owner himself is to use it or employes, the kind of wood and the facilities for sharpening and keeping in condition all have their bearing on the selection.

There is a wide choice, too, in the design of saws. Some men prefer a rather light saw while others prefer one of a much heavier weight. In cross-cut saws, there is a much wider variation, the territory in which the man has been working frequently influencing him in the choice of the shape of saw used in that particular locality.

After the selection of the saw, the care of it is of the utmost importance. The teeth should be kept sharp, properly set, and of even length. This varies somewhat with the different qualities of the wood to be worked and is a further item for individual selection.

"On the Care of the Saw," the E. C. Atkins Co., Inc., of Indianapolis, Ind., have prepared a most interesting little booklet containing explicit directions for filing and caring for saws of many descriptions. The Atkins Co. are well known as manufacturers of the Silver Steel Saws, and with their many years' experience are well calculated to be able to get up a book of this character. Every carpenter and contractor should have this booklet for the purpose of being posted himself and also to instruct his men how to keep their saws in shape.

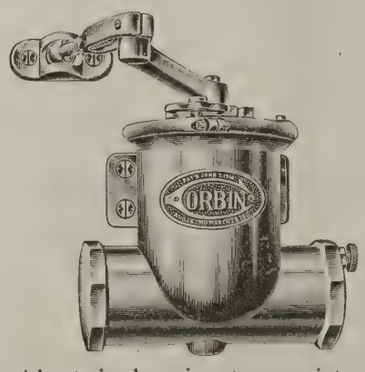
We understand the Atkins Co. are willing to send this booklet on request, and we would suggest that you write to them direct at Indianapolis for a copy of it.

THE CORBIN DOOR CHECK AND SPRING.

Many items contribute to comfort in our modern structures, but it is doubtful if any are more important, save more time or do their work better, than the door check and spring. The door should be closed when not in use and still be always ready to open. It should close itself quietly without jar or slamming.

The P. & F. Corbin Company of New Britain, Conn., are placing on the market their 1911 model door check and spring. Among the advantages which they claim for it are:

It is adaptable for right-hand and left-hand doors without change.



It is supplied with or without the hold-back attachment. The hold-back attachment can be adjusted to stop the door at any point.

The spring used is long and resilient, reducing the crystallization to a minimum and giving a quick, live action, which is highly desirable.

The spindle has a lower bearing which absolutely prevents side pressure or friction and gives rigidity to the check.

The rack and pinion in the check give control to the door at all points from the wide-open to the closed position. The movement in closing is steady, without shock or jar at any point.

The parts are few and strong, easily accessible and quickly replaced.

The liquid used is one which has been carefully compounded with a view to securing immunity from changes due to difference of temperature. It is non-freezing and not affected by extreme heat.

The checking pressure is confined to the cylinder. There is no pressure at the spindle so that the liquid is not forced upward and the check will not leak.

The brackets used are the same as used with other models of the Corbin check.

Six sizes are made to swing all doors from the lightest screen door to the heaviest doors made.

While this is a rather short description for an excellent device, the cut may help to give an idea of its construction. We understand the Corbin Company are anxious to hear from anyone interested in hardware of this character.

SAW POINTS.

A knowledge of the principles upon which his tools are constructed is one of the first requisites to keeping them in order.

Under the heading, "Saw Points No. 7," Mr. Charles Morrill, 277 Broadway, New York, is sending out a booklet showing the essentials in saw filing and care. The information is valuable and timely, as the rush of work and high wages render it imperative that every carpenter should be an authority on saw filing.

A postal to Mr. Morrill will bring this booklet, and it is worth many times that to every mechanic.

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SOME PEOPLE HAVE THE FACTS BACKWARDS.

Many hold the very erroneous belief that WHITE PINE, "the People's Lumber since the Pilgrims landed," no longer exists in commercial quantities (!) or is not easily available at comparatively low cost. They do not know that our annual cut of White and Norway Pine is 1,250,000,000 feet.

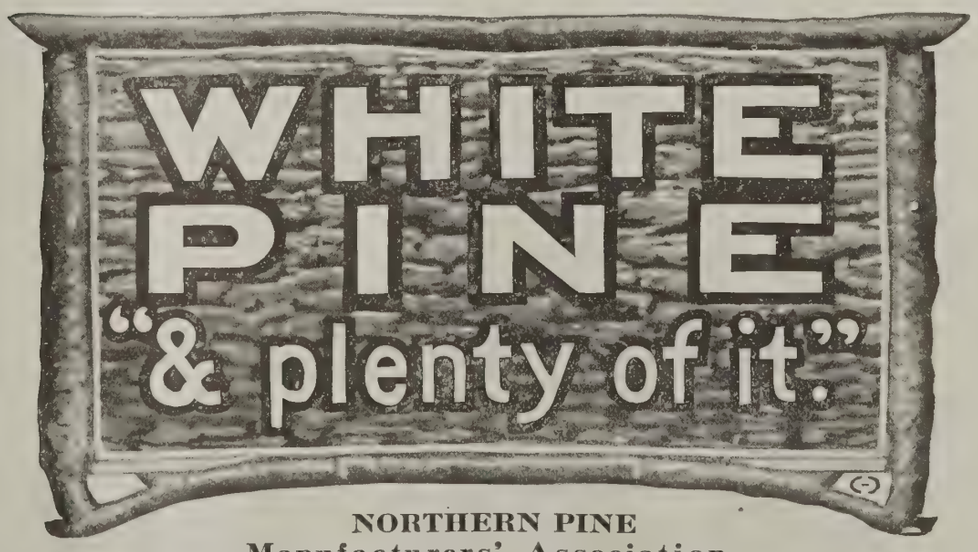
THIS IS TO SET THEM RIGHT

and head them straight for WHITE PINE and NORWAY PINE—"THE RELIANCE OF YOUR FOREFATHERS," THE MOST UNIVERSALLY USEFUL WOOD GROWN, and the

"Leader in the Markets for 250 Years" (U. S. Government Report Bulletin 99, October, 1911)

You may rely on us to see that through WIDE AWAKE RETAILERS EVEREWHERE, **YOU** may secure this "staple American lumber" with the same prompt *certainty* and the SAME QUALITY ADVANTAGES ENJOYED BY YOUR ANCESTORS. (*They knew* White Pine, and *Why.*)

WRITE US before you BUY ANY LUMBER. Inform yourself This question of "what wood to use" is deeper than many realize. We will reply Promptly and CANDIDLY. (Ask for "Why—When—WHITE PINE" book. Sent for a postal.)



NORTHERN PINE
Manufacturers' Association
1119 Lumber Exchange Minneapolis, Minnesota

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Steel Ceilings

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today

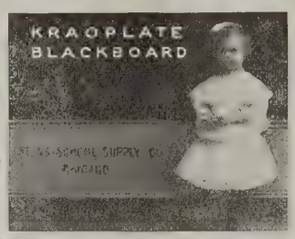
Indianapolis Corrugating Co. INDIANAPOLIS, INDIANA

KRAOPLATE

The Best Composition Blackboard Manufactured

EASILY ERECTED
MOST ECONOMICAL
ABSOLUTELY GUARANTEED

Write for FREE sample and prices.



ATLAS SCHOOL SUPPLY CO.
1020 Van Buren Street, Chicago, Illinois

Carpenters—Builders—Architects—Owners

Sea Green or Purple Roofing Slate is the only known Roofing whose First Cost is the Only Cost—no painting or repairing or recoating as long as the building stands.

SEA GREEN OR PURPLE SLATE ROOFS

NEVER WEAR OUT

Because it's Solid Rock, split into thin sheets of standard sizes—nothing to rust, rot, warp or wear. ¶ Write to us for full information. Write today.

AMERICAN SEA GREEN SLATE CO.
Box 150, GRANVILLE, N. Y.

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

ELEVATORS



and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa

The New

PARKHILL PITCH GAUGE

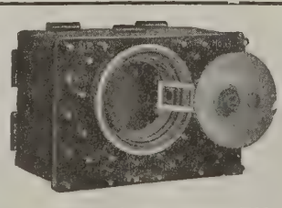
on a square gives the easiest method ever devised to mark roof framing—and by far the quickest. Complete framing for **any** roof pitch—of hundreds—marked on the timbers inside of 5 minutes. Any hip in a few seconds (7). And in 17 seconds all the following:—Side bevel for jack; miter bevels for roof sheathing, facia, plancher, purline, and a hopper; also length and cuts for an irregular hip. Other cuts, etc., with equal ease and speed.

The PARKHILL PITCH GAUGE has no equal AS A STAIR and BRACE GAUGE

See illustration in National Builder for September. If these statements strike you as strong, it costs nothing to verify them, as a Gauge Set with directions will be sent you prepaid for $1.50, with the privilege of returning it inside of 30 days and get your money back.

JOHN PARKHILL, Reference—First Nat'l Bank **ROCHESTER, MINN.**

The Gale Wall Safe



It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

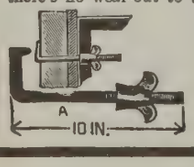
WRITE FOR DESCRIPTIVE MATTER TODAY

WILLIS MFG. CO., - - Galesburg, Ill.

Fred Liebrich, Agent for Cook County, 1102 Monadnock Bldg., Chicago, Ill.

$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)

ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



THE TAYLOR STEEL SCAFFOLD BRACKET

Write for Catalogue of Builders' Specialties

JAMES L. TAYLOR MFG. CO.
POUGHKEEPSIE, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUTHER'S JIG SAW ATTACHMENT.

The Luther Grinder Mfg. Co., 410 Michigan street, Milwaukee, Wis., have designed a jig-saw attachment for use in connection with their grinders. This is a most valuable attachment for the use of carpenters and pattern makers, as it is used on the same frame as the head for the grinding wheels, another cap being supplied in place of the one used in grinding.

Every carpenter has more or less use for a jig-saw. For scroll work and pattern making it is indispensable. This jig-saw is heavily built, and, although a large range of work can be done on it, the necessary power can be very easily developed by foot. It can take work up to two inches in thickness.

A particularly valuable feature in certain classes of work, and which comes in handy in almost any sawing, is the adjustable table. By means of this, work can be done at any angle and the same angle rigidly maintained throughout the job.

A pulley attachment for power is also supplied so that gasoline or engine power may be used in place of foot power if this is an object.

The Luther Grinder Company have recently greatly increased their manufacturing capacity and are now located, with all their fine machinery, etc., in a fireproof building. They are anxious to send their catalogues to every contractor, builder, mechanic and home owner.

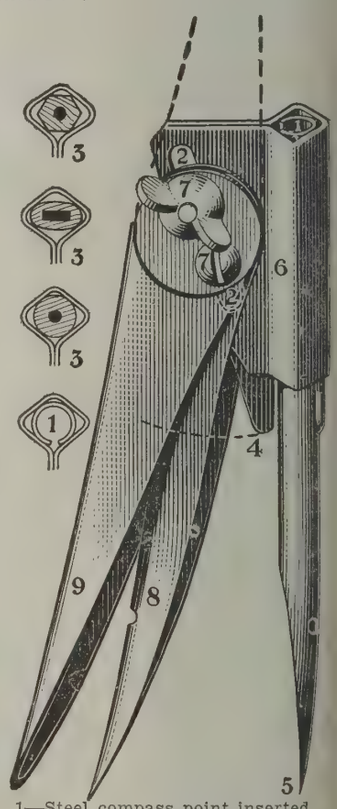
P. S.—We understand that the Luther company make a kitchen machine which keeps the knives sharp and preserves the good temper of the entire family as well.

THE PEERLESS DOUBLE COMPASS AND SCRIBER.

(Patent Applied For.)

The Peerless 5½-inch double compass and scriber is superior as a compass because it has a double joint with a thumbscrew on each side, thus making it more secure and rigid than any other compass on the market. This does away with the old style, clumsy, quadrant compass. It therefore can be used in much narrower spaces than the ordinary compass. It also swings on a center so that it can be easily adjusted to the width desired by operating only one screw. Either leg can be made the longer, as desired. The legs can be adjusted up or down to three-quarters of an inch. The three points become one when the compass is closed, thus providing a very useful tool for all conditions. No other compass has these features.

It will be seen that the legs numbered 8 and 9 may be used in connection with each other, forming an entirely separate scriber. When so used, the steel point, No. 5, is taken out entirely. Pencils of any length and of various shapes can be inserted in place of the steel leg and held equally well. In this way the compass becomes a scriber with almost an endless diversity of uses. The steel leg, when inserted with pointed end up (inverted) will hold round or very short pencils, which will be found very useful. All pencils can be fastened by one movement of the new lever and just as easily removed. However, it is only necessary to adjust the pencil once in a great while because of the three-quarter inch adjustment feature. To insert, put the pencil in the holder at the top, then drop it down to the length desired; then simply shut the lever and the pencil will be held rigidly. To remove pencil, force it forward.



1—Steel compass point inserted.
2-2—Adjusting slot.
3—Pencils inserted.
4—Lever for fastening pencils.
5—Steel compass point.
6—Any style or length pencil or the steel point can be inserted in this holder equally well.
7-7—Double locking device.
8—Sharp steel point for compass work.
9—Broad point. Can be swung out of the way as indicated by dotted lines.

The broad point can be placed against the jamb, in scribing in doors, or against fine woodword, plaster walls, etc., without marking or marring same. It is also used as a protector for the pencil point.

Potter Bros., specialty manufacturers, 614 West 110th street, New York, the manufacturers of the double compass and scriber, are well known for the excellence of their other specialties in this line, the sales of which have reached upward of 1,400 dozen, and no doubt the demand for this device will be equally great.

Prices are given in their advertising this month, and goods will be sent direct upon receipt of price. Address, Potter Bros., Specialty Manufacturers, 614 West 110th street, New York.

CONTRACTORS' AND BUILDERS' LEVELS.

Even the small jobs require to be laid out accurately, the grade must be determined and often a great deal of grading and leveling done about the building. Many builders think that the ability to use a builders' level requires a high college education and a sort of initiation into the realms of astronomy and necromancy, when as a

SARGENT

Hardware

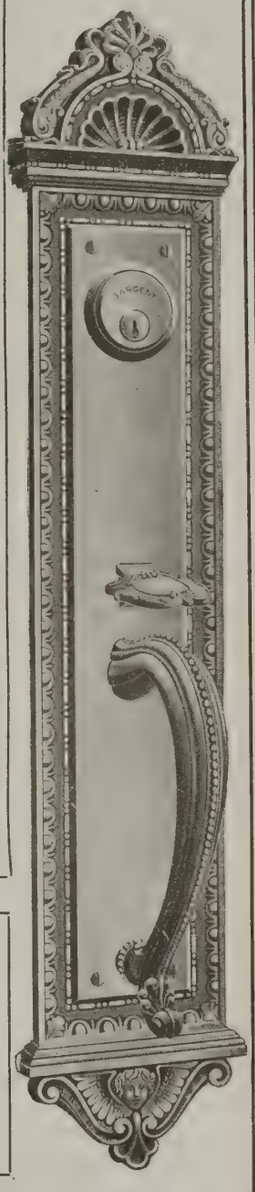




THE beauty and artistic quality of Sargent designs are apparent; they are on the surface, to be seen by everyone. Beneath them are qualities of material and workmanship that are appreciated by experienced architects and expert workmen.

Carpenters and locksmiths recognize the inner worth of Sargent Locks. They see in the solid construction the security for which these locks are famed; they find every part accurately fitted in its place.

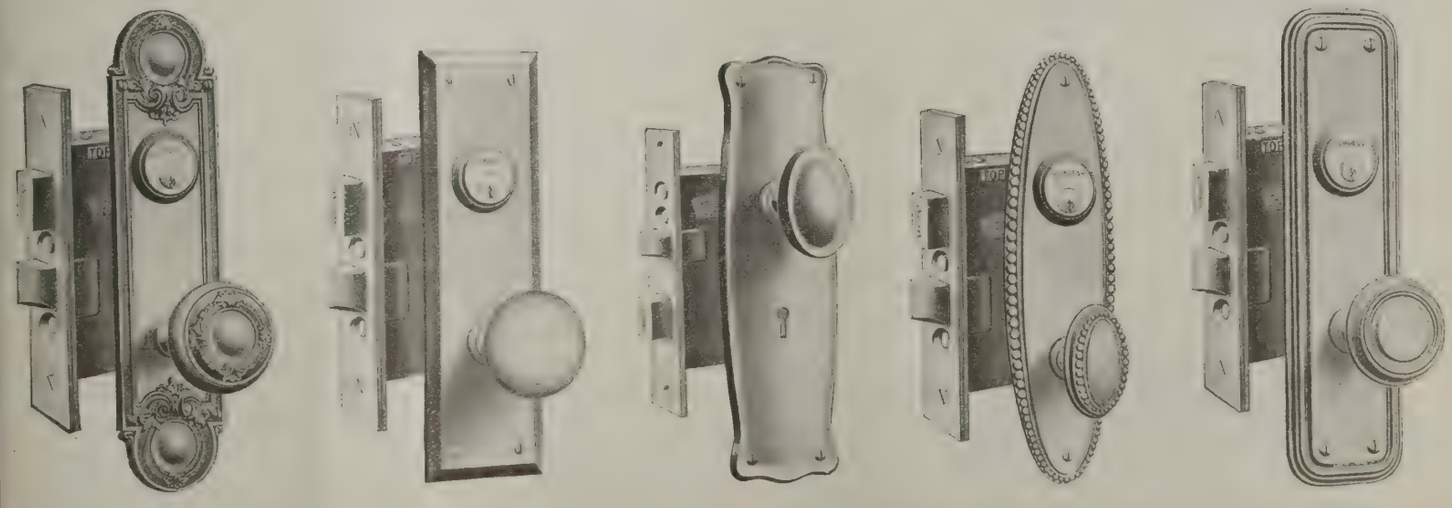
Sargent Hardware and Locks are smooth-working, efficient; they work with ease, quiet and sureness through long years of service.



The Sargent Book of Designs—mailed free

illustrates many patterns suitable for public buildings, residences, etc. Write for this book. It will aid in the selection of a design to harmonize with your architecture. Specify the use of Sargent's Hardware throughout the building.

SARGENT & COMPANY 1151 Leonard St. New York



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

(FREE) HOME BUILDERS' PLAN BOOK

containing a nice selection of views for

COLONIAL HOMES, BUNGALOWS, and COTTAGES

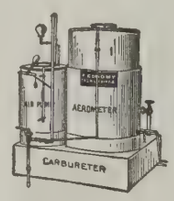


with floor plans showing size of rooms and arrangements. Full description of finish, cost, etc. **The result of years of planning and building homes.**

Residences $1000–$6000; Bungalows $500–$2500; Cottages $1000–$3000. Complete blue print drawings, working details, specifications and list of material at reasonable prices. Get this handsome **Home Builders' Plan Book.** Send 6c in stamps for postage and mailing.

JENS C. PETERSEN, Architect
802 State Bank Building, Traverse City, Mich.

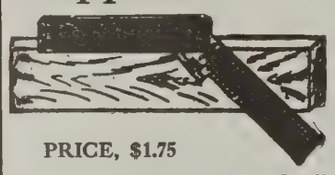
Automatic Safe-Sanitary Gas Light and Fuel



Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)
Today is the time to write home department of

Economy Gas Machine Co. 437 E. Main St. Rochester, N.Y.

Topp's Framing Tool — **A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED**



Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.

IT DOES ALL THIS

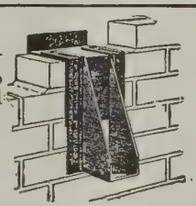
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.

PRICE, $1.75

G. A. TOPP & CO., Indianapolis, Ind. **See tool at Your Hardware Dealer's.**



Van Dorn's Steel Joist Hanger Has no Equal



Send for Catalogue

THE VAN DORN IRON WORKS CO.

CLEVELAND, : : OHIO

Structural Steel and Ornamental Iron Workers

No. 1.—Steel Joist Hanger for Wood Header.

No. 4.—Steel Joist Hanger for Brick Walls.

CALDWELL SASH BALANCE



Does away with weights and cords and VASTLY more durable.

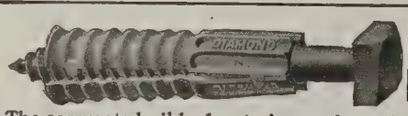
Makes sashes work perfectly.

Permits greater window space in new work, as box frames are not necessary.

May be applied to old windows without altering sashes or frames.

Write for circular to the

Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.



Diamond "N" Expansion Shields

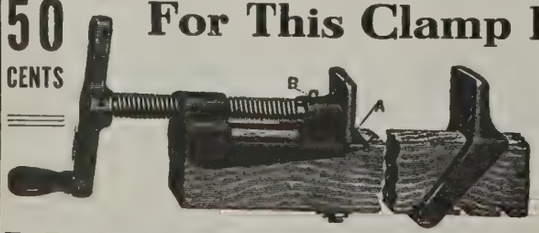
The corrugated ribbed exterior surface gives increased holding power. The longitudinal ribs at the outer end of the shield prevent the shield from turning when the screw is inserted.

THEY HOLD AS LONG AS THE WALL LASTS

DIAMOND EXPANSION BOLT CO.

90 WEST STREET, NEW YORK.

50 CENTS **For This Clamp Fixture**



IT IS UNEQUALLED FOR STRENGTH— QUICK ACTION AND LASTING QUALITIES

Write for Catalog of Sheldon's Clamps and Vises

E. H. SHELDON & CO., 221 N. May St., CHICAGO

matter of fact it is far simpler, quicker and more accurate than using a level and straightedge.

Any man who can wind and set a watch can operate an engineers' or builders' level or transit, and any man who builds anything larger than a chicken coop should have a good instrument.

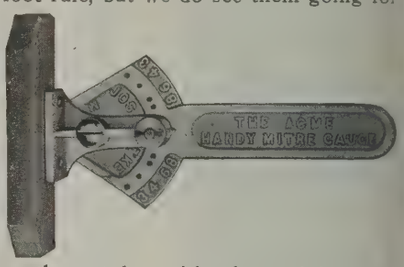
The possession of an instrument stamps the contractor or builder as being in the "accurate" class, for he can check up his work. He can allow the owner to squint through the telescope and convince him that the grade, heights, etc., are right.

Believing that their name should be constantly before their customers, present and prospective, the David White Company, 421 East Water street, Milwaukee, Wis., are sending out calendars which are both useful and ornamental.

The calendar shows in colors one of their engineer's levels, finished in gun metal and polished bronze, and will be a constant reminder that the company are manufacturers of high-grade instruments. A postal will bring a calendar and a catalogue.

THE ACME HANDY MITER GAUGE.

No carpenter would think of having to run to his tool box every time he wanted to use a two-foot rule, but we do see them going for a trysquare, bevel or miter box every time they have use for one, because, as ordinarily made, these separate tools are so bulky that they cannot easily be carried about on the job.



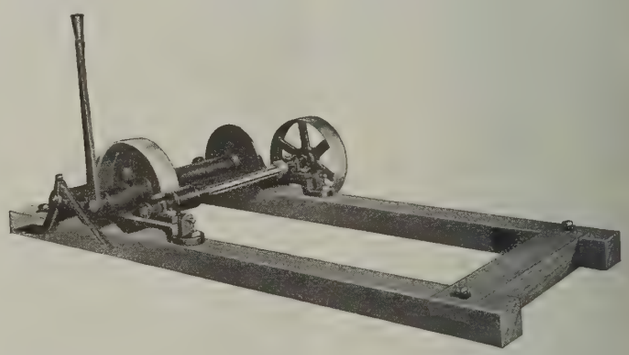
The necessity for a tool which would take the place of these three tools led Mr. Jos. Miotke, 249 Lake street, Milwaukee, Wis., to perfect the Acme Handy Miter Gauge. As will be seen from the cut herewith, the tool is small enough to go in the pocket, and being made of aluminum, is so light that its presence is not a burden to carry around.

As a serviceable tool, however, it is right on the job every time. The graduations are such as are most commonly met with, and when set the gauge is extremely accurate and cannot slip.

While the "Acme" is sold generally by hardware stores, those not familiar with it may obtain a descriptive circular from Mr. Miotke.

CONTRACTORS HOISTS.

When we were building only one or two-story houses, the question of raising material was of relatively small moment. It was generally possible to provide a good runway by which material could be wheeled to the second and even the third floor, but with the advent of high buildings it became necessary to provide means for rapidly raising quantities of material to the upper floors, as methods of construction and improvements in material allows the work now to be carried on with far greater rapidity than a few years ago. The



quick setting action of Portland cement has reduced the time for laying walls from seventy-five to eighty per cent.

In order to get the material to the upper floors some form of hoist therefore became absolutely necessary. As the work for this class of machine lasts only a comparatively short time on each building, the machine had to be made in such a manner that it was portable and adjustable to practically any place in which it was to be used.

Recognizing this then, the Erie Clutch and Pulley Co., 114-116 West Twelfth street, Erie, Pa., designed a hoist known as the "Reliable Erie," having a capacity of 600 lbs., adjustable and sufficient for all the ordinary work on a building, such as brick, mortar, lumber, etc. The cut shown herewith will give a good idea of the simplicity of the hoist itself. As will be seen, the hoist can be used in connection with practically any kind of power, steam, electricity or gasoline, and the hardwood skids, on which it is mounted, permits it to be easily moved from place to place.

Contractors who are interested in getting material rapidly and economically to the upper floors of a building during construction are advised to investigate this hoist, as the saving which it will do on one job will practically pay for the complete outfit.

CABOT'S SHEATHING QUILT.

The Samuel Cabot, Inc., booklet on Cold-Proof, Heat-Proof and Sound-Proof Construction not only describes their famous "Quilt," but gives a number of examples in which the Quilt has demonstrated its value for these purposes.

The booklet also shows exactly how the best results may be obtained at the minimum cost for labor and materials.

It is a well-known fact that modern construction in which wood forms any considerable part is far from sound-proof. For instance,

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Don't Miss This Opportunity

We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing Others have made big profits **simply devoting part of their time to selling and laying our Metal Spanish Tile.**

Edwards Metal Spanish Tile





Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10 x 14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TO-DAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TO-DAY FOR OUR SPECIAL AGENTS' PROPOSITION.



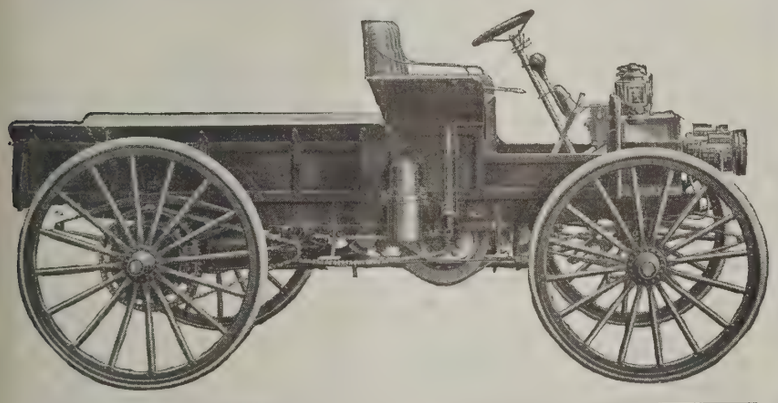
Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

430-450 Eggleston Ave. **CINCINNATI, OHIO**

THE WORLD'S LARGEST METAL ROOFING, METAL SHINGLES AND METAL CEILING MANUFACTURERS.



Where Haste Makes Money

The International Commercial Car is a wonderful help in quick transportation of the essentials in tools, finishings, and light materials. How much time and money is lost for the want of the right-size auger bit or those few necessary boards!

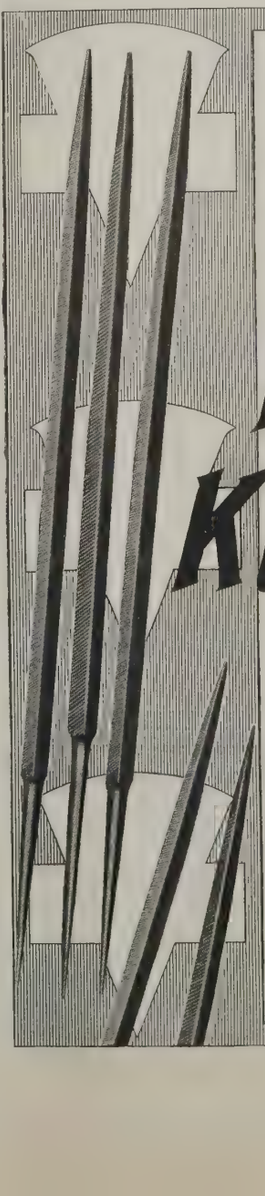
International Commercial Cars

save their initial expense many times over in the delays avoided and the relief of having things when you want them. An International is always ready; always at your service, regardless of roads or weather.

Easily handled, easily stored, simple, strong, and dependable. Let us tell you all about them.

International Harvester Company of America
(Incorporated)

81 Harvester Building, Chicago U S A



100% Cutting Efficiency

That's the kind of a slim tapered file you need to file a fine saw. Don't run the risk of ruining a valuable tool with a poor file.

KEEN KUTTER

Quality Files

guarantee deep, true, quick cutting—right into the bottom of the tooth. And the best test is for you to make a trial for yourself.

Keen Kutter slim taper files produce 100% efficiency against 65% of ordinary files. And their uniform temper is proven by their whitey-gray color throughout.

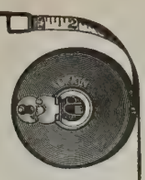
"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS.

If not at your dealer's, write us.

SIMMONS HARDWARE CO., Inc.
St. Louis and New York, U. S. A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN
Steel Measuring Tapes



With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor



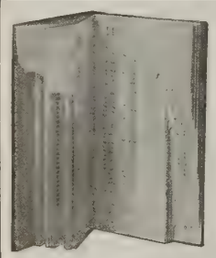
Mr. Builder:—If you are lucky enough to read this advertisement, and wise enough to write and tell us what you buy in
IRON, BRASS AND BRONZE
we will send you catalog that is attractive enough to go in any man's library. Do you want it?
DOW WIRE & IRON WORKS, Incorporated
LOUISVILLE, KENTUCKY



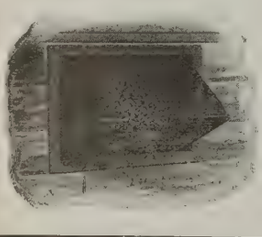
WHITE'S IMPROVED LEVEL
combines Simplicity with Accuracy and Durability. Three features to be found only in the White's Level. We will ship this regular $45 Improved Level for the next 30 days at $40 prepaid to any address. Examine it upon receipt and if found other than we represent it return it to us and your money will be refunded.
DAVID WHITE COMPANY, 421 E. Water St., Milwaukee, Wis.
Write for Catalogue and complete price list.



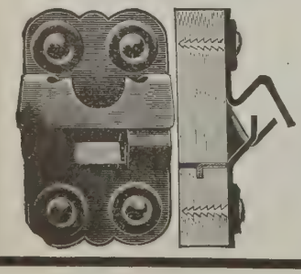
BOVEE FURNACE
AT MANUFACTURERS' PRICES
Will prove to be very easy to install—durable and the most economical furnaces made. Special prices to Contractors and Builders on our five-room residence heating plants and also on our church and school furnaces. Specify a Bovee Furnace and install it yourself. It will pay you to do it. Write for catalogue N.
BOVEE GRINDER & FURNACE CO.
60 8th STREET, WATERLOO, IOWA



THE PERRY LUMBER RECKONER
ESTIMATING ERRORS ELIMINATED
Mistakes are impossible with the Perry Lumber Reckoner, as all the figuring is done for you.
The lumber tables give the number of board feet in any number of pieces, from one to a hundred, for all the commercial sizes of lumber. You can turn instantly to the right page. Ask your bookseller about it, or send direct.
Price, prepaid $1.00
Benjamin L. Jenks, Publisher — 906 Williamson Bldg. Cleveland, Ohio



The Window Chute
FOR BUILDERS OF MODERN HOMES
Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.
HOLLAND FURNACE CO.
HOLLAND, MICH.



THE WATROUS No. 18 SAFETY SASH HANGER
EASIEST AND QUICKEST TO SET
Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.
E. L. WATROUS MFG. CO., Des Moines, Iowa

the ordinary apartment house, with end joists and partitions, is really a series of sounding-boards, which pass any unusual sound or vibration, such as coming from a piano or phonograph, from room and from floor to floor. The annoyance caused by the sound of these instruments passing beyond their natural limits is a continual source of neighborhood trouble, the blame seldom falling where it belongs; on the head of the ower or landlord who failed to properly build his house. These troubles can and have been removed in many high-class buildings, and could have been avoided at a much less cost than the loss of rent resulting from their omission.

Intending builders, as well as contractors and builders, should be posted on the value of "Quilt" in deadening sound, as well as in its heat and cold protection qualities. The booklet is small and concise, for the busy man, and is sent free on request to Samuel Cabot, Inc., 141 Milk street, Boston, Mass.

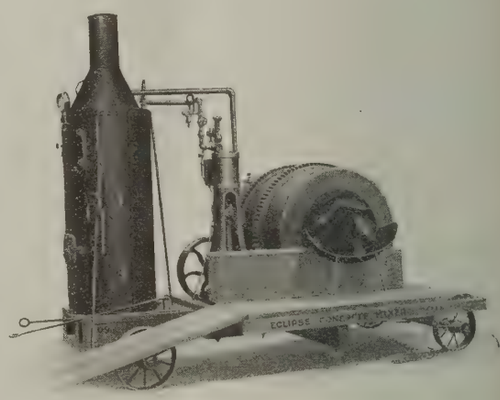
CHANGES IN THE L. S. STARRETT CO. ORGANIZATION.

The L. S. Starrett Company, which has the largest manufacturing establishment of fine mechanical tools in the world, has recently increased its capital stock to $3,500,000, of which $1,500,000 is to be six per cent cumulative preferred stock and $2,000,000 common stock.

The officers of the company are: L. S. Starrett, president; F. A. Ball, vice-president; F. E. Wing, treasurer and secretary; W. G. Nims, assistant treasurer; with a board of nine directors consisting of the officers named and M. B. Waterman, Augustus P. Loring, John A. McGregor, J. H. Drury and W. B. McSkimmon. The last four named are officers of the Union Twist Drill Company, the second largest machine factory in Athol. The Union Twist Drill Company becomes a stockholder of the L. S. Starrett Company and as such has representation on the board of directors, which is increased from five to nine.

The L. S. Starrett Company was incorporated in 1900, succeeding to the business established by L. S. Starrett in 1880 and conducted by him individually up to the time of its incorporation. The capital stock of the incorporation was $100,000 in 1900, since which time the business has increased far out of proportion to the original capital. L. S. Starrett continues in active control of the business.

THE "STANDARD" LOW CHARGING CONCRETE MIXER.



Every contractor who has mixed concrete by hand realizes the value of machine mixing. A better "mix" is obtained at far less labor, and in a fraction of the time.

On small jobs, however, the mixer has sometimes been at a disadvantage, as in many styles of mixers it was necessary to build a platform four feet or more above the ground with an inclined runway, and the labor required to do this—and the space required—often prevented the contractor from getting the best results from the job.

Under the name of the "Eclipse" Mixer, the Standard Scale & Supply Co., 1345-47 Wabash avenue, Chicago, have been manufacturing a concrete mixer which has become well known to the trade. In the future, however, the same mixer will be known as the "Standard" in order to avoid the confusion of names.

"The Standard" Scales, manufactured by the same company, and which has been on the market for so many years, have made the name "The Standard" in connection with scales familiar in every section of this country as well as foreign countries, and "The Standard" Mixers will in the future we as well known all over the world as "The Standard" Scales.

The illustration shows "The Standard" Low Charging Concrete Mixer, with steam engine and boiler. The simplicity of construction of this machine as shown by the illustration will commend it to all experienced contractors who are familiar with the difficulties of keeping complicated machinery in operation on the contractor's plant. The mixer is charged directly from the low-charging platform shown in illuustration, and the entire batch is in view of all while it is being mixed. This feature is important, especially for reinforced work, where it is often necessary to be very particular as to the mix before discharging.

The discharging arrangement on "The Standard" Mixer is very simple and semi-automatic, requiring the men to throw the discharge lever only past the center in either direction, when a strong spring completes motion of the lever and the discharge door.

One special feature of "The Standard" Low Charging Mixer is because of the simplicity in construction, it is much lighter and can be readily moved from one job to another or placed inside of buildings or in locations where other outfits could not be used.

The machines are built in all sizes, from 2 or 3 cu. ft. capacity up to 40 cu. ft., and with steam, gasoline or electric power. Full information will be sent upon request to the manufacturer.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Any Man Can Get $1,000.00

Who Joins Fritter's $1,000 Class



For Goodness Sake Listen To Me.

Reader, I, Fritter, am talking to YOU!—Am saying, that you; yes, you, can get $1,000; but be warned—only 5,000 can be accepted. So get mighty busy—write Fritter today. It costs nothing to investigate this remarkable $1,000 class.

5,000 Men Will Get $1,000 Each

You, by acting **now**—today—can get the thousand allowed to your section. This money—$1,000 or more per man—goes to **mechanics, clerks, farmers, preachers, doctors lawyers, teachers**—people from all walks of life—**any man, anywhere**—up to 5,000, who is willing to join Fritter's $1,000 class. Nobody barred. Not a fairy tale, fake or humbug; for listen—it's going on daily—hundreds have received their thousand—some many thousands. If you can use $1,000—real money—payable $35 to $75 weekly—say so—don't hesitate—don't delay a minute, but get the thousand-dollar hustle—**get your first $1,000**—first start, first taste of real independence—power, influence, luxuries—get these through Fritter, just as hundreds have done. Poor men joining his wonderful $1,000 class

Without Capital—Without Experience

—starting with only their nerve—finishing with thousands; yes, thousands of dollars. You, if willing to join hands with Fritter, can easily enjoy same abundant prosperity. Knowing the reason dispels all doubt—creates confidence—enthusiasm

CLASS GETTING OVER $2,000.00 PER MAN.

Korstad (Minn. farmer) received **$2,212.13 in 2 weeks**; Zimmerman (Ind. farmer) **$3,856 in 30 days**; Stoneman (Nebr. photographer) **$3,841.68 in 60 days**; Rasp (Kansas agent) **$1,685 in 73 days**; Juell (Canada clerk) **$6,800**; Oviatt (Iowa minister) **$4,000**; Hart (Va. farmer) **$2,000**; Wilson (Ky. cashier) **$3,000 in 30 days**; Beem (Kans.) averaged **$164.25 weekly** for 3 months; Langley (Dak. liveryman) **$115 first day.** No wonder these men bless the day they joined Fritter's $1,000 class. Reads like fiction, yet it's the gospel truth. **Proven by sworn statements—investigation—personal interviews.**

10 MINUTES' WORK $6.50 Cash, Presto!

IT'S SOLVED. The long-desired, much wanted, universal bathroom has come. Requires **no plumbing, no waterworks—no water systems. 10 minutes to install—$6.50 to buy. The equivalent of any $200 bathroom.** Self-heating—hot or cold running water facilities. Cleansing, friction, massage and shower baths in any room. No tubs to clean bowls or buckets to fill. Simple, durable, handsome, sanitary. The dream of millions come true. Modern homes, modern bathing facilities within the easy reach of every man, woman and child in the land. No experiment. **Used by U. S. Government. Over 200,000 delighted customers.** With such an article, with exclusive selling rights, with Fritter's help and your nerve you're bound to make from $1,000 to $5,000 this year. **It's not a question of ability, location or capital** (for we **give credit** to active workers), but **whether you act quick enough to get into Fritter's $1,000 class. Once in you're good for a $1,000 anyhow.** Reese solicited 60 people—sold 55; McDaniels 20—sold 19; Lodewick 41—sold 39; 17 orders in one day; Hart "16 in 3 hours"; Wilson 102 in 14 days.



Sectional View of "Energizer"

Address Fritter personally today—make him prove his claims and above all that you too can get $1,000. Don't accept anything without proof. First get Fritter's entire proposition—it's free. Then decide. Just a postal will do.

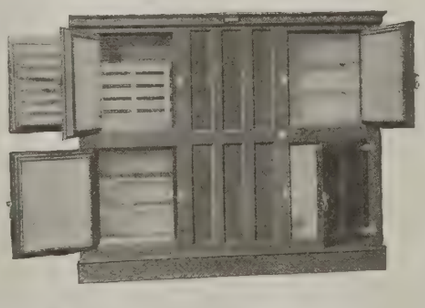
M. FRITTER, Secretary and Manager

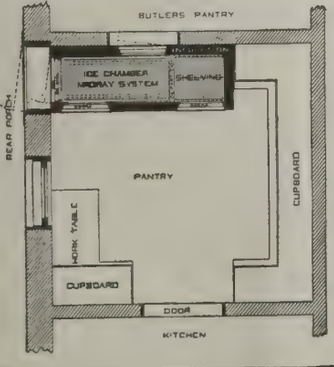
ALLEN MFG. CO., 3493 Allen Bldg., Toledo, O.

SPECIFY

McCRAY REFRIGERATORS

The plans of well built homes are not complete unless they include McCray Refrigerators. We will build one to order or co-operate with you in adapting one of our stock size refrigerators to your plans. Let us know what space is at your disposal and we will give you our advice free of charge. The illustrations show one of our special refrigerators and its location in the house. The arrangement shown here is a very convenient one as the entrance to the storage compartment can be had from either the Butler's Pantry or the Kitchen Pantry. Write for our free book, "McCray Refrigerators in American Homes" which shows many convenient arrangements





for both built-in and stock refrigerators.

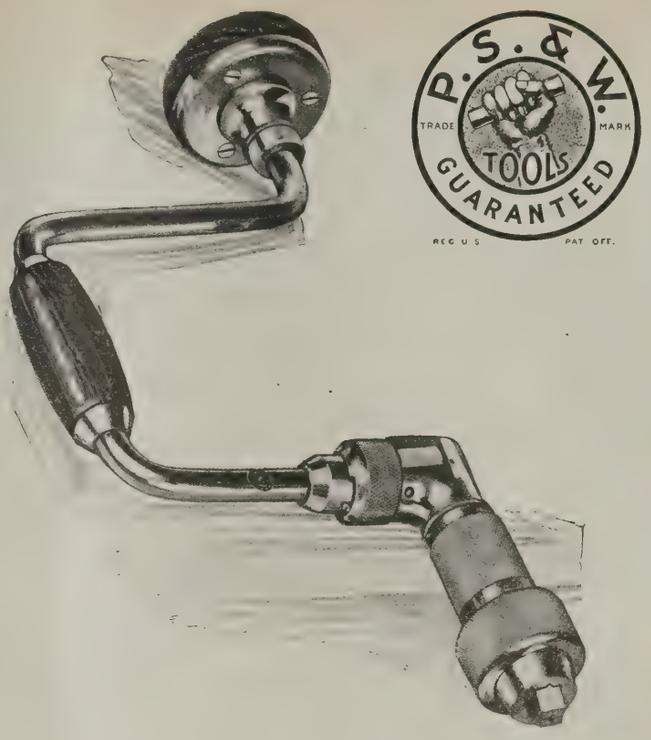
We manufacture Refrigerators and Coolers for Residences, Groceries, Markets, Florists, Hotels, Clubs, Institutions, etc., and will furnish a catalog for any of these lines on request.

McCray Refrigerator Co.

336 Lake Street

KENDALLVILLE, INDIANA

Agencies in All Large Cities



P. S. & W. TRADE MARK TOOLS GUARANTEED REG U S PAT OFF.

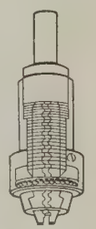
Your Tool is Your Helper. It's on your payroll, just as truly as any two-legged human helper.



The head with noiseless ball-bearings, of **steel,** *not shot—made split-proof by a steel cap.*

You won't give a poor helper room, whether the helper goes to supper or into a tool box when the whistle blows.

If you want a tool that will produce—for yourself and the boss—you'll get the



This is the chuck that the weakest wrist tightens as tight as the strongest vise; **instantly.**

P. S. & W.

SAMSON BRACE

The Brace with the Ball-Bearing Chuck

The same master workmanship and integrity go into P. S. & W. Guaranteed Chisels. Behind them, as behind all P. S. & W. Guaranteed Hand Tools, is 93 years of honorable tool-making.

P. S. & W. Chisels are made of the best tool steel, tempered and hardened by special process; they are sharpened **before they leave the factory;** and the handles are turned and sandpapered until they fit the extra-long sockets **exactly.**

P. S. & W. Tools for Carpenters include the largest line of braces and auger bits, the most complete line of chisels and gouges, highest grade drawing knives, squares, calipers, hammers, hatchets, and many other tools.

Write today for our 170-page "Mechanics' Handy List." It contains 35 pages of valuable shop information and a catalog of over 200 tools.

The Peck, Stow & Wilcox Company

MANUF'RS of the Largest Line of Mechanics' Hand Tools Offered by any Maker

Address Correspondence: 32 Murray St., New York City

Established 1819 *Five Large Factories*

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE CREAM OF A THOUSAND HOUSES.

The United States is known among all the nations of the world as being given to homes for the people. While the large cities are obliged for economical reasons to tolerate apartment houses, the country places are rapidly building up with small homes, which display the individuality of the owner and the skill of the architect.

Under the above title, Mr. Jens C. Petersen, State Bank Bldg., Traverse City, Mich., has selected from the thousands of homes which he has built, those which come nearest to the ideal of the home owner. A few of these houses run over $3,000, the majority of them being between $1,200 and $2,000.. That these houses can be built for the prices named is vouched for by the statement of the architect, owner and contractor, showing that the houses were actually built within the prices named.

On another page of The National Builder will be found the advertisement of Mr. Petersen, and we believe that those intending to build will do well to have his portfolio of houses before advancing very far with their plans, as the many unique and economical ideas will convince one that Mr. Petersen is at the front in the forward trend in the science of planning homes.

APPLIED ART.

Human ingenuity has made deep inroads into the realm of art. As the printing press revolutionized the world, scarcely less has modern methods of reproduction influenced art.

Where formerly paintings or drawings were prepared laboriously, even if lovingly, by hand, the modern press grinds them out by the thousand. But has the number of artists decreased? Hardly. The demand for them is far greater than the supply, and those who can originate or carry out new ideas are really in line for a good income for life.

Art has truly been commercialized and the art student of today looks forward to a steady position.

Modern schools of art have foreseen the trend of commercialism and have made provision for supplying the lack of competent artists. Among the schools catering to this class of employment is the School of Applied Art, at Battle Creek, Michigan. Here "art for art's sake" is taught, but with it, too, is the undercurrent of training making it possible for the artist to live while practicing his art, and handing down, not one or a dozen paintings or objects of art, to be prized in cathedrals and museums, but thousands of copies which will educate and edify all the people.

Yes, commercialism has recognized art as a help to its success, and applied art is benefited while being so used. One has only to glance at a modern magazine to realize to what an extent the study of Applied Art is of value. On every hand are posters, catalogues, etc., displaying the highest grade of art in its applied or commercial form.

The School of Applied Arts teaches both at its home studio and by correspondence. Many have not the means to enable them to give their entire time to study, but by the correspondence course can soon greatly improve their conditions. Many students report that while studying at home they have made more than enough to pay their tuition.

Anyone contemplating the study of art, whether for their own edification or as a source of income, should consider the courses offered by this school.

THE IMPROVED SIMPLEX CONCRETE MIXER.

There are many things which enter into good concrete construction. Besides material and mere strength, a certain amount of skill must be used in the selection of the materials and the greatest care used in the working of the same. For various localities, the construction varies considerably, and through the different seasons. details of constructions must be governed by the action of the weather upon the setting of the cement. Many failure are reported from time to time of concrete construction, where forms have been removed before the concrete was perfectly set, and where equally reprehensible work was done by the contractor or his employes.

There are many places where poor work can be done, which will not lead to direct failure. In the matter of concrete blocks, there is practically more latitude between the best construction and the poorest than there is in any other class of construction, which enters into a building. Blocks can be made hard, dense and strong, equal to the best monolithic work; on the other hand, they can be made so soft, porous and weak that the blocks scarcely hold themselves in place at all when put in the wall. The use of poor blocks has done more to prevent the construction of the concrete block industry than any one thing, and it is the more deplorable from the fact that such work is absolutely unnecessary.

There are many machines on the market for the use of the concrete contractor, all of which aid greatly in reducing the expense for labor, the time for construction, the appearance and solidity of the work, and last but not least, the cost of the job. The use of machine mixers is insisted upon in many specifications, and properly so, for it stands to reason that one hundred mixings or turning over of the material in the space of a few minutes is better than half a dozen by hand, taking several times longer. By the use of a machine, concrete is not only mixed quickly, but is more thoroughly mixed and placed in the trench or block machine in much less time than by mixing by hand. It is possible, also to gauge the quantity more accurately.

Many concrete mixers, like the Simplex Mixer as made by the Miles Manufacturing Co., 303 East Franklin street, Jackson, Mich., are practically automatic in their crushing, mixing and discharging; the only labor necessary being to get the material into the various hoppers. With a machine of this character, it is further possible for the superintendent or inspector to watch the work a great deal closer with a great deal less effort, and any contractor knows that any time or labor he can save the inspector will greatly redound to his credit. The contractor who uses a machine of advanced design is soon known as being the leader in his line, and the small cost of a mixer is soon made up by the benefit he receives in this direction.

For several years, the trend of concrete construction, especially in the small towns, has been in the line of concrete blocks. The first of these were made in rough wooden forms, the operation of which was slow and laborious, and not always productive of the best results. Ths variation in sizes was not evenly made, and there was, unfortunately, a variation in the sizes of blocks supposed to be the same size. This necessitated considerable work by the mason inserting them in place, and created an unfavorable impression from their appearance.

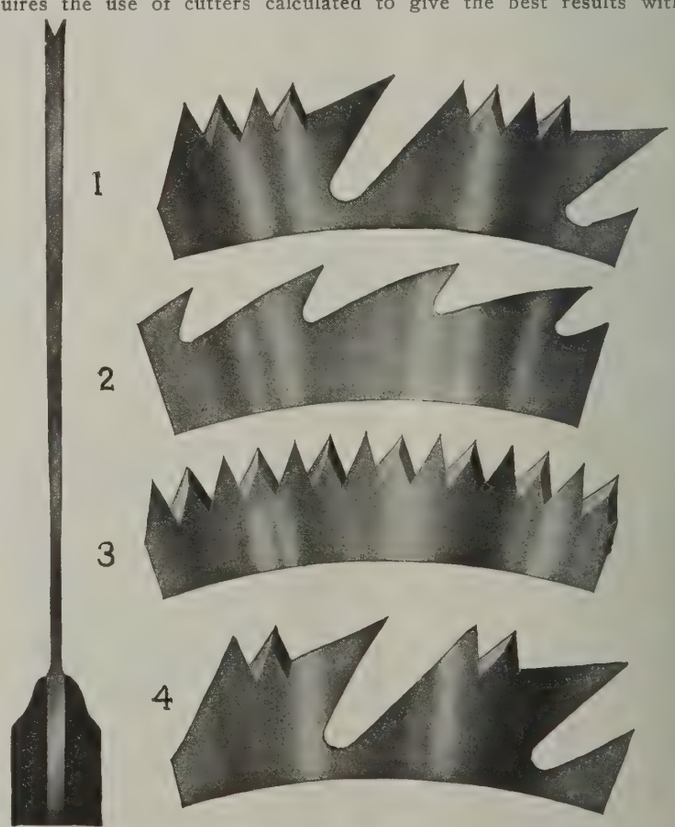
The Miles Manufacturing Co. also manufacture a block machine which embraces many of the special principles of the best construction. The machine is uesd with comparatively wet concrete, thus doing away with a large amount of the tampering necessary with some machines, as the blocks are moulded face down, it allows the use of a finer facing ot fine sand, crushed granite, marble or other colored mixture on the face of the stone. The machine is adjustable to make some forty different sizes of blocks from 4 inches to 24 inches in length and from 4 to 12 inches in thickness. It is also adjustable to make bay window blocks, angles of any degree, circles, etc. While a large part of this work is accomplished by means of extra parts, still the machine is complete for all ordinary work at the start.

The manufacturers claim that as they have five thousand machines in use, the "Miles" is deserving of careful investigation. A catalogue of these two and other machines made by the Miles Manufacturing Co., having the complete range of work capable on them, will be sent on request.

HUTHER BROS.

The use of modern woodworking machines is extending so rapidly to the contractors throughout the country in the shape of saw rigs, combination woodworkers, etc., that the contractor has become more or less independent of the planing mill.

The use of these machines to the best advantage, however, requires the use of cutters calculated to give the best results with



the least power. For various classes of work, such as cross-cut sawing, ribbing, dadoing, moulding, grooving, mitering, etc., special forms of cutters are required.

The Huther Bros. Saw Manufacturing Co. of Rochester, N. Y., are experts in the design of saws, cutters, etc., for this class of work. Their last catalogue, called the "Woodworkers' Addition No. 32," shows a vast variety of cutters for various purposes, and shows how the proper cutter may be selected.

The cut shown herewith shows the regular teeth used in their hollow-ground mitre saws. We understand that the Huther Bros. Saw Manufacturing Co. are anxious to give this catalogue a wide circulation and for that reason are sending it free to all who ask for it.

Glidden

Green Label Varnishes are the highest grade varnishes made. They are made in the largest, most complete and best equipped varnish plant in the world, and are the result of nearly half a century's experience in manufacturing varnishes for all purposes.

Wherefore, it redounds to every builder's credit to use Glidden's Green Label Brand.

To any builder who is interested in the subject of wood finishing, we will gladly send demonstrating panels of Glidden's Endurance Wood Stains and Glidden's Green Label Varnishes They give to interior trim a richness and beauty that cannot be imitated.

The five Brands we recommend your specifying:

	Per Gal.
M. P. Durable Exterior - - - -	$4.00
M. P. Durable Interior - - - -	3.00
M. P. Durable Floor - - - -	3.00
Glidden's Velvet White Enamel (Egg Shell Finish) - - - - - - -	5.00
Glidden's Superior White Enamel (Gloss Finish) - - - - - - -	5.00



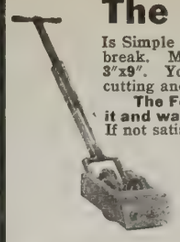
These varnishes are high in price, but as the finish is the final touch that completes the job, the finishing material should be of the best. Price ought not to be considered.

The Glidden Varnish Company

Factories: Cleveland, Ohio; Toronto, Canada

Branches. New York—Chicago—London

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



The Fox Floor Scraping Machine

Is Simple in Construction, yet perfect in every detail. There are no parts to break. Machine will not chatter or leave waves. Weight 85 pounds. Knife 3"x9". You get 8 knives made of the finest steel and being unequalled as to cutting and lasting qualities, together with a set of tools with each machine.

The Fox is Shipped on 5 days Free Trial. Freight Prepaid. If you like it and want it—and there are now 8025 satisfied users—**send us $25.00.** If not satisfied, return at our expense.

Please cut out (and get your money back) as we do not ask money until after the trial.

Write Us—Order Now—It's a good "buy" for you.

FOX SUPPLY CO., Manufacturers

115-123 KING STREET, BROOKLYN, WISCONSIN

ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO



"Sterling" Transits and Levels

If you heard of an Instrument that would actually advance your work faster, easier and better than ever before, wouldn't you be anxious to learn the particulars about it?

Our Convertible Level will do it.

Write today for Illustrated Catalog.

ISZARD-WARREN CO., Inc.

136 No. 12th St., Philadelphia, U. S. A.

$15 SAVED ON EVERY FRAME HOUSE YOU BUILD WITH

Wheeler Safety Scaffolds

No lumber or nails used—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

Write today for our trial offer

AMERICAN STEEL SCAFFOLD CO., 59 McGraw Bldg., Detroit, Mich.

CONCRETE MACHINERY

The greatest mixer made All kinds of styles of the latest cement block and brick machines and molders from $5 and up; in fact **WE MAKE EVERYTHING IN CONCRETE MACHINERY** (low prices but high grade) **GET CATALOG N. FREE.**

SYSTEMATIC CONCRETE MIXER

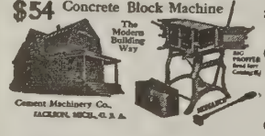
28 ADVANTAGES



CEMENT MACHINERY COMPANY

Jackson, Michigan, U. S. A.

$54 Concrete Block Machine



CEMENT IS CHEAP—BIG PROFITS

making concrete products and building sidewalks. Get a mixer. Get started. Prospects brighter than ever; things are going to boom in the cement industry. Get free Catalog "N."

CEMENT MACHINERY CO., Jackson, Michigan



BUILDERS

SAVE TIME and SAVE MONEY

By using this **Adjustable Level** you can do the work of two men and do it quicker. For all jobs requiring **leveling, plumbing or grading it has no equal.**

There are no conditions to the **guarantee, money returned if not satisfactory.**

Price by mail $1.00.

J. D. WEAVER

JACKSONVILLE ILLINOIS

THE ROYAL STANDARD UNIVERSAL WOODWORKER



HAS A BORING ATTACHMENT

which gives you all the desirable features found on an independent boring machine. Besides the attachments for sawing, jointing, box-chamfering, grooving, rabbeting, matching, dadoing, tenoning, moulding, etc. Write for well illustrated catalogue.

CORDESMAN-RECHTIN CO. 10 Butler Street CINCINNATI, O.

"DURABILT COLUMNS."

Possibly the greatest objection to wood columns is due to the tendency to warp or shrink and so open up joints extending far into the center of the column. In an ordinary column this means entirely through the shell, so that an opening is made for dampness to enter, starting trouble right away where it is difficult to get at it.

One of the methods used to overcome trouble of this character is shown in the method adopted by Harris & Cole Brothers of Cedar Falls, Iowa. A column made in this manner has no exposed joints to be affected by the weather, whether the column is kept painted or not.

Harris & Cole Brothers are well known as manufacturers of the finer grades of red gum and oak finishing lumber, trim and mouldings. Their facilities for getting out special widths and sizes on short notice are surpassed by few mills in the country, and their large stock is of the first quality.

SIMONDS GUIDE FOR MILLMEN.

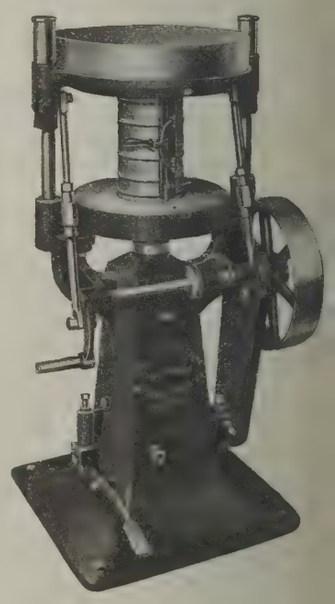
In a neat little booklet the Simonds Manufacturing Company of Fitchburg, Mass., takes a party of interested millmen through their plant at Lockport, N. Y. From the offices, through the melting rooms where crucibles are carefully filled with the necessary ingredients to make perfect steel, the chemical laboratories where a careful check is kept on all the processes, to the rolling mill, is a fascinating trip for those who consider the quality of the material. Many metals take a fine polish, but few meet the severe tests necessary to class it as saw material.

For the manufacturer, the businesslike manner in which the rolling, shearing, cutting, stamping, finishing, etc., is carried on call for his approval.

But there is one place where the visitor is not allowed to enter, although its purpose is plain. Under the big "Danger—Keep Out" sign is the transformer house, where the high tension wires from the big Niagara Falls turbines enter with their tremendous power to be stepped down to a safe current for the many motors throughout the plant. From three thousand volts the current is reduced to four hundred and forty. Thus, if he wishes, every Simonds saw owner can at the same time possess a souvenir of Niagara Falls, made by electricity.

Those interested in seeing how extensive a plant is necessary to keep up the demand for Simonds goods can obtain this interesting booklet by writing to the Simonds Manufacturing Company of Fitchburg, Mass., and mentioning the January, 1912, number of Simonds Guide for Millmen.

CEMENT DRAIN TILE.



While some sections of the country are clamoring for water for their parched and dry land, others are praying for relief fom too much water. If it were possible to mix the soil, seasons and climate of the dry portions of Oregon and Washington with the swamp lands of Mississippi and Louisiana, the result would probably be an ideal condition for farming purposes.

But it is not alone the very dry countries that want water, nor the very wet that would get rid of it. Much of the finest soil in the United States suffers for want of proper drainage at certain seasons of the year. Books have been written on the subject, fortunes spent to reclaim acres of land by drainage.

The underlying requirement of drainage is "tile," and permanent results are obtainable only by permanent drain tile.

For many years the agriculturist has depended upon burned clay tile for his supplies, and it is only in recent years that it has been possible to find a substitute at a reasonable price, in fact, one which every cement worker could make without a large outlay for equipment, buildings, storehouses, etc.

With the advent of cement products, at reasonable prices, efforts were made to perfect a machine by which cement drain pipes could be made in quantities and at low cost. A cylindrical form and casing would do the work, possibly, but at an enormous loss of time and material.

The W. E. Dunn Co., 4135 Fillmore street, Chicago, Ill., recognizing the need for a practical machine of this character and being well versed in the manufacture of machines for making cement blocks, cement brick and cement porch columns, have placed on the market a machine for making cement drain tiles, which they claim eliminates much of the inconvenience usually attending work of this character. So certain are they that it will meet every requirement, that we understand they offer to send it on fifteen days' free trial. So many other good points are claimed that we ask every interested reader to get their catalogue and see for himself. The machine as shown herewith will give a good idea, but if one has use for it, the real machine will be shipped on approval. It takes faith in one's machine to send one out under such conditions, but we believe the W. E. Dunn Co. have the goods.

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And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.

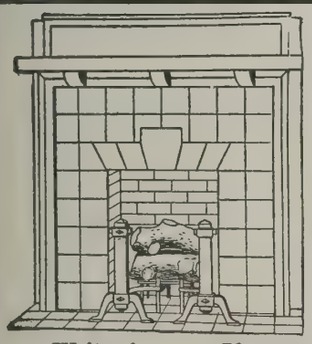


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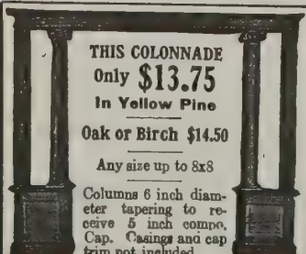
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KRAOPLATE BLACKBOARDS.



Educational lines are being extended so rapidly that those directly interested realize the advances which are being made. New systems of teaching are being introduced, new methods and theories being worked out. To carry out advanced lines of thought, many buildings are being replaced by others of modern construction, and the equipment should be in keeping with the rest of the building.

For many years it has been recognized that one of the best methods of teaching the little scholars many things is by blackboard illustration. Only those who attended, or visited, the "country-school" realize how imperfect these blackboards can be. Rough, cracked, spotted, glazed, shiny, bare, a source of torment to teacher and scholar, and a continual expense to the district.

Many efforts have been made to produce a perfect surface for blackboards. Coatings on plaster are, as a rule, short-lived and unsatisfactory for hard usage. A dense substance, that neither water nor hard usage will affect, is necessary as a base, and the surface must retain its color and surface through all the usage to which it will be subjected.

The Atlas School Supply Company, 1020 Van Buren street, Chicago, Ill., are making a specialty of Kraoplate, which in many respects forms an ideal surface, so heavily coated with waterproof slating that we understand the manufacturers guarantee it for ten years under ordinary schoolroom usage.

Those having the erection, alteration or equipment of school buildings under their supervision are urged to investigate Kraoplate blackboards, as their low price makes their use advisable, and we understand that a special price is made to carpenters and contractors. The Atlas School Supply Company also manufacture and handle a large line of other school supplies.

RIB LATH AND RIB STUDS.

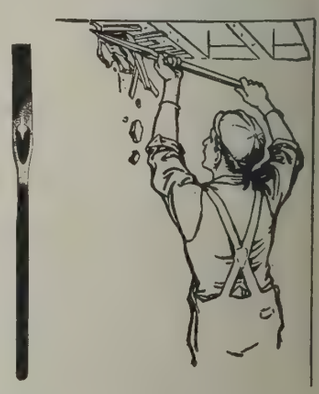
Fireproof construction, if used at all, should be carried out to the logical limits. If the outside walls are fireproof, it decreases the exposure hazard, but the interior remains subject to the ravage of the flames which originate within the building.

That interior fireproofing is possible is seen from a catalogue of the Trussed Concrete Steel Company of Detroit, Mich., showing the construction possible with their rib lath and rib studs for plaster and stucco. The pages show examples from small cottages to large apartments in which this construction is used, and shows the wonderful adaptability of this form of stud and fabric.

Not only can this lath be used for interior partitions, but for the exterior walls as well. The finest effects in stucco are obtained, while the construction is also incombustible. The drawings in the booklet showing the details of construction are good examples for the draftsman to follow, and the builder will find many items of value in the pages of this excellent booklet, which we understand is sent on request.

A NEW PRY AND NAIL PULLER.

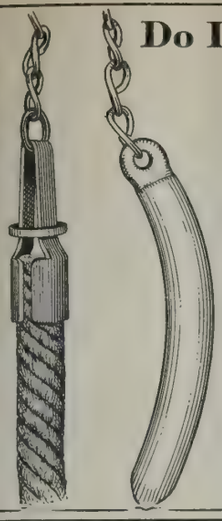
It is an expensive pry for the carpenter who takes one of his fine framing chisels to use as a crow-bar when a piece of flooring or ceiling is to be removed. It is expensive because the chisel is not made for that purpose and it is generally broken or at least dulled. Also, when it comes to pulling out a nail, and one of those nails made made years ago and driven into a piece of hardwood for the purpose of staying right there, the carpenter will find his hammer unable to pull the nail out.



The illustration accompanying this article shows the Bonner pry bar and nail puller, which the manufacturers state is even handier than a hammer. It is made in 14 and 23-inch sizes of special dull steel and tempered to stand the hardest wear and tear.

The small size is an especially good tool for the home owner to have around. The larger size is blue finished and just what the average carpenter and contractor likes. This new tool can be bought at the hardware stores or direct from the manufacturers. It is made by the C. O. Bonner Mfg. Co., Champaign, Ill., who are mailing circulars about it at this time.

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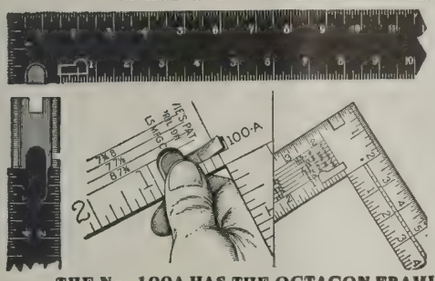
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No. 100A Framing	3.25	3.50	3.75

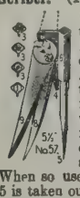
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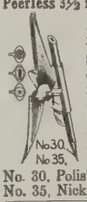
Combines all features of No. 30 and No. 55. No other compass equals it. As a scriber, beats them all. Legs marked 8 and 9 when used in connection with each other, form entirely separate scriber. When so used, steel point No. 5 is taken out entirely. Broad point No. 9 can be swung out of the way as indicated by dotted lines. Send for circular. Price, nickel-plated, 60 cents, postpaid. Order now.

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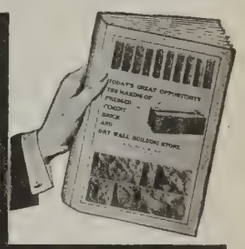
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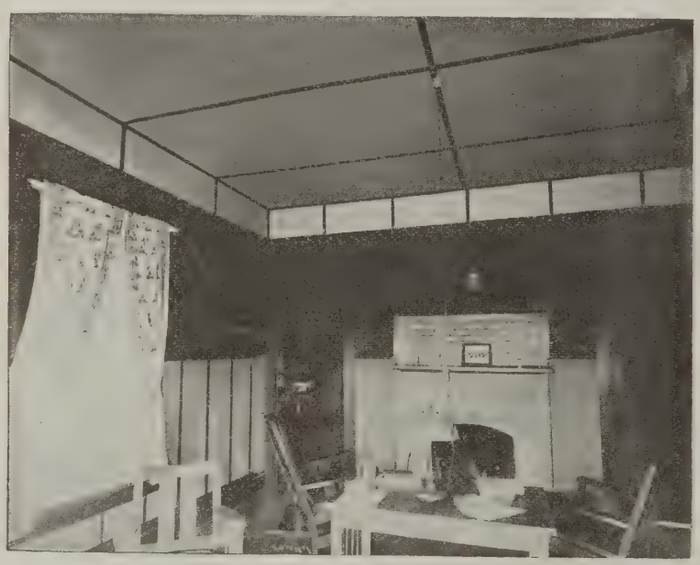
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A UTILITY WALL BOARD BUNGALOW.

When Mr. Ellis of Hot Springs, Ark., decided to build there was no doubt in his mind but that he wanted a perfect home, within the limits of cost and other conditions. From the satisfactory results which he obtained and the praise he received from his visitors, he is



THE LIVING ROOM.

more than ever convinced that Utility Wall Board was just the thing to use.

In accordance with his first plans, every one of the five rooms in the bungalow is finished with Utility Wall Board. The bathroom and halls also have the walls and ceiling of the same material, and the ceilings of the porches are likewise in panels of this most satisfactory covering.



A BED ROOM.

In this case, the owner was looking for "ideal" results. Why not judge from the photographic reproduction whether or not he is satisfied?

While cost is not necessarily a determining factor, the low price of Utility Wall Board makes a building cost materially less than one with plaster. The convenience and ease with which it is put on, and the saving of time would be enough to warrant its use at even an increase over plastered surfaces.

But suppose you want to decorate your walls—you can wait a few months for plaster to dry out and set thoroughly, so that the lime will not burn the colors out of the paper or kalsomine. The bare white walls will soon be covered with finger marks and dust, and isn't it a temptation to mark on a nice white wall, especially after someone else has made a few lines on it?

With Utility Wall Board the first operation is the only one, and the wall is ready for decoration, whether by oil or water paint, enamel, paper, burlap or tapestry.

Anyone having taste enough to pass upon a set of plans for his home has sufficient talent to select the colors and materials to decorate the walls. Except in some of the higher grades of paper-hang-



THE KITCHEN.

ing and burlap, the ordinary householder can do all his decorations himself at his leisure, making his house a real home with his own hands.

But while we have spent considerable time on this bungalow, we should remember that this is only one of the many places where Utility Wall Board may be used to advantage. As it comes in large sheets, forming a water-tight and air-tight surface, it is of value wherever it is desired to exclude the air, moisture, heat or cold. Its homogeneous nature prevents its warping, twisting or opening up at the joints. As it is waterproof, it repels the moisture where plaster, cement and similar surfaces usually soak it up like a sponge.

Utility Wall Board is possible not only in new buildings, but in old. Where plaster is damaged and falling it can be used to good advantage. When the attic roof beams are bare and cold, use it, and have a nice, livable room. When you want to refinish your living room, or dining room, use Utility Wall Board, and put on a beamed ceiling at small cost.

So many places might be mentioned that we can only refer you to the manufacturers, the Heppes Co., 4502 Fillmore street, Chicago, Ill. Their large, new catalogue shows many pleasing examples which are well worth studying.

Amatite ROOFING

Mineral Surfaced

Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface *which never needs painting;* the two layers of Pitch which is the greatest waterproofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.

We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

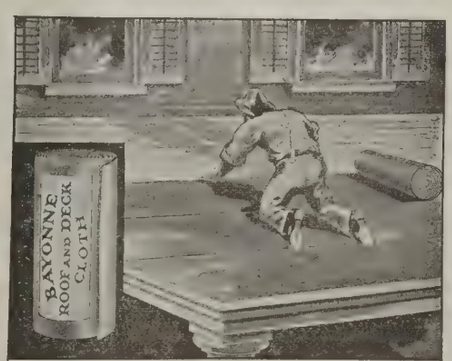
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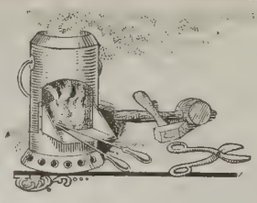
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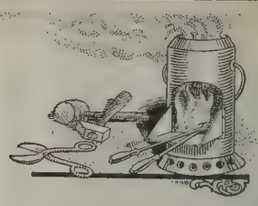
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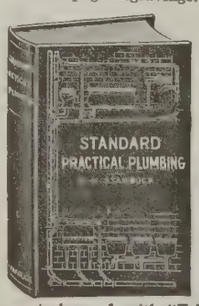
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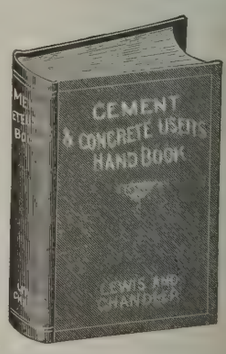
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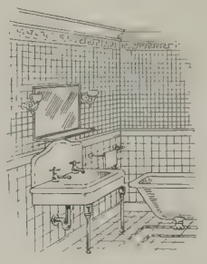
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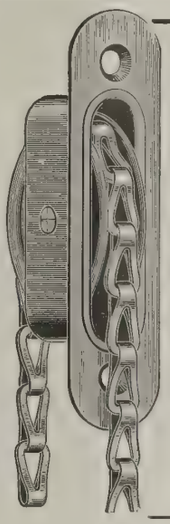


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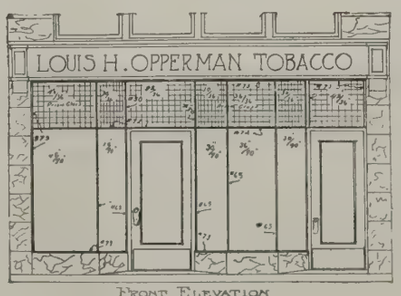
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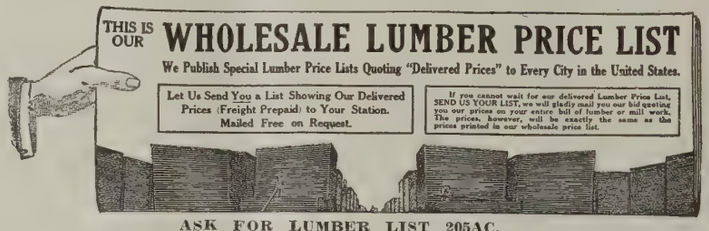
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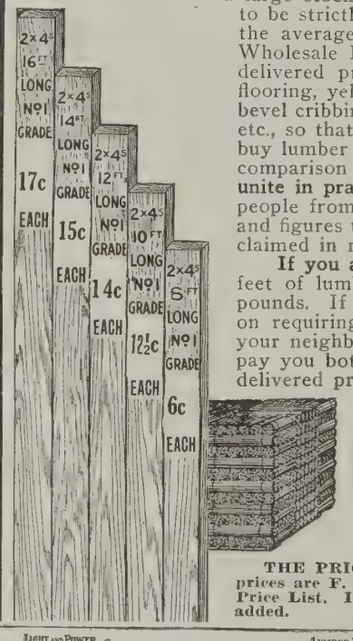
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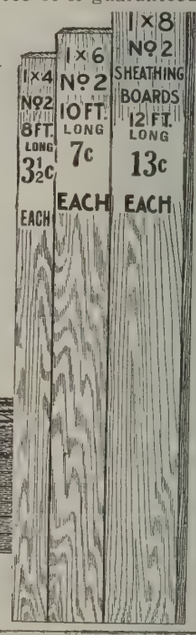


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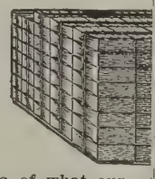
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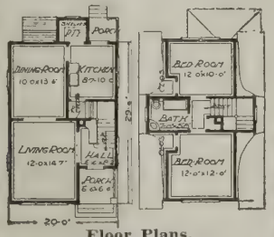
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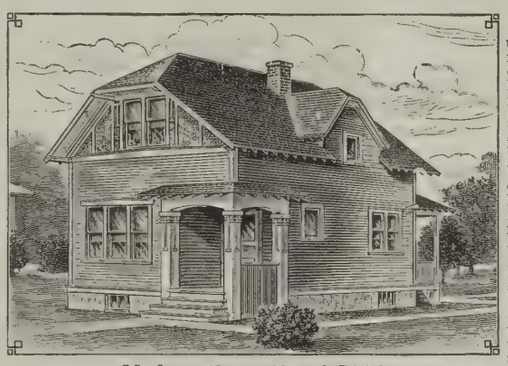
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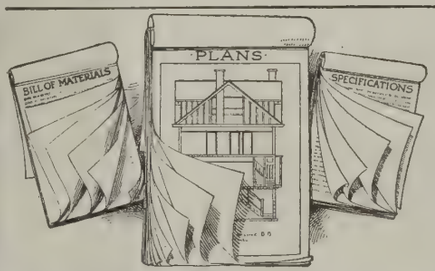


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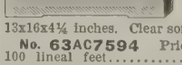
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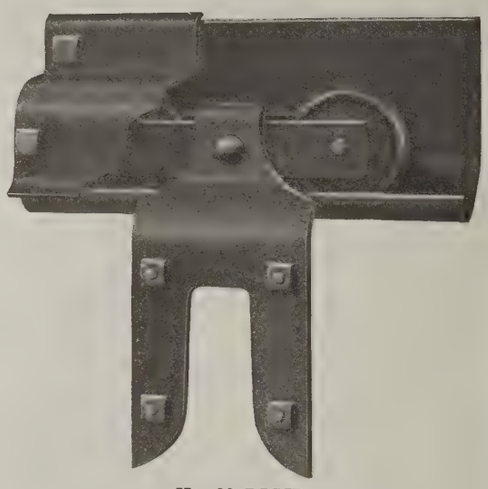
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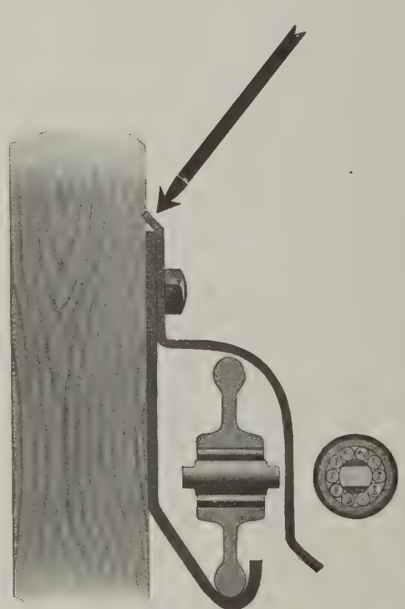
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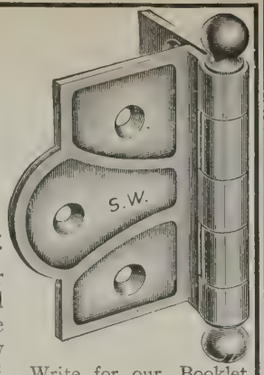
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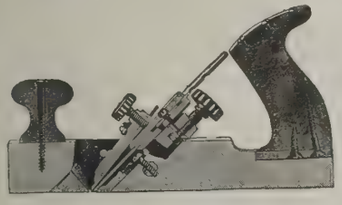
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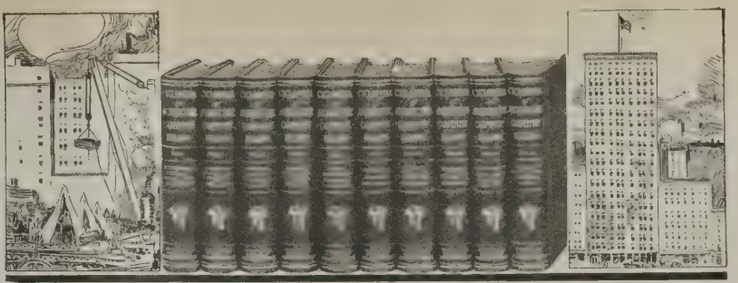


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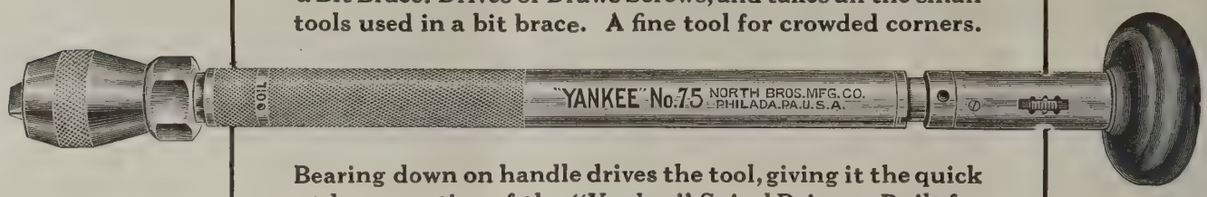
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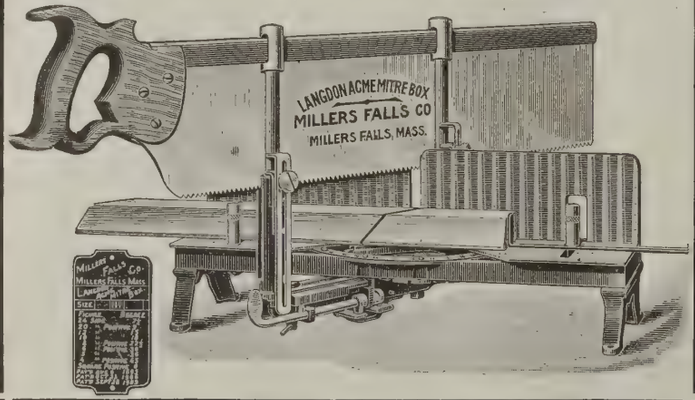
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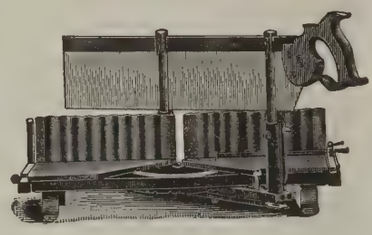
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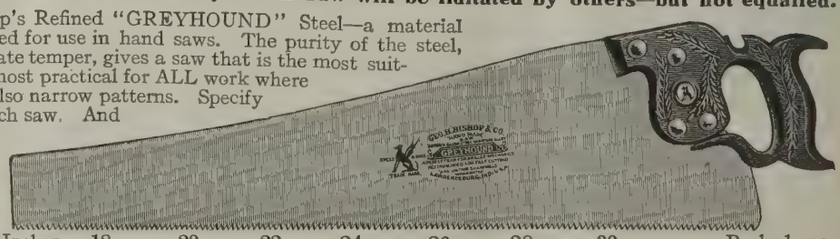
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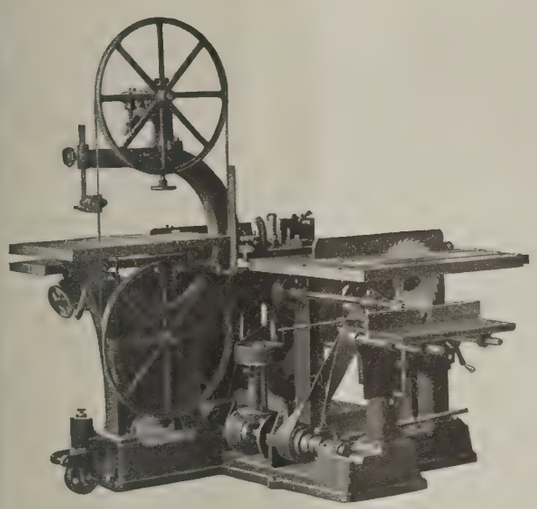
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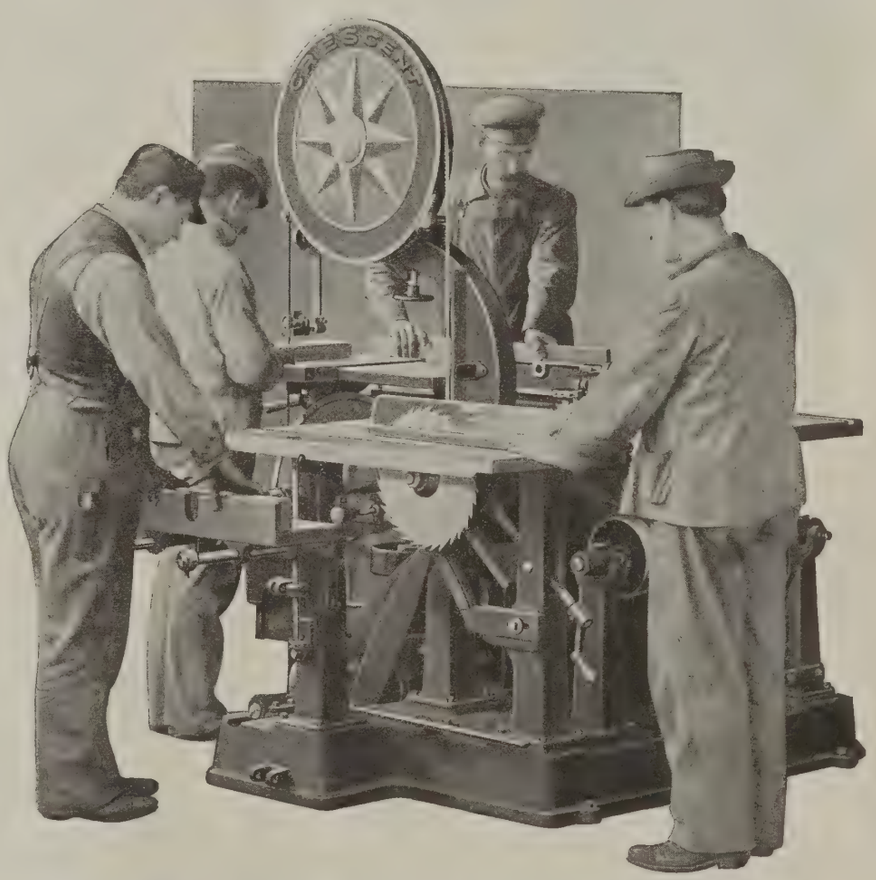
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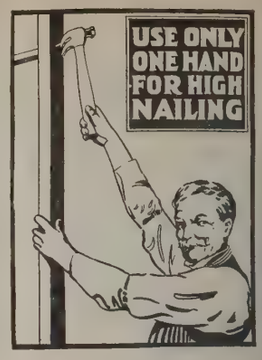
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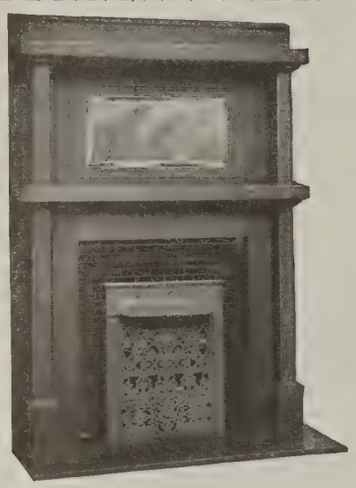
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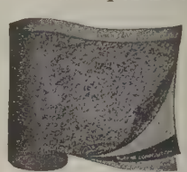
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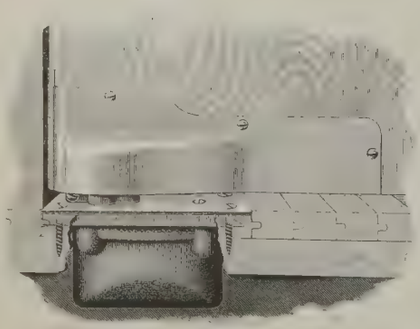
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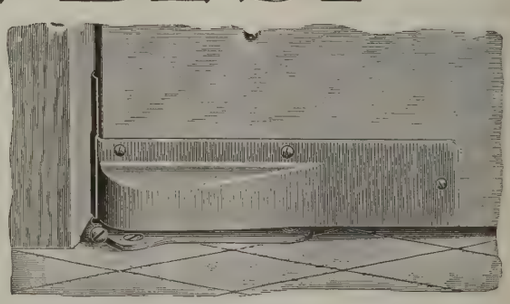
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TWO OF THE BEST



"STANDARD" DOUBLE-ACTING SPRING FLOOR HINGES and "STANDARD" CHECKING HINGES

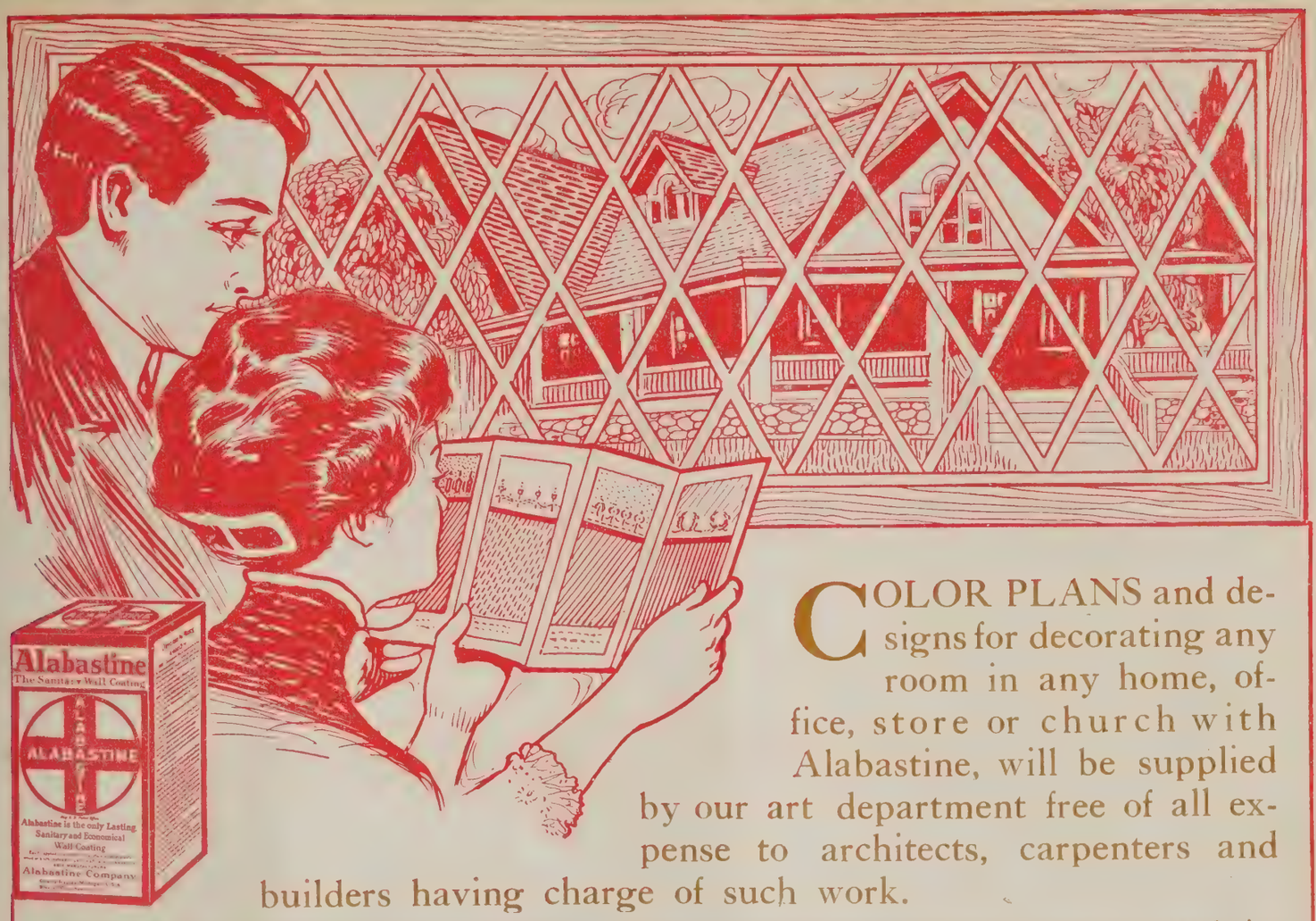
for Double-Acting Doors



Ask Your Hardware Dealer

THE STANDARD MANUFACTURING CO., SHELBY, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



COLOR PLANS and designs for decorating any room in any home, office, store or church with Alabastine, will be supplied by our art department free of all expense to architects, carpenters and builders having charge of such work.

Beautiful cut stencils for carrying out the decorative work now so much in vogue will be furnished by the Alabastine Co., to be used in connection with

Alabastine

THE SANITARY WALL COATING

Where the merit of Alabastine is known there it is used. Any architect, builder, decorator or property owner who comes to know the advantages of Alabastine, becomes an advocate and user of it. We want you to know about Alabastine and to feel that you are doing your customer a favor when you recommend its use.

WHAT IT IS

Alabastine is a water color, fine in texture, artistic in tint, for use on all interior surfaces, whether plaster, brick, cement, wall board or canvas.

It is a dry powder in white and many tints and colors, that may be used as manufactured, or combined and intermixed to produce any color desired.

Alabastine is ready for use by mixing with cold water. It is put up in 5-lb. packages and specially packed in bulk for large jobs where desired.

It is durable, sanitary, artistic and economical. Write us for more detailed information.

WHY IT IS BEST

Alabastine is best because it is durable, by that we mean that when once applied to a suitable surface, it can later be retinted and redecorated, putting succeeding coats of Alabastine over the old ones without the necessity of going to the expense or passing through the disagreeable experience of washing the walls.

Should you ever desire to wash Alabastine from your wall it can be done, which is not the case with paint once it commences to scale off.

An Alabastined wall can be re-coated when soiled at less expense than to wash a painted surface.

FOR NEW BUILDINGS

Alabastine is the ideal material for all new buildings because, unlike kalsomine sold under various names, when once on the wall it forms a perfect surface for any future treatment. Paper can be applied over Alabastine, a new coat of Alabastine can be put on or it may be painted. Many people desire to allow their new building to stand until it is through settling and all cracks have shown. Instead of living in a building with white, glaring walls, soft Alabastine tints may be put on and afterwards treated in any way desired without removing this Alabastine. Alabastine for an ordinary plastered surface or on wall board will not, when purchased at retail price, cost for regular tints to exceed 1½c per square yard for material. The cost of applying would be extra, but it costs no more to apply Alabastine than the cheapest kalsomine.

OVER WALL BOARD

Alabastine makes the only suitable material for use on the various wall boards. It costs much less than paint, is too superior to be compared with any kalsomine, as it is durable and may be recoated. The surfaces of these boards vary, some of them will take a coat of Alabastine with no preparation, others will work by giving them a coat of varnish or shellac size. If interested please write us.

ALABASTINE CO.
Decorative Dept.
GRAND RAPIDS, MICH.

Coupon

Alabastine Co.,
Decorative Dept.
Grand Rapids, Michigan

Gentlemen—Please send us your special literature to contractors and builders. I am desirous of investigating further. Yours truly,

Name.....

Town.....

State.....

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



They Save Man Power

ATKINS Silver Steel SAWS

HERE is a clear demonstration of only one of the scientific advantages of SILVER STEEL SAWS. In the picture you will see ATKINS' Famous No. 53 with Perfection Handle. Follow the line down the man's arm and see where the force of stroke is centralized. On the saw teeth. You know that you can push harder and easier from an elevation that is in a direct line. Just so with the Perfection Handle. What could be easier than the motion shown in the picture above? The Perfection Handle is the only shape of Handle that naturally places the saw blade in this position. That's why we recommend it.

Now Note the Dotted Line

See how the straight handle throws the saw blade downward. See where the greatest force is exerted. On the back of the saw. Is this not energy wasted needlessly?

WE MAKE BOTH KINDS

If you still prefer the old style straight handle, ask for the following skew back Saws—Nos. 51, 52, 66, or the following straight back saws—Nos. 54, 55, 64 or 67.

The following are the most popular saws fitted with Perfection Handle. In skew back, Nos, 400, 53, or 68. In straight back, Nos. 65 and 69.

OUR FREE OFFER. If there are any carpenters who have not as yet received one of our aprons free of charge, we will be glad to forward one upon receipt of ten cents to pay postage and will send with it full information in regard to High Grade Saws.

HOW TO BUY THEM. Your dealer most likely sells SILVER STEEL SAWS. If not, he will be glad to order for you from his wholesale house. Specify ATKINS SILVER STEEL. None genuine unless plainly marked "SILVER STEEL" on the blade. If your dealer won't supply you, write to us. We'll see that you are taken care of.

E. C. ATKINS & Co., Inc. **Indianapolis, Ind.**

MORE COPIES
PRINTED AND CIRCULATED THAN ANY OTHER BUILD PAPER IN AMERICA.

THE NATIONAL BUILDER





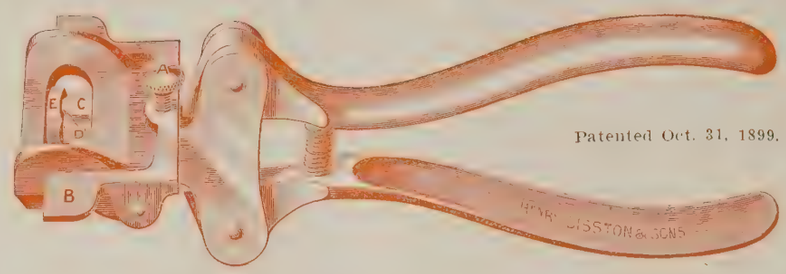


PUBLISHED MONTHLY

Twenty Cents Per Copy Two Dollars Per Year

MARCH, 1912

DISSTON TRIUMPH SAW-SET



SPECIALLY ADAPTED FOR HAND SAWS, CROSS-CUT SAWS, CIRCULAR SAWS AND ALL SMALL SAWS.

THE IDEA embodied in this Saw-Set is one that will commend itself to every user of a saw-setting tool. The principal feature is the use of two plungers operated by the two levers or handles; pressure on the lower lever forcing plunger "D" against the body of the saw, thus holding it rigidly in position and preventing slipping, whilst a continuation of the pressure on the upper lever operates plunger "C" in setting the tooth.

In action it is easy and powerful, and while it will perfectly set wide and heavy saws, it is also particularly adapted for narrow blades, such as web saws, narrow band saws, etc. If the gauge "B" is properly adjusted, the result will be a uniformity of set that cannot be obtained by any other hand set.

Another important point is the head of the Set is made open, enabling the operator to quickly adjust the Saw-Set to the tooth, the work being in plain view at all times. The gauge "B," for regulating depth of set, has a wider bearing than in most saw-sets, thus doing away with the tendency to incline the tool to one side or the other, which would give an uneven set to the teeth. The anvil "E" is fitted with four bevelled surfaces, suitable for different sizes of teeth.

IN OPERATING First adjust the anvil so that the bevel most suitable for the size tooth to be set is brought into position, hang the Saw-Set on the saw so that the gauge "B" rests on the teeth; adjust this gauge for the depth of set to be given, by the use of set-screw "A." Use care not to go too deeply into the body of the tooth, as all of the set should be in the point itself. Taking too deep a hold is liable to distort the body of the blade or break out the teeth. The top of plunger "C" should be in line with the top of tooth to be set.

We claim this to be the best Hand Set ever put on the market, and a trial will convince any one of its superior merits. If the instructions as to adjustment are carried out the results will be entirely satisfactory to the operator.

The **Triumph Saw-Set** is manufactured in three sizes, the smaller size, No. 28, being suitable for Hand Saws, Back Saws, Web Saws, narrow Band Saws, etc.; the medium size, No. 18, for small Circular Saws, etc., and the large size, No. 8, for Cross-cut Saws, Circular Saws, etc.

Made only in POLISHED FINISH.

HENRY DISSTON & SONS

INCORPORATED

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS PHILADELPHIA

Common Sense Tools for Common Sense Men

WHAT could be simpler than a turned shank? The new RUSSELL JENNINGS PRECISION Bits have turned shanks and can be placed more easily and rapidly with less tightening of the brace chuck than any bit you ever saw. Once placed they stay put; they can never "wobble." These bits are the well-known Russell Jennings, having the extension lip, double twist, and screw point, which has made them the standard of excellence for more than half a century.

THE RUSSELL JENNINGS Precision tools are now put up in a variety of sets, packed in neat basswood boxes, having clips and other devices for holding the tools.



SETS include brace with Precision chuck for Precision tools with turned shank; or Universal Precision chuck for either Precision bits or bits with ordinary shank.

Ask Your Dealer for Our New Bulletin

RUSSELL JENNINGS MFG. CO., Chester, Conn.

21-78

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

This Will Bring You More Spring Building



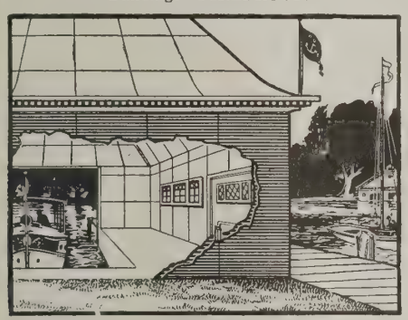
Bishopric Wall Board Just the Thing for Park Buildings—FIREPROOF.

Scores of jobs are waiting for you to point out the uses of Bishopric Wall Board. Far better than lath and plaster. Guaranteed to last as long as any building. Cost so low that it can be used in any kind of building. Get our special proposition to Builders and Contractors and prepare NOW, not only for your usual lines of building—Houses, Stores, Factories, etc.—but ALL KINDS OF BUILDINGS FOR AMUSEMENT RESORTS AND PARKS, BOAT HOUSES, BATH HOUSES, CHATAUQUAS, BOOTHS, SUMMER THEATERS, ETC.



Shows Construction of Bishopric Wall Board.

Bishopric Wall Board means the best finish and the speediest finish.



Handsome and Lasting Finish for Boat Houses or Bath House.



Used in the finest residences as well as cottages, bungalows, etc. Makes remodeling easy; no mess, no dirt. Bishopric Wall Board takes paint, paper or burlap.

This is the Year for Lower Priced Materials

Make the most of the opportunity Bishropic Wall Board gives you. Show the owners that Bishopric outlasts laths and plaster many times over; that it is air-tight, moisture-proof, rat and cockroach-proof, a non-conductor of heat or cold, and FIRE-RESISTING. Made with non-burning Asphalt Mastic (our exclusive patent) in which dressed lath is firmly imbedded. Lath is positively necessary to keep any Wall Board flat and rigid, and to prevent warping, swelling and pulling away from seams. Bishopric Wall Board is the only Wall Board made with lath.

Bishopric Wall Board comes to you in sheets 4x4 feet all ready to put on. Any man who can drive nails can apply it. Sixteen sheets to the crate. Price, $2.50 per 100 square feet; $6.40 per crate of sixteen sheets; or 256 square feet. Bishopric Sheathing comes in crates of sixteen sheets, 256 square feet. Price, $2.35 per 100 square feet; $6.00 the crate, f. o. b. Cincinnati.



Bishopric Wall Board makes the most satisfactory finish for office buildings, stores, apartment houses, schools, churches, theaters—every kind of building. Its fire resisting quality has been proved in actual use.

Get Our Special Proposition to Contractors and Builders

Fill out the coupon in this advertisement—or drop us a letter or a postal today. You put yourself under no obligation to us whatever. Let us send you a sample. Examine it and convince yourself. Do it now—before you lay this paper away. This is our great 1912 offer—specially made to meet building conditions for this spring. Address

The Mastic Wall Board & Roofing Mfg. Co.
318 Este Avenue **CINCINNATI, OHIO**

CONTRACTORS AND BUILDERS COUPON

The Mastic Wall Board and Roofing Mfg. Co.
318 Este Avenue, Cincinnati, Ohio

Send me Free, sample of Bishopric Wall Board and your special proposition to Contractors and Builders. This places me under no obligation whatever.

Enclosed find 6c in stamps to pay for mailing book of House & Home Plans, describing its uses.

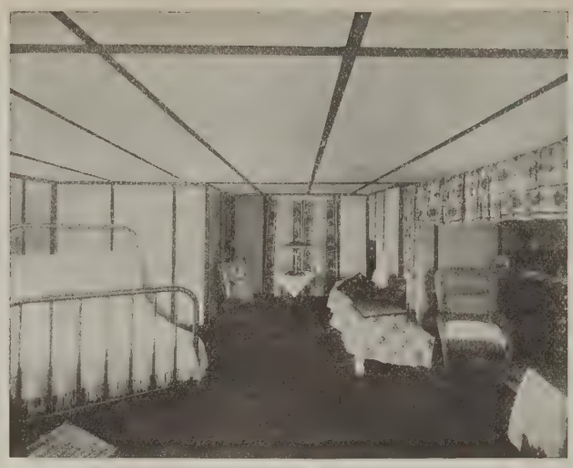
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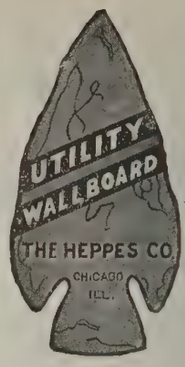
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BISHOPRIC WALL BOARD AND SHEATHING

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FIVE THOUSAND CARPENTERS HAVE ASKED FOR AND RECEIVED SAMPLES OF

UTILITY WALL BOARD

A large majority of them are using Utility Wall Board in the houses and other buildings that they are putting up. Every wide-awake carpenter and builder appreciates the convenience and economy of Utility Wall Board. It appeals to him because it is so easy to put on—so tough and durable—so easily adapted to every type of building—because it does away with all the muss and bother and delay of lath and plaster—because it gives universal and lasting satisfaction wherever it is used.

Utility Wall Board is moisture proof. It does not warp or crack. It is put on directly over the studding—or over old plaster. It will stay on as long as the building lasts.

If you haven't had your free sample, write for it today.
Also for the illustrated book.

THE HEPPES COMPANY

4502 FILLMORE ST.
CHICAGO, ILLINOIS

Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.

Pearl and Main Streets

CINCINNATI, OHIO



Builders Who Know This Modern Wall Lining Use No Other

M. BARRY & SON, of Chicago, Ill., write: "Compo-Board is the best of its kind we have ever used. It is cheaper, cleaner and more easily put on than any material we know of." So say hundreds of others who know from experience. For instance: N. A. Beck, a contractor in Burlington, Iowa, won the everlasting gratitude of a customer by using Compo-Board directly over a plaster ceiling that had begun to crack and fall off in spots. Thos. S. Whitbank, a real estate broker in Philadelphia, uses thousands of feet in remodeling houses. Woodruff Mfg. Co. of Washington, D. C., use many thousand feet in government contracts.

The exclusive features of Compo-Board make it the most satisfactory wall lining. The basis of its construction is a wooden slat, arranged so the grain of the wood runs in different directions, making it non-warpable. It is non-porous and airtight—hence, impervious to cold, heat, moisture and vermin. Can be papered, painted or kalsomined more satisfactorily than plaster, with or without panels. Write for sample and interesting booklet containing many money-making hints for contractors, builders, architects and home owners.

Northwestern Compo-Board Co.

5776 Lyndale Ave. No. **Minneapolis, Minn.**

Compo-Board

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

The third of a series of twelve monthly talks to carpenters about the practical use of Beaver Board, the pure-wood-fibre wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall paper; and is appropriate to any type of building, new or old.*

Beaver Board is essentially a proposition for carpenters and builders.

CHAPTER III

BEAVER-BOARDING STORES

Here's an almost unlimited field for the carpenter who'd keep busy no matter what the weather or season.

And this field is growing at a tremendous rate.

It's because Beaver Board has so many advantages for this work.

Instead of cracked, dingy plaster and unsanitary wall paper, it means pure-wood-fibre panels, handsomely painted and stenciled—quickly and easily put up.

A clean, light, artistic interior helps to sell the goods. It has every advantage over heavy, expensive, ugly metal ceilings.

You can get frieze and panel effects, wainscoting, covework, arched, beamed or mullioned ceiling effects easily.

Beaver Board makes attractive backgrounds for show windows.

It's just the thing for partitions—the floor space can be quickly and economically partitioned off to suit the tenant.

You can't get away from all these merits—and they mean more work for you. It's a carpenter and builder proposition and has more profit and reputation buying possibilities than any you ever tackled.

We'll Plan the Whole Job for You

We maintain an expensive Architectural Department for your benefit. For the asking, we'll plan the whole job for you and give you estimates also.

Your problem, if it is only that of Beaver Boarding a 10x12 candy store, will be given just as thorough attention as the other fellow's 12-story office building job.

It's Very Easy to Put Up Beaver Board

If the directions which come in every bundle, are followed intelligently, putting up Beaver Board is as simple as assembling the simplest of knocked-down furniture.

These are some of a *very few things* you must be careful about in putting up Beaver Board:

Don't nail Beaver Board closer than 3/8 of an inch from the edge of the panels.

Don't place Beaver Board before using where it will absorb moisture.

Don't put up Beaver Board until all necessary headers and furring strips have been set in between the studs and rafters.

Don't paint Beaver Board until it has been well sized.

Here's Beaver Board's Case in a Nutshell:

Beaver Board is economical, easy to handle, suits any kind or sort of building, retards heat, cold and sound, doesn't crack, check or deteriorate with age.

Beaver Board's endless possibilities for all kinds of uses are fully described in our free booklet, "Beaver Board and Its Uses," with many pictures of different interiors. Write for it today.

*These chapters began in the January number. If you missed back chapters, write us—we'll mail them to you.

The BEAVER COMPANY of BUFFALO
445 Beaver Road, Buffalo, N. Y., U. S. A.
The BEAVER COMPANY, LIMITED
385 Beaver Avenue, Ottawa, Canada

BEAVER BOARD

PURE-WOOD-FIBRE
WALLS & CEILINGS

BEAVER BOARD
PURE WOOD FIBRE

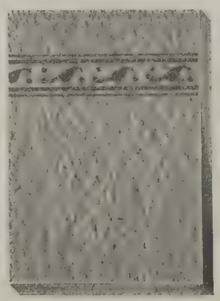
Look for this trade-mark on the back of every panel



Room ready for Beaver Board construction, studs evenly spaced and headers in correct position to suit panel designs adopted.



Nailing up panels, using flat-head nails three-eighths inch from edges, three inches apart and bung-head nails six inches apart for centers.



A sample of Beaver Board, showing its pebbled surface, which so lends itself to painting.



Wickham & McCarthy, who have used Beaver Board in this attractively designed barber shop, find that it elicits comments from owners of commercial buildings of all sorts.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BOOST YOUR OWN REPUTATION, MR. CONTRACTOR, BY TELLING YOUR CUSTOMERS—"PUT A STOP TO DEPRECIATION—BUILD WITH CYPRESS *AT FIRST*"



IS THE "LIFE-SAVER" of an HONEST CONTRACTOR'S REPUTATION

Here is a letter just received from a builder who **knows** by experience. Probably you feel the same way. Why not **CUT OUT TROUBLE?**

——— — ——— **Contractor and Builder,** — ——— **Street,**
PITTSBURG, PA., Mar. 22, 1911.

Southern Cypress Manufacturers' Association, New Orleans, La.

Gentlemen: Please send me information about Cypress lumber. Have about a dozen frame houses, from two to 16 years old, which I never get through repairing. Window frames, sash, siding, sills, etc., become rotten in a few years, and *the contractor gets a bad name* (as if it was his fault!)

Yours respectfully, ——— ———

This is a bona fide letter—"hot off the bat." The facts are all too true. HE WILL BE A CYPRESS MAN FOREVER. HOW ABOUT **YOU?**

We say it again—that by honest and intelligent advice on **woods** we are not only saving losses to people who are going to **build anyhow**—but we are also

CAUSING MORE PEOPLE TO BUILD

This is going to be of more and more benefit to **you** month by month. It is **up to you** to intelligently take advantage of this by **learning for yourself** that **CYPRESS** is not only the ONE BEST OUT-DOOR WOOD for the owner—but also the ONE BEST WOOD FOR **YOU.** Cypress **"makes good."** That helps your reputation. Cypress is easy to work—that's **good for your tools.**









We are giving away complete working plans and specifications for THIS SHINGLE HOUSE. Many thousands of people ALL OVER THE U. S. are writing for them. THEY WILL HAVE TO GET **YOU** TO DO THE WORK.

THEY WILL INSIST on CYPRESS.

It will be MONEY IN YOUR POCKET TO HELP THEM GET JUST WHAT THEY WANT.

CYPRESS

is the "comer" in YOUR territory.

LISTEN FOR IT

Why not FIND OUT what CYPRESS can do for YOU, NOW? WRITE US—ASK YOUR OWN QUESTIONS—about your own needs, big or little. You can rely on detailed and reliable **CYPRESS** information if you address our "BUILDERS' HELPS DEPT." We will recommend **CYPRESS ONLY FOR USES WHERE IT IS THE BEST WOOD TO USE.**

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

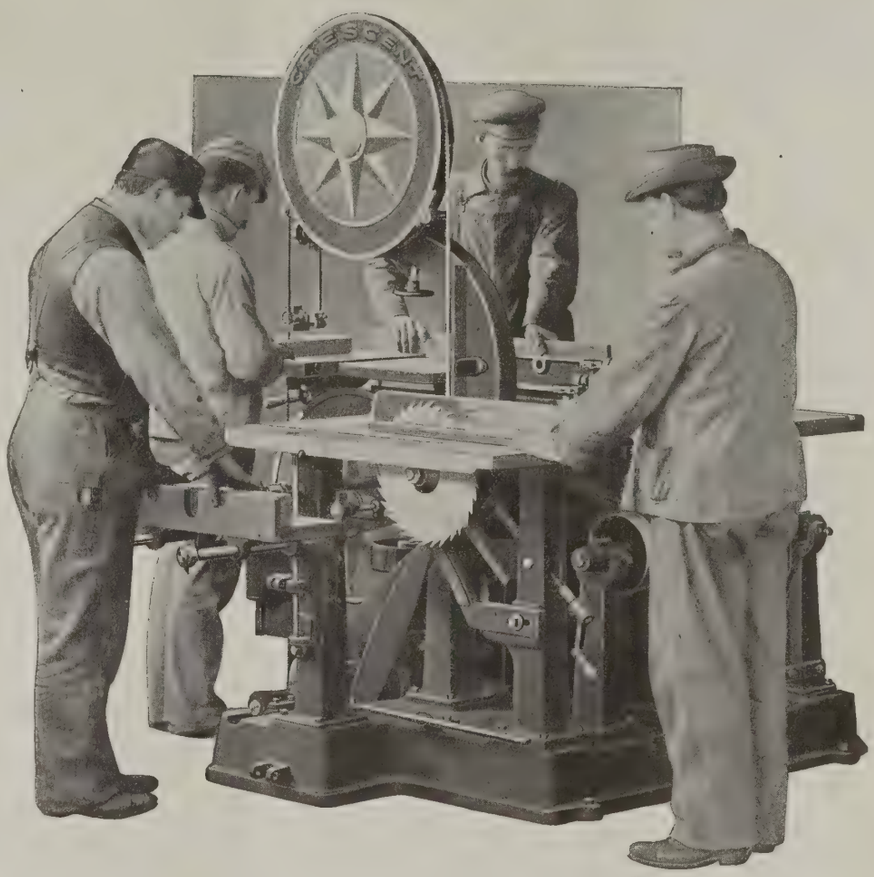
We are *producing* CYPRESS—*and talking it—but not retailing it.* BUY IT NEAR HOME. *ASK your lumber man if he sells CYPRESS; if he does not, ask him WHY. Then WRITE US. We will tell you where you CAN get CYPRESS.*



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

See How Easily Four Men Can Work on The No. 51 Crescent Universal Wood Worker Without Interfering With Each Other

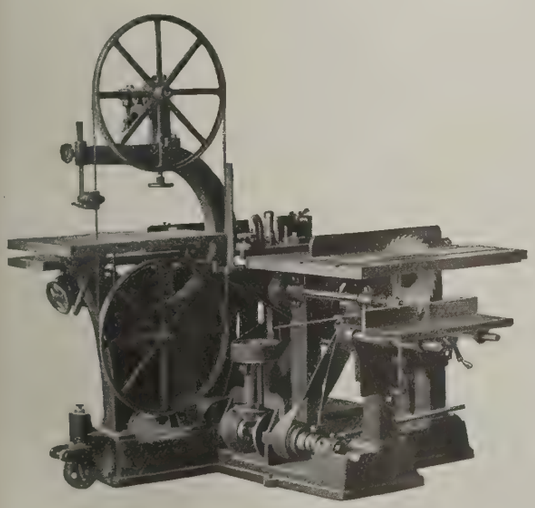
EACH man has absolute control of his own machine, independent of any other. He can start or stop it at will and he can handle his work without hindering his fellow workmen.



Your competitors are investigating the merits of this splendid machine, because they are looking for a machine that will enable them to cut down the cost of their work and increase profits. The No. 51 **CRESCENT** Universal wood worker is the machine that will accomplish this.

Keep in advance of competition and put in this tool, as it will enable you to turn out a greater variety of work than anything you have ever had offered to you. It has special features of construction that make it impossible to compare the machine with any other combination wood worker on the market.

With a machine of this kind in his shop or out on a job a contractor is sure to increase his profits. The machine is better built than any variety wood worker or any combination machine you have ever examined. Each part has its own independent adjustments. The fundamental principle of each machine is identical with larger machines of the same kind.



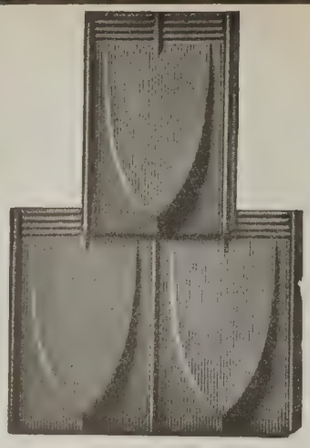
When you buy this machine you have a complete planing mill instantly at your command. If the combination machine you bought does not come up to your recommendations, look into the merits of this tool. It will please you. If for various reasons you have not investigated the merits of combination machines, send for the circular anyway. You will find something of interest in it and besides we want you to know all about the tool.

If you are interested in our general line ask for catalogue of band saw, saw tables, shapers, jointers, variety wood workers, planers swing saws, disk grinders and borers.

THE CRESCENT MACHINE COMPANY

10 Main St., LEETONIA, OHIO, U. S. A.

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STYLE B.
Showing Method of Laying

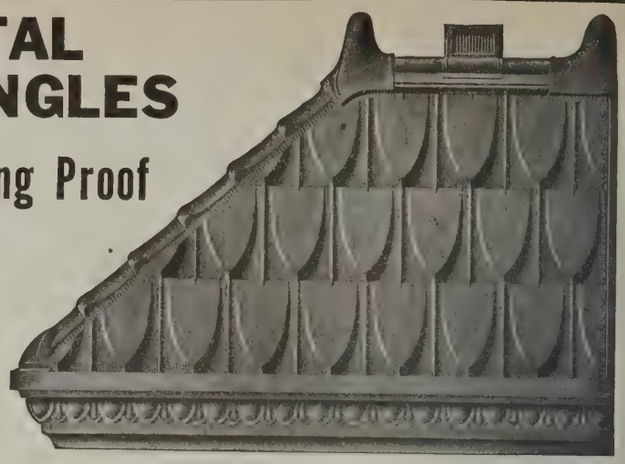
"TITELOCK" METAL SHINGLES

Fire, Water and Lightning Proof

ASK FOR SAMPLES AND CATALOG

Milwaukee Corrugating Co.

MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.

CUSTOM MADE **FLY SCREENS**



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS

Our screens are made from kiln dried lumber and have water-proof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced.

Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

A. J. PHILLIPS & CO., Le Roy Street, **Fenton, Mich.**

28 Years Experience. 3½ Acres of Floors

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

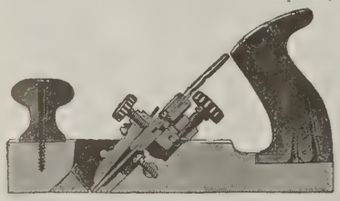
D. R. BARTON 1832. ROCHESTER, N.Y.

MACK & CO., Sole Makers

Brown's Race Rochester, N. Y.

Introductory Trial Offer

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.



As this paper guarantees we will do as our advertisement says, you know the plane must be O. K.

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH if it fails, RETURN IT AND WE WILL RETURN YOUR MONEY.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

GAGE TOOL COMPANY, Vineland, N. J.

SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off

is the best that we can make after forty years' effort. It is guaranteed by the Samson Cordage Works to be free from imperfections of braid or finish, and it will last longer than any other device for hanging windows.

Our trade-mark on the label is Samson and the Lion **IN ANY COLOR.** The Spots **IN ANY COLOR** are our trade-mark on the cord, used by us for eighteen years to show, after the label is removed, who guarantees the quality of the cord. You recognize either of these marks by the design, not the color.

Don't be misled by imitations.



SAMSON CORDAGE WORKS

BOSTON, MASS.

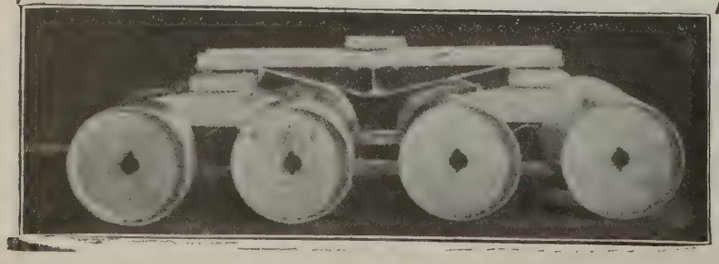
Reg. U. S. Pat. Off.

Move the Old House to Another Lot — Instead of Wrecking It — You Can Make More Money by Doing So

THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE

Of steel—on scientific lines—are interchangeable so they can be worked singly, in pairs or in fours. Write for Catalogue N and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

LA PLANT TOOL CO. 900 E. Nevada St., MARSHALLTOWN, IOWA



HARTMANN-SANDERS CO.



Manufacturers of

KOLL'S PATENT LOCK JOINT COLUMNS

Universally Recognized

As the leaders in Arctitectural Beauty and Quality.

When other houses were selling columns of thin material, because they could be sold at less price, we steadfastly refused to cut our quality.

We continued to resist every effort to get us to cheapen our goods—put in thin material—sacrificing quality and beauty. But we are glad we stood the test, that's why we are selling more columns today than ever before. Ask for Catalogue "P"—it's worth having for any Home Builder. Send for Catalogue T-27 of pergolas, sun dials and garden furniture or T-40 of wood columns.

We manufacture a full line of porch material and interior Hardwood Columns.

MAIN OFFICE AND FACTORY, 2155 ELSTON AVENUE, CHICAGO

EASTERN OFFICE, 1123 BROADWAY, NEW YORK CITY

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

SAP GUM

Three years ago the architect or builder would have had a hard time to find any building of importance in which the owner had been courageous enough to use ***RED*** *or* ***SAP GUM.***

Today there are literally hundreds of apartment houses and fine residences in every section of the United States in which ***RED GUM*** has been deliberately chosen for the trim solely because of its actual beauty and entire practicability; and ***SAP GUM*** has also come into general favor for many builders' uses.

In places where White Enamel trim is required ***SAP GUM*** is the ideal material. Not only does it take and hold the white enamel better than any other wood, but it is possible to get good ***SAP GUM*** cheaper than any other wood hitherto used for White Enamel Woodwork. ***SAP GUM*** presents remarkable qualities where moderate priced trim of good appearance is desired. Another field in which ***SAP GUM*** has reached supremacy is in the manufacture of porch columns. ***SAP GUM*** takes stains and wood dyes beautifully, and the popular Flemish, Mission and Weathered Oak finishes are easily reproduced in ***SAP GUM.***

Anyone planning to build apartment houses, office buildings, hotels, residences or specially designed furniture, should defer final arrangements and correspond at once with any of the following firms regarding samples, prices and lists of important buildings of all types wherein RED and SAP GUM have been used with eminent practical success and signal artistic satisfaction.

BAKER LUMBER COMPANY . . . . . Turrell, Arkansas
ANDERSON-TULLY COMPANY. . . . . Memphis, Tennessee
THREE STATES LUMBER COMPANY . . . . . Memphis, Tennessee
CHARLES F. LUEHRMANN HARDWOOD LUMBER CO., . . St. Louis, Mo.
LAMB-FISH LUMBER COMPANY . . . . . Charleston, Mississippi
HIMMELBERGER-HARRISON LUMBER COMPANY, Cape Girardeau, Missouri
CARRIER LUMBER & MANUFACTURING COMPANY . Sardis, Mississippi

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Mechanical Requirements
of a perfect Floor Surfacing Machine:

ADAPTABILITY:

a—For use on old, varnished or new floors.
b—For use in large or small rooms.
c—For use in buildings under construction and not equipped with power.
d—For both scraping and sandpapering.

ADJUSTABILITY:

a—OF THE SCRAPER HEAD—
1—For the reversible shear cut.
2—Up and down to fit every angle that a scraper edge may be turned to.
3—To scrape corners and close to baseboards.
4—To use entire edge before resharpening.
5—For simple, quick and easy resharpening, without removal of blade.
6—For sandpapering attachment.

b—OF THE OPERATING HANDLE—
1—To an easy working position according to height of the operator.
2—For use in very small rooms or halls.

c—OF THE WEIGHTS—to conform with any size of scraper edge that may be required—for light or heavy cutting—to prevent waves on all kinds of work—to do the work in the easiest practical way.

EFFICIENCY:

a—In Weight to insure a smooth wide cut.
b—In Motive Power to insure ease of operation, great capacity and A-1 quality of work.

? ? ?

Now, how would you like to own such a machine? There's only one made that really fills the bill—that is the

TRIPLE "A"
SPRING-DRIVEN FLOOR SMOOTHER



THIS IS THE MACHINE that you and every other contractor in the business needs, so don't let the grass grow under your feet—send for full particulars now.

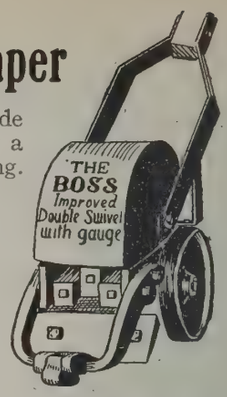
THE PRICE is right and the machine will earn its cost for you on practically every job. It will last a lifetime.

SENT ON A WEEK'S FREE TRIAL.

Triple "A" Machine Company
24 N. Clark Street, CHICAGO

It Works Like a Plane

The Boss Floor Scraper



The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. **Why?** Because the Boss is made with a gage on front to which is attached a pear-shaped wheel which raises when the machine is pulled and lets the knife down gradually.

The Boss can be set for any thickness of shaving, it also can be set for any shearing cut, right or left, up or down, to suit the kind of lumber.

It is guaranteed to give absolute satisfaction.

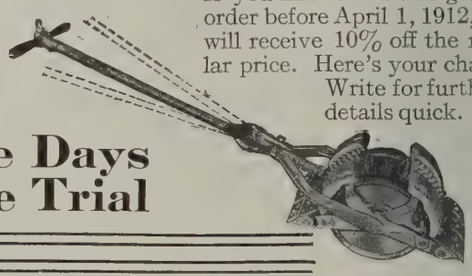
G. J. Keppinger, MAIN OFFICE Dwight, Ill.
Manufactured also in Canada

Do You Use
The WEBER DOUBLE ACTING Floor Scraper
No? Read This Offer

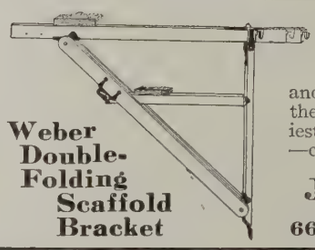
Send for a Weber Floor Scraper on five days' free trial. Give it the hardest floor scraping test you can. If it doesn't suit you, return it at our expense.

10 % Off on All Orders Received Before April 1st

If you like it and will give an order before April 1, 1912, you will receive 10% off the regular price. Here's your chance. Write for further details quick.



Five Days Free Trial



Weber Double-Folding Scaffold Bracket

Saves One-third Of Your Time

and money. Any contractor who has used them will tell you they are the best, handiest brackets made. Very light and strong—can't swing. Write for details.

JOHN F. WEBER
President Weber Mfg. Co.
661 71st Ave., West Allis, Wis.



The Excelsior Dumb Waiter

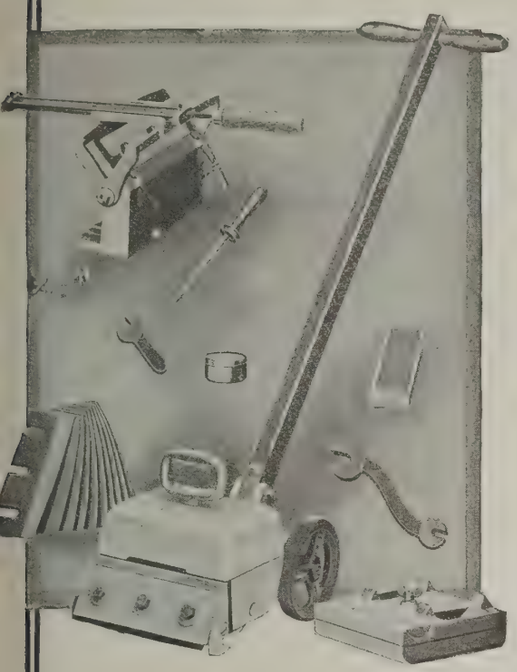
Sent complete to a nail $18.50
Knocked down, ready to erect

Self-Retaining Machine. Hardwood Car. Ropes, Guides, Weight, Lumber and Hardware. No splicing necessary. Explicit working directions sent with every outfit. We sell direct to the consumer, and give an up-to-date Waiter for the price of an inferior one. Send for Descriptive Pamphlet.

R. M. RODGERS & CO.
175 Washington Ave., Brooklyn, N. Y.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

OVER $100,000.00



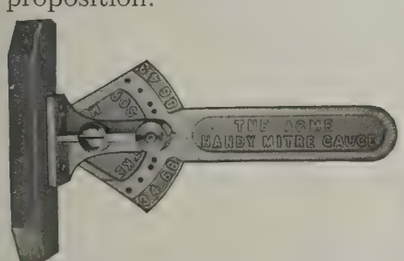
Has been SAVED by USERS of the

Acme Floor Scraping Outfit

during the past five years. Thousands of machines are now in daily operation, and every mail brings letters from users commenting upon the satisfactory work their outfits are doing and the vast amounts of labor expense they are saving.

Now, Mr. Contractor, you do not have to rely upon what I say regarding the merits of my machines, but I want you to let me send an outfit to you on **one week's free trial,** and you can then let the machines demonstrate on your own work just what they can do. If, after working with the equipment for one week, you are not convinced that the same will save you many dollars, and do your floor scraping better than it was ever done before, just pack up the machines, return them to me, and you will owe me nothing.

Write to-day for booklet and full details of my proposition.



The Acme Handy Mitre Gauge

is another labor saving tool. It is absolutely accurate, can be set at any angle and fits in the pocket where it is always ready for instant use. If your dealer does not carry them in stock, then write to me for circular describing this wonderful little tool.

JOSEPH MIOTKE

249 Lake Street : : Milwaukee, Wis.

THESE TWO MACHINES FOR $170.00

Read What Contractors Think of Our Machines.

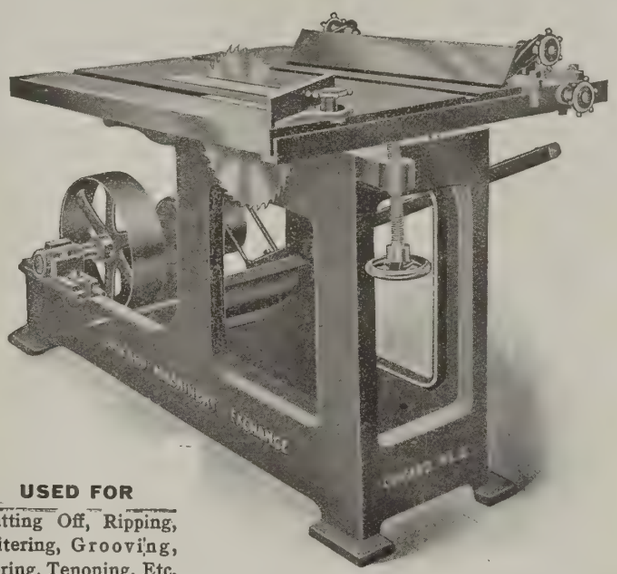
Charleston, Ill., July 13th, 1911.

Chicago Machinery Exchange, Chicago.

Dear Sirs:

Your saw table which I bought of you last fall is a complete success, the best I ever saw for the money, and I worked in a good mill for ten years. You can refer anybody to me in regard to your saw table No. 5.

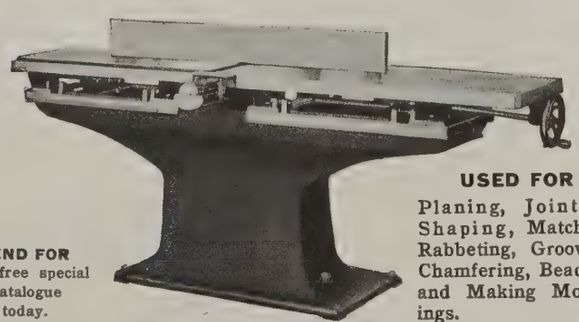
Yours,
CLARENCE B. MUCHMORE



USED FOR
Cutting Off, Ripping, Mitering, Grooving, Boring, Tenoning, Etc.

MACHINE No. 1
Chicago No. 5 Combination Saw Table

These two machines are always ready for work without any changing. They are a big bargain at $170.00. This price includes belt for saw arbor, countershafts, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼ in., 5-16 in., ⅜ in., ½ in., ¾ in.—and 1 pair of jointer knives. Ask for price on one if you cannot use both.



SEND FOR
Our free special Catalogue today.

USED FOR
Planing, Jointing, Shaping, Matching, Rabbeting, Grooving, Chamfering, Beading, and Making Mouldings.

MACHINE No. 2
Chicago 12-Inch Jointer and Planer

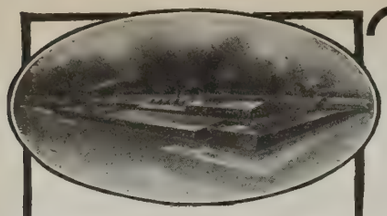
WE ISSUE A CATALOGUE OF MACHINES ESPECIALLY ADAPTED TO CONTRACTORS' AND BUILDERS' USE.

CHICAGO MACHINERY EXCHANGE

1217 TO 1225 W. WASHINGTON BLVD.

CHICAGO, ILL.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



WHOLESALE PRICES

on Concrete Machinery

Tell us what you are interested in and we will send catalog of wholesale prices. Any or all catalogs sent free. Write today.

Block Machines $10 to $250; Brick Machines, $22 to $75; Mixers, $24 to $1,000; Porch Column and Baluster Outfits, $15 to $75; Cap and Sill Moulds, $12 to $35; Lawn Vases, $15 to $25; Ball Moulds, $2 to $17; Grave Stone Moulds, $7 to $69; Well Curbing Moulds, $4 to 7; Drain and Sewer Tile Moulds, $6 to $83 Block Cars, $11 to $17; Fence Post Moulds, $7 to $12; Silo Moulds, $14 to $150; Coping Moulds, $18; Hitching Post Moulds, $20; Baluster Moulds, $6 to $18; Jardinieres, $12; Special Gate Post Moulds, $10 to $30; Newel Post Moulds. $14; Grave Markers, $7; Burial Vaults, $90.

Also complete line of Cinder Crushers, Rock Crushers, Sand and Gravel Elevators, Sand Screens, in both Revolving and Stationary Type, Mortar Gauges, Wheelbarrows, Jointers, Groovers Edgers, Corner Tools, Curb and Gutter Tools, Corrugating and Radius Tools, Roller Jointers, Brick Tongs, Curb Clamps, Curbing Edgers, Hawks, Floats, Line and Indentation Rollers, Tampers, Rammers, Name Stamps and Indentation Letters, Wall Plugs, Expanded Metal and Water Proofing, Flower Pots, etc.

Wholesale prices on everything needed for concrete work

Northwestern prices save you from 15% to 50% on any machinery, moulds, tools, appliances and accessories used in concrete work. We are the largest manufacturers of concrete machinery in the world. We add no profits because of patents or territorial rights, and our big volume of business enables distribution direct to the user at wholesale prices. All machines guaranteed and returnable at our expense, inside of ten days, if not satisfactory. Big stock for immediate shipment. We also build machinery for other concrete machinery concerns, and are especially equipped for big contracts.

Northwestern Concrete Machinery and Tools

Our Cone Batch Mixer sells at about a third the price of any other standard mixer—will reduce labor costs about one-third. Less than waist high intake makes quick charging. Special discharging device releases any amount of mix from shovelful to cartload, shooting it directly into wheelbarrow or moulds—no slopping. All sizes from 7 ft. up.

Get Our New Mixer Catalog Illustrates superior features and construction of Northwestern Mixers—the largest line in existence—a mixer for every purpose at wholesale prices—sidewalk, contractor's, block plant, continuous mixers, etc., hand, gasoline, steam, electric power, combined hand and power mixers, etc.



THE BEST MIXER EVER MADE

NORTHWESTERN STEEL & IRON WORKS, 1029 Spring St., EAU CLAIRE, WIS.

THE RAPID FLOOR SCRAPER



FREE TRIAL use it—then pay us.

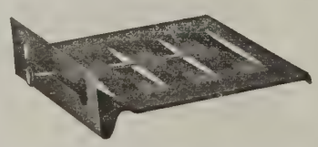
Large wheels, easy motion. Automatic Brush cleans floor, saving knife edge. Knife adjustable to any angle. Knives sharpened in machine.

With the Rapid KNIFE SHARPENER (free with machine) any man can sharpen knives.

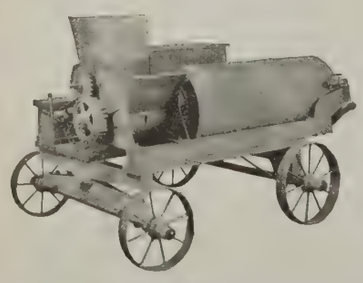
MONARCH METAL WALL PLUG

The lowest priced standard plug on the market. Has a positive grip on the nail, and a definite key in the mortar.

SAMPLE FREE



MONARCH CONTINUOUS CONCRETE MIXER $218.00



Complete with high grade gasoline engine, all on truck. Low feed. Capacity 40 to 50 yards in 10 hours with two men to do all the work. Saves its cost in 2 months use. Concrete Machinery of all kinds. Mixers from $35.00 up.

CATALOG FREE.

Monarch Mfg. Co. 252 SHEPARD BUILDING, GRAND RAPIDS, MICH.

MASHLAND MIXER

Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers



The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry. A high-grade mixer at minimum cost. Our business has been built up on repeat orders. Correspondence invited.

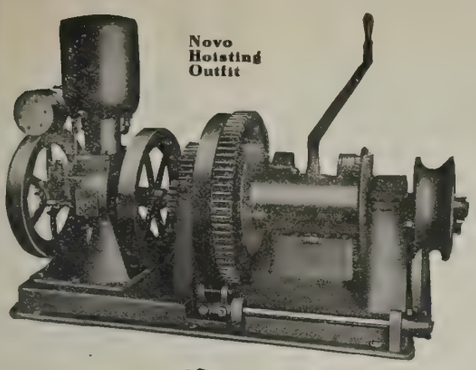
Send for Catalogue B

THE ASHLAND STEEL RANGE & MFG. CO.

ASHLAND, O.

MASHLAND MIXER

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Novo Hoisting Outfit

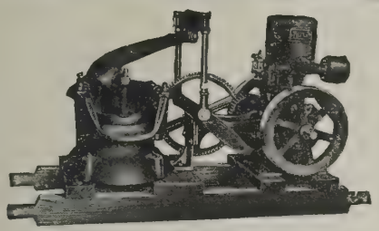
NOVO ENGINE

"The engine for every purpose"

NO TANK
NO FAN
NO FREEZING TROUBLE

Novo Engines Are Adaptable to Every Contractor's Needs

for hoisting, drilling, rock crushing, shop machinery, portable saw rigs, pumping and all power work within range of their capacity—1 to 10 h. p.

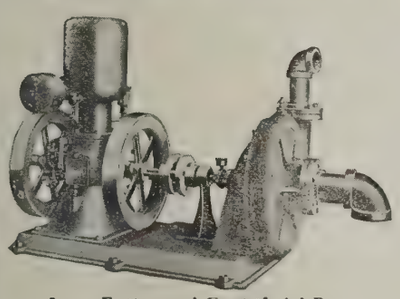


Novo Contractor's Trench Pump Outfit

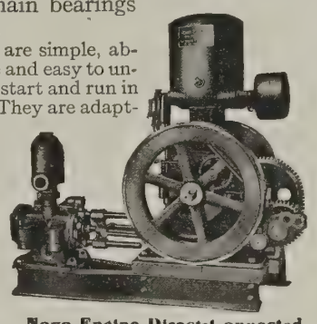
Novo Engines and hoisting rigs have many advantages. They occupy a minimum of space; the engine is the lightest made for the power developed. Being of vertical type, a Novo runs with less vibration than horizontal engines and gives uniform wear on cylinder and piston.

The cooling system of the Novo is simple, self-contained and guaranteed against breakage from freezing. The Novo has the lightness of air-cooled engines and the advantages of the water-cooled, without the disadvantages of either. Working parts are interchangeable and protected from dirt within the crank case. Perfect lubrication of parts and main bearings is secured by a splash system—cylinders are oiled direct. Extra wide main bearings give long life.

Novo Engines are simple, absolutely reliable and easy to understand. Will start and run in any weather. They are adaptable to all contracting work.



Novo Engine and Centrifugal Pump Direct-Connected

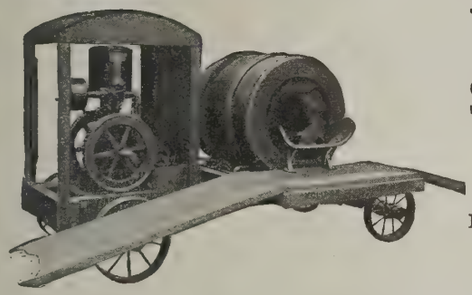


Novo Engine Direct-Connected to Pump

Send for Novo Equipment Catalog
and let us give you the whole story.

NOVO ENGINE CO.

CLARENCE E. BEMENT, Sec'y and Gen'l Mgr.
228 Willow St. LANSING, MICH.



Why Not Save 1-3 of the first cost of your mixer?

Not a theoretical saving but an actual saving in dollars and cents.

Get a collection of ***high charging*** mixer catalogs and study them from the ***economy*** standpoint. You will find they are very careful to recommend a ***charging elevator*** with nearly every machine. The fact is, on ***nine jobs out of ten*** they are only economical when ***equipped with*** a charging device. Now make a careful comparison of the price lists and you will find the ***price averages one-third more*** for the charging contraption.

You save every cent of this useless expenditure, not in theory but in actual money, as proved by the price lists, by buying the low charging direct from barrows.

"The Standard" Concrete Mixer.

But this does not begin to tell the story.

It requires one-third to one-half more power to operate the charging device.

It requires an extra **high-priced man** to operate it.

The entire complicated mechanism of a mixer—the part that is always getting out of order and causing no end of expense and trouble—is the very part required to operate this charging elevator.

That includes the friction clutch. Do you know what genuine clutch troubles really are?

You save every cent of this expense, and all the annoyance you buy with it, by purchasing **"The Standard"** mixer.

The charging platform is only 2 feet above the ground.

Both the charging platform and inclined runways are a part of the mixer, moved with it and set up ready for work in a moment's time.

Now sharpen your pencil and figure.

One-third of the cost is an item worth considering.

That means not only one-third more money in first cost but one-third more interest on your investment.

It often means the difference between a profitable investment and a prohibitive price to the small contractor; it's an economy the biggest contractor **cannot afford to overlook.**

And, remember this, **"The Standard"** mixer is a perfect mixer, unexcelled in quality of output or quantity of work performed by any other mixer.

It's saving money for the biggest contractors in the business. Do a little investigating and it will save money for you. Complete new catalog No. 32 by first mail if you say so.

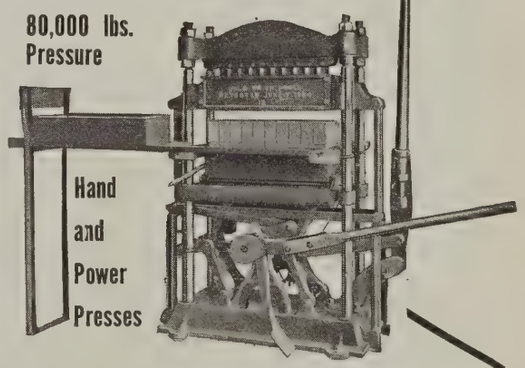
The Standard Scale & Supply Co.

CHICAGO 1545-47 Wabash Av. PITTSBURGH 243-5 Water St. PHILADELPHIA 35 So. Fourth St. NEW YORK 136 W. Broadway

Contractors and Builders Here is a Money Maker for You!

80,000 lbs. Pressure

Make Pressed Brick and Blocks and Increase Your Profits.



Hand and Power Presses

This Machine Will Earn You $20 to $50 a Day

There's big money for the man with the Helm Press in the concrete business. We are continually getting letters from our customers reporting daily profits of $20 and upwards. Many report as high as **$50 a day.** And **you** can make just as much if you get into the business right. Our press is the only one you will consider if you want to make the biggest profits.

80,000 Pounds Pressure It's this terrific pressure that makes Helm Block and Brick the finest looking and most permanent. **Wet mix concrete** is used, insuring absolute cohesion. Then the irresistible, crushing power of the press welds all the elements into bricks and blocks that will last for ages. One Helm owner landed a **$90,000 government contract** after government experts had subjected the Helm products to the most severe tests and decided they were the best to be obtained.

1,000 Blocks a Day The Helm has turned out as high as 1,500 brick an hour. Three men can make **1,000 blocks** or **10,000 brick every day** and do it **easily.** Our power machine has 50% greater capacity than the hand machine. With either hand or power machine you can bid on large contracts where the **big money** is made. You are in a position to deliver brick and block according to schedule, and to get out rush orders in a few days that would take your competitors weeks.

Don't think of buying a brick or block machine until you have **investigated** this marvel of the concrete industry.

Send Coupon for FREE Concrete Book

Here is the most complete and thorough book on Concrete, taking up all sides of the business. It tells how to make the **big money** in concrete. All about different methods of concrete manufacture, curing, etc. Your name and address on the coupon brings this book at once, **free.** Send it **right now** before you forget.

QUEEN CITY BRICK MACHINE COMPANY
483 State Bank Bldg., Traverse City, Mich.

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THE NATIONAL BUILDER

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Charles A. Miller, Jr. } Associate Editors
Wm. C. A. Stevenson }

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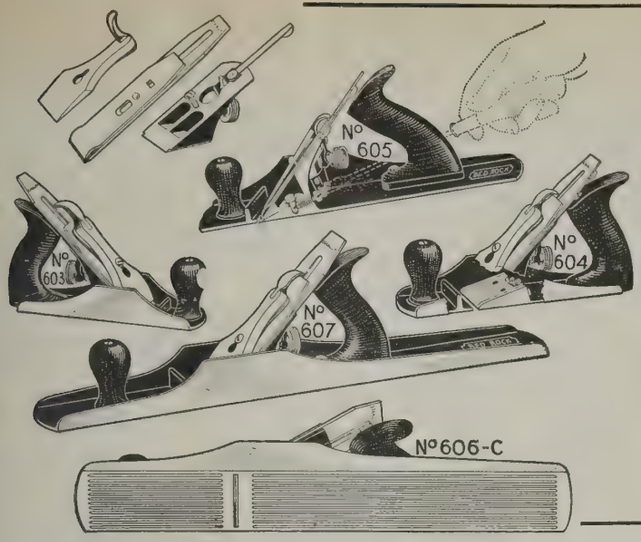
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Stanley Tools

In the well known "BED ROCK" Plane as now constructed, we offer the user of high-grade tools a Plane that is the strongest and most perfect in adjustment of any Plane ever manufactured.

The design of the sides, which is a new and distinctive feature, adds greatly to the strength and attractiveness of the Plane, as will readily be seen from the illustration.

The new method of fastening the frog to the seat permits of the frog being adjusted either forward or backward without moving the lever or the cutter.

The shape of the knob has been changed, the new shape permitting a much firmer and easier grip than before.

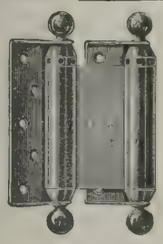
The high grade of material used and the great care taken in their manufacture, enables us to guarantee these Planes in every respect.

STANDARD THE WORLD OVER

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

BOMMER SPRING HINGES
ARE QUALITY GOODS



This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge



REJECT SUBSTITUTES

The Springs Never Go Lame

Spring Hinges lead the strenuous life in Builders's Hardware; no other article in their line endures such wear and tear; therefore don't err in judgment, use BOMMER SPRING HINGES; they stand up to their work.

FOR SALE BY ALL HARDWARE MERCHANTS

HAVE YOU POWER
BORING MACHINES?



Quadruple Bit
Price $5.00
Can not be used in a hand brace

IF SO,
No Sash Pulley Can be Classed with the

Grand Rapids No. 12
Mortised at one Punch with the
Quadruple Bit

or bore four holes with a single bit and it's done

No cutting, fitting nor trimming
Saves time and money

Write for Free Samples



Grand Rapids Hardware Co., 118 Pearl St. GRAND RAPIDS, MICH.

ELEVATORS FOR INVALIDS

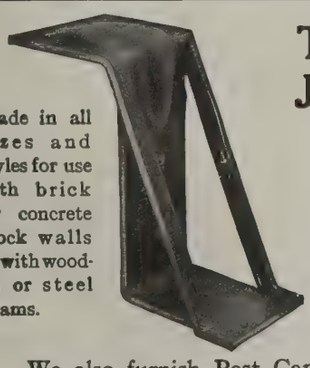
"The Sedgwick Machine Works,
130 Liberty St., New York.

Gentlemen:

In my house we had no elevator and my daughter had to depend on our man to carry her up and down stairs. If she wished to let the man have an evening off, she had to go upstairs right after supper and stay there. Now the man could be dismissed so far as carrying her in the house is concerned. She is entirely independent, goes up and down by herself, can run the elevator with one hand, and she goes up and down as often as she wishes and when she wants to. The elevator is a great comfort to us and we shall be glad to have anyone needing such a thing come and see it, or write us about it. There are many invalid ladies and men who toil laboriously upstairs who, if they knew of the Sedgwick Hand Power Elevators, would not be without one."

The above unsolicited letter was written to the Sedgwick Machine Works by a well known New England Judge who has had a Sedgwick Hand Power Invalid Elevator in his house now for nearly five years. The Sedgwick Machine Works, 130 Liberty Street, New York, will furnish his name and address upon request, or will send catalog and full information as to their Hand Power Elevators and Dumb Waiters free on request. Judge B——purchased his elevator through his local carpenter.

Sedgwick Machine Works
130 Liberty St. :: :: :: :: New York



Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

TRUS-CON JOIST HANGERS

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

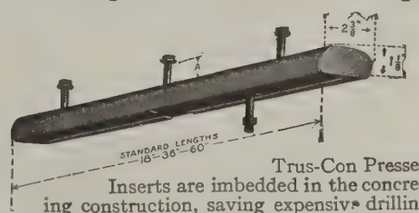
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are imbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots. Write for details and prices.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MORE

C.H.&E.

PORTABLE SAW RIGS NOW IN USE THAN ALL of our IMITATORS COMBINED



WE ARE THE PIONEERS IN THE MANUFACTURE OF

PORTABLE SAW RIGS

WE MANUFACTURE THEM IN FOUR SIZES

Write for our descriptive catalogue

C. H. & E. Manufacturing Co., Inc.

319 Mineral St., MILWAUKEE, WIS.

Saves Time Makes Money "Grimm Woodworker"

A Planing Mill Combined in One Simple Machine for Use on the Job and in the Shop or Factory



Built to operate with electric motor or belt drive, also with gasoline engine for portable use.

A "Grimm" can be changed into any one of nine different machines at a moment's notice.

Can be used for ripping, cutting off, sizing, jointing, planing, plowing, jig sawing, boring, moulding, shaping, rabbeting, mitering, mortising, tenoning, sanding and emery wheels.

No more delays in going outside for your woodworking operations.

More money made on all your jobs and contracts with a "Grimm."

Catalogue and prices on application.

Grimm Manufacturing Co.

42 Erie St., Buffalo, N. Y.

"Victor" Scroll Saw

For Foot and Power



Suitable for carpenters, pattern and cabinet-makers and all wood-workers requiring accurate work, also for sawing soft metals. Will cut up to 3 inches thick, swings 24 inches, has powerful tread motion, cuts rapidly and is easy to operate. Has adjustable tension spring on upper spindle, dust blower, drill attachment, iron tilting table, etc. Will furnish tight and loose pulleys for power in place of treadles when desired.

This is acknowledged to be in all respects the most complete foot-power scroll saw made.

We make a complete line of Foot, Hand and Light Power Wood-Working Machinery, suitable for Carpenters, Builders, Cabinet-Makers and other Wood-Workers. It will pay you to investigate their merits.

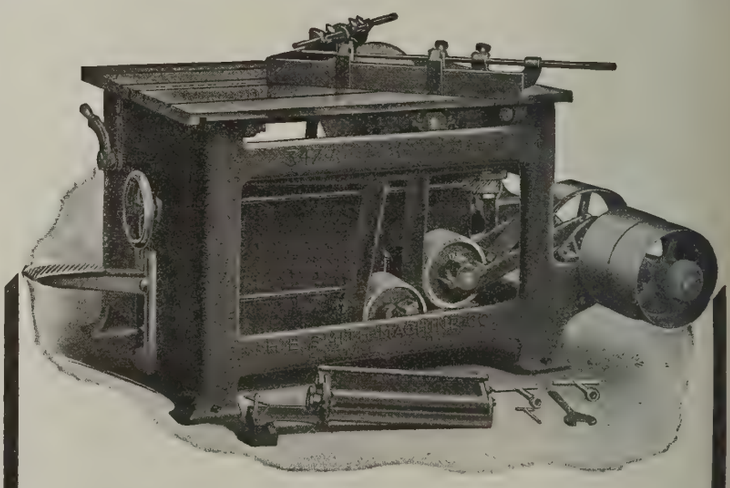
Send for Catalog A

The Seneca Falls Mfg. Co.

629 Water Street

Seneca Falls, N. Y., U. S. A.

263



No. 347. Combination Saw and Dado Machine.

Looking for a Modern Saw Bench?

The above cut represents our new Combination Saw and Dado Machine.

The **Frame** is quite substantial, with closed front.

The **Ways** adjust for depth of cut, and

The **Carriage** moves on rollers having ball-bearings.

The **Saw Mandrel** runs in self-oiling boxes, and is brought into the work by a foot treadle, thus leaving both hands free to handle the work.

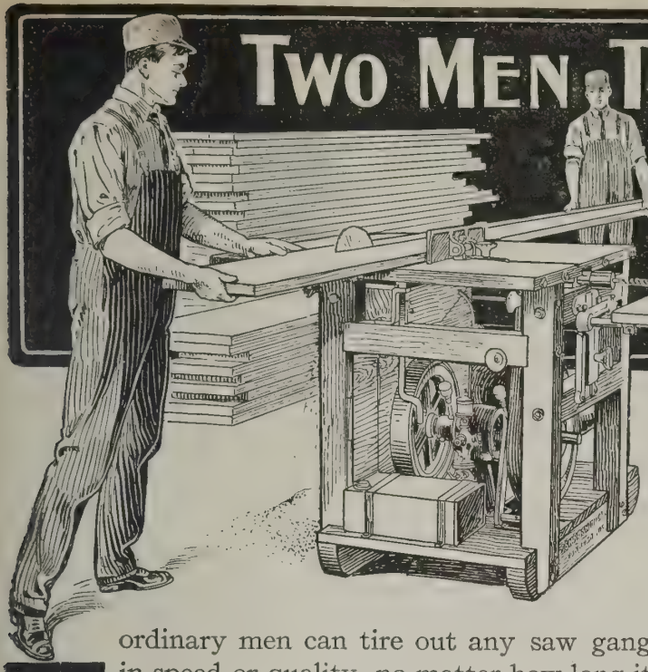
For further particulars concerning above and other machines, address

H. B. Smith Machine Co., Smithville, N. J., U.S.A.

New York Chicago Atlanta San Francisco

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

TWO MEN TIRE OUT TWENTY-FIVE





YES, and they'll do better work. Watch any gang of men. They get in their "best licks" during the first few hours. Then speed and quality commence to drop at an alarming rate. This drop explains why a whole lot of contracts don't pan out like you figure. Get an Eveready and save your men's time and strength for other work. With it, two ordinary men can tire out any saw gang you ever saw. And there won't be the sign of a drop in speed or quality, no matter how long it runs.

TRADE MARK OSHKOSH

Eveready SAW RIG

"Guaranteed for Life"

Two men can load it onto your wagon. Once on the job it can be skidded anywhere. With help of the free attachments pictured below, it does rip, cross-cut and jig sawing, dadoing, mitering, beveling, boring, sanding, tool grinding, etc. The frame table and skids are of the very best rock maple, air and kiln seasoned. Guaranteed to remain perfectly true. Contains a 4 h. p. gasoline engine of new improved type. Simple to understand; any of your men can easily operate it. Just a whirl of the wheel and she's off! Costs **2c an hour** when running—**nothing** when idle. The Eveready is not an experiment. We have made heavy duty saw rigs for years and know just how they ought to be made. This wide experience and a finely equipped factory also enable us to put the price down surprisingly low for such sturdy quality. Especially when you get all

These Standard High Class Attachments FREE

Jointer Head—This works on exactly the same principle as an up-to-date planer. Produces a smooth, even job with no deep cut as the material leaves the jointer head. 2½ inches in size.

Boring Attachment—A high class attachmemt. Guaranteed absolutely accurate. Extra long boxes insure easy, long-running qualities on the guides. Bits, standard size.

Jig Saw—Not a cheap one, but the best 12 inch jig we can make. All joints reinforced with steel, equipped with brass bushings. Once use it and you won't part with it.

Sander—The best one yet—a great time and money saver over old methods in change and economy of paper. Our method of holding paper will not blister as do many others. 10 inches in diameter.

Saw Gauge and Mitre Device—Saw Gauge of best gray iron, 18 inches long, adjustable to any bevel. Miter device adjustable to any angle and can be used as a cross cut gauge.

Dado Head—Our own special design. Does smooth, even work with or across the grain. Makes window frames, dados, etc.

Emery Wheel—A 6-inch wheel made for grinding tools is also furnished with this rig.

Free Attachments



Try the Eveready Six Days FREE

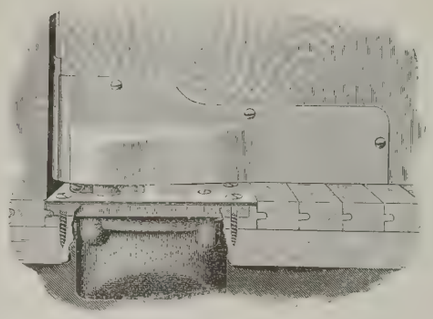
Then if You Can Get Along Without It, Return It at Our Expense

We mean just what we say! Send for one right now. We'll ship it immediately on receipt of the order. You take it right out onto your hardest job and work it for six days steady. If you don't want it then—just ship it back **freight collect**. There won't be any kick from us. If you keep it, just bear in mind that it is not guaranteed for three years or five years—it is actually "guaranteed for life." Send for full details, prices, guarantee, etc., right now. **They're free.**

OSHKOSH MFG. CO., 414 S. Main St., Oshkosh, Wis.

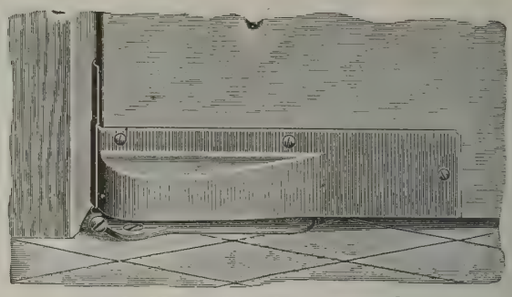
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

TWO OF THE BEST



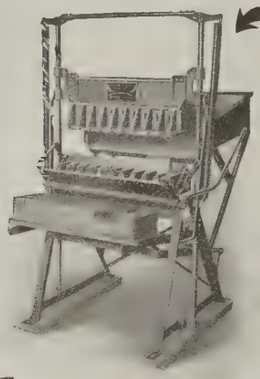
"STANDARD" DOUBLE-ACTING SPRING FLOOR HINGES and "STANDARD" CHECKING HINGES

for Double-Acting Doors



Ask Your Hardware Dealer

THE STANDARD MANUFACTURING CO., SHELBY, OHIO



MAKE CEMENT BRICK

Our "Crescent" Vertical Tamping Brick Machine will establish a big and profitable business for you. Cement bricks are rapidly replacing clay bricks, also cement blocks, owing to their beauty, durability and low cost of production. You get a handsome price for artistic brick.

Get our Illustrated Catalog and lowest prices. It will be an "eye-opener" to you.

It will pay you to act at once.

We also manufacture Continuous Mixers, Sewer Pipe and Tile Molds, Power Tile Machines, etc., etc.

RABER & LANG MFG. CO., 819 MILL ST. KENDALLVILLE, IND.

Read This

We have recently finished housing material for the new bank building and your Universal Hoist has fully met the requirements. We have saved enough time and expense on this job to more than pay for it and the outfit is still in excellent condition. Blacknawk Construction Co., Waterloo, Iowa.

Special Hoist

For Contractors and Builders

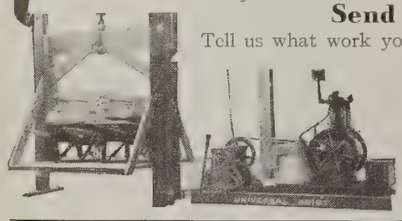
Lessens operating cost and increases profits. Saves time, money, labor. Easy to operate. Costs little. Durable. Does any kind of work that any hoist can do. Saves enough on one job to pay for itself.

Helps You Make Low Winning Bids

because it cuts your expense at a point that few contractors consider. Sent on 30 Days' Free Trial. Give this hoist a fair trial and send it back if unsatisfactory.

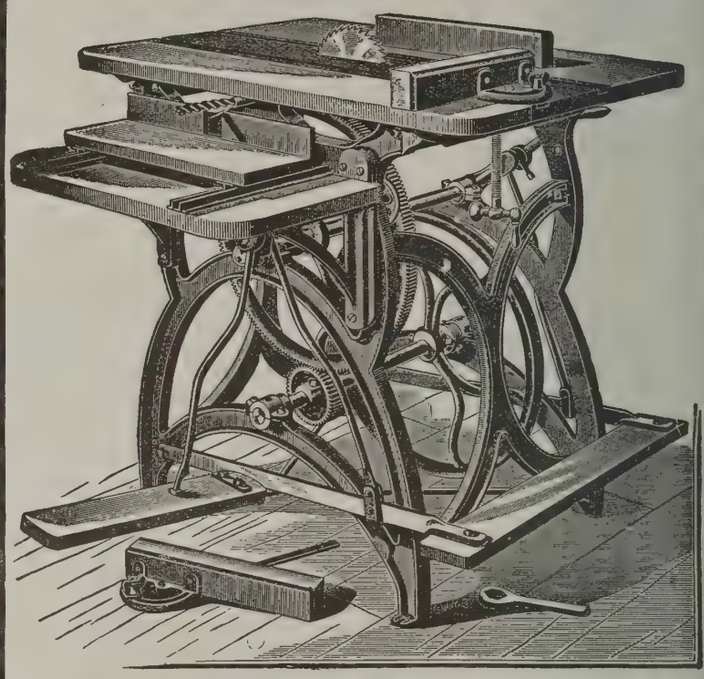
Send for Catalog

Tell us what work you have to do. We'll send you free catalog and quote you an attractive price on exactly the kind of a hoist you need.



UNIVERSAL HOIST & MANUFACTURING CO.

180 State Street CEDAR FALLS, IOWA



MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.



Barnes Hand and Foot Power Machinery

COMPLETE OUTFIT FOR

Carpenters and Builders

Price $15.00

IMPROVED FORMER. Has an adjustable table. Knives can be instantly reversed to suit the grain of wood. Speed of knife is 2,500 per minute, thus insuring smooth work.

Warranted to be well made, will saw pine 3 inches thick at the rate of one foot per minute. Other woods in same proportion according to hardness. **IMPROVED NO. 7 SCROLL SAW.**

We make Sixty Styles of Knives

SEND FOR NEW CATALOGUE

W. F. & JOHN BARNES CO.

436 Ruby Street, Rockford, Illinois



PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Buy a FAMOUS PORTABLE Universal Woodworker and Get *Value* for Your Money

WE ARE MAKING TWO CHALLENGES on behalf of the FAMOUS Universal Woodworker: *FIRST:* We challenge any builder of woodworkers to show a machine possessing one important feature not possessed by the FAMOUS. *SECOND:* We challenge them to show *as many* important features embodied on one machine as those which form part of the FAMOUS.

We are the pioneer builders of Universal Woodworkers in the world. It was the FAMOUS that proved the **existence** of a demand for a **good** universal woodworker; it is the FAMOUS that is **satisfactorily filling** the demand today. Over a thousand are in use.

The latest FAMOUS innovation is the Portable woodworker—a planing mill on wheels, which can be moved around from job to job without having to be taken apart or reassembled.

The work of thirteen woodworking machines can be done on this FAMOUS Portable Woodworker. And a number of men can work at the same time if necessary.

Here are the thirteen machines which the FAMOUS displaces: 27″ Band Saw; 10″ Jointer; Reversible Shaper; Saw Table; Boring Machine, Tenoner and Mortiser; Knife Grinder; Emery Grinder; 10″ Power Feed Sander; Disc Sander; Power Feed Planer; Dadoing Machine; Panel Raising Machine. All are independent of each other.

Then there is the power plant. This is a sturdy little three horse-power gasoline engine, complete with batteries and all necessary belts—entirely self-contained.

The FAMOUS is so durable that we guarantee it for life—no half-hearted statements. We couldn't have sold over a thousand without we had the **best** machine! Nearly eleven hundred FAMOUS Woodworkers are in use today—and not one has ever been returned for repairs nor been found fault with in any way.

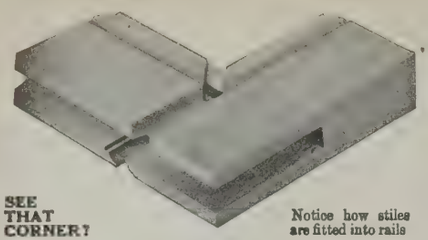
We make woodworkers in all sizes to suit all needs, from machines to fill the small contractor's requirements to woodworkers for planing mill use. As **investments** they are as safe and will pay bigger dividends, than gilt-edge bonds.

Write for our interesting literature today. State your business and let us estimate on just the machine you are likely to need. Don't wait but **write right now.**

THE SIDNEY TOOL COMPANY

SIDNEY : : : : : : OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



MADE TO ORDER FLY SCREENS and SCREEN DOORS

WE use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th St., Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

A FREE BOOK



On Concrete Machinery

BUILDING BLOCKS
BRICK
PORCHES
CHIMNEYS
DRAIN TILE
SEWER PIPE
SILO BLOCKS
AND OTHERS

It isn't exactly a catalogue, because it gives you the cost of making concrete Blocks, Bricks, Porches and Chimneys. It tells all about the profits in making Drain Tile for farmers. The advantage of drainage, etc.

You ought to have this book if you are interested in concrete. Sixty-four pages of illustrations and interesting reading. Send at once, today, a postal will do.

W. E. DUNN MFG. CO., 4135 Fillmore St., Chicago

The Standard Portable Combination Woodworker

Nine Machines in One Equipped with **6 H. P. Engine**

Send for Illustrated Catalogue

ATLANTIC ENGINE CO., Inc.
Mercer Street **Meadville, Pa.**
Canadian Office Bridgeburg, Ont.

To Keep Out Dampness

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

"REMEMBER IT'S WATERPROOF"

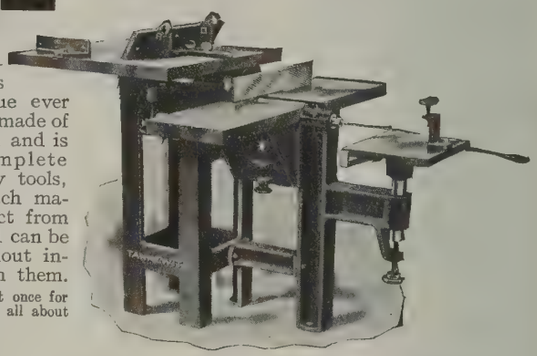
and your cement floors with TOCH BROS. CEMENT FILLER and FLOOR PAINT, Pat'd.

Proof Against Water, Acid, Fumes or Alkali
SPECIAL ELASTIC COMPOUND for EACH SPECIFIC PURPOSE

The Garden City Sand Co.
709-711 Chamber of Commerce, Chicago

$95.00 BUYS 3 Machines

- A SAW BENCH
- AN 8" JOINTER
- A MORTISER AND BORER



This combination machine is the best value ever offered. It is made of solid cast iron and is furnished complete with necessary tools, belt, etc. Each machine is distinct from the others, and can be operated without interference with them.

You should send at once for literature. It tells all about this new machine.

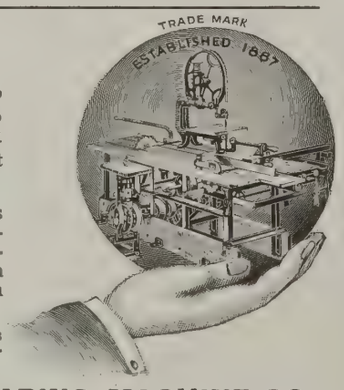
THE TANNEWITZ WORKS, 41 S. Front St., Grand Rapids, Mich.
WE SELL GASOLINE ENGINES

PARKS' WOODWORKING MACHINES

CIRCULAR SAW, JOINTER, MOULDER, BAND SAW, SHAPER, SWING CUT-OFF SAW, GROOVER and BORING MACHINE — all set ready for use.

It is Parks who for twenty-five years has been putting out the most practical combinations—convenient in operation and most effective in use—in large quantities—at a price you can afford to pay.

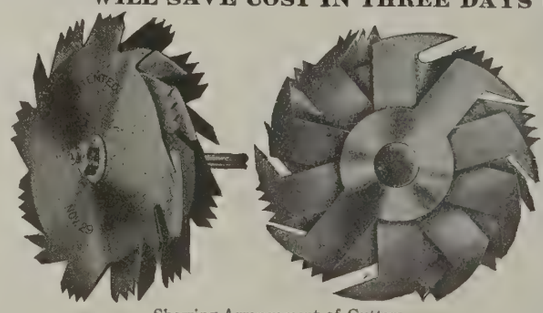
Ask for Catalogs and see the many designs of Foot, Hand and Belt Power—also our Portable outfit.



THE PARKS' BALL BEARING MACHINE CO.
Knowlton and Fergus Streets **CINCINNATI, OHIO, U. S. A.**

HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

For cutting any width groove from ⅛" to 2" or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N.Y.**

SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.



ANDREWS HEATING CO.
1287 Heating Building
MINNEAPOLIS, MINN.

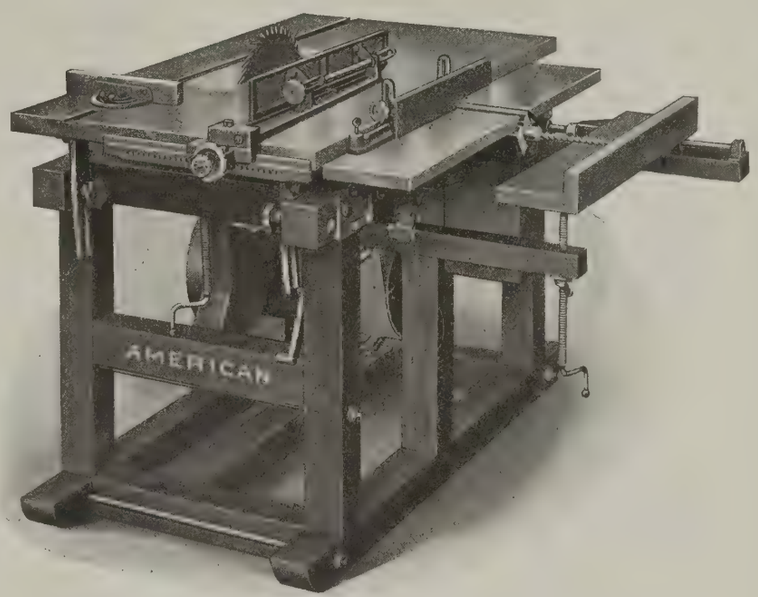
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"AMERICAN"

CONTRACTORS' PORTABLE

VARIETY WOOD-WORKER

Study the illustration—read the description herewith—consider the possibilites of this new machine in YOUR work—and decide for yourself whether you can AFFORD to do without the manifold advantages of the "AMERICAN."



The "American" Contractors' Portable Saw Bench was, and is, the best bench made. **The "American" Contractors' Portable Variety Wood-Worker marks another great forward stride in "bringing the mill to the job."**

For the "American" Wood-Worker is more than a saw bench. **It is a miniature planing mill to be taken right onto the work.** Note what it brings you in the way of equipment.

On its table you'll find a Rip Saw, Cut-off Saw, Mitre Saw, Dado Machine, Gaining Machine, Grooving Machine and Rabbeting Machine.

At its side is an independent Jointer, Planer, Matcher, Moulder, with which a Sander Drum, Disk Sander, and Emery Wheel are furnished and can be used.

Its boring table has a 6-inch feed, and serves as a work rest in sanding or grinding.

And here is the vital thing—three men can work at one time on the "American," at three different operations, without interference or change in the machine.

This three-man capacity is an exclusive feature, **giving one "American" Wood-Worker a work output equal to three ordinary saw benches.**

A 3 H. P. gasoline engine or a 3 H. P. electric motor (d. c. or a. c.), built in, is regularly furnished with the "American." But on order and at extra cost, a 6 H. P. engine or a 5 H. P. motor can be furnished, for heavier work.

With its standard power, the "American" will cut 75 to 125 **lineal** feet of 1¼-inch lumber, or 30 to 60 feet of 2-inch, per minute; and will rip 3-inch stock easily or heavier when fed slowly.

With the larger power, the capacity is correspondingly increased and 4-inch or even heavier lumber can be handled rapidly and cheaply.

As to materials, workmanship and construction, it need only be said that they are of **the standard "American" quality, which means that nothing better can be had in any machine at any price.**

The saw table and jointer tables are of cast iron, strongly ribbed, carefully planed, and provided with more rapid and accurate adjustments than have hitherto been deemed necessary.

The frame and boring table are of seasoned hard wood, bolted up and braced and fitted to have **all the strength and rigidity of a solid iron casting, but without its weight.**

In fact, neither labor nor expense has been spared in making the "American" Wood-Worker measure up to the most exacting requirements of contractors, builders, and wood workers in genesal.

Whether your work be the rough framing of a house, its interior finish and trim, or the making of forms for concrete construction—**an "American" Contractors' Portable Variety Wood-Worker will mean for you more work and better work, in less time and at less cost, and with bigger profits.**

And the price is but a trifle more than that of the plainest saw bench.

Write for the Special Circular—NOW

AMERICAN SAW MILL MACHINERY CO.

80 Laight Street, HACKETTSTOWN, N. J. 1650 Hudson Terminal, NEW YORK CITY

BUILDERS OF

SAW MILLS AND WOOD-WORKING MACHINERY

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

APOLLO Best Bloom Galvanized SHEETS

"A Product Without a Peer"



Pay the largest dividends on the money invested. Their softness, strength and ductility supplement the metal worker's efforts for better and faster work. Their long life creates a distinct saving for the man who pays the bills.

Every builder should know about our Cambridge Rigid Reversible Metal Lath, Tin and Terne Plates, Formed Roofing and Siding Products, Etc. Write for full information.

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Sheet Metal Statuary *of* Rare Artistic Worth



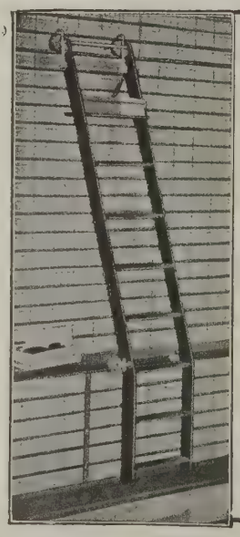
WITHIN the last quarter of a century there have been reproduced at the Mullins Factory, Salem, Ohio, statues of Sheet Bronze and Copper that are nothing short of marvelous. Many of them were made from the models of famous sculptors, to their entire satisfaction.

We are prepared to reproduce, in minute detail, the most delicate lines of any model. It is this faithful portrayal which helps to account for the world-wide fame of Mullins Sheet Metal Statuary. Diana on the top of Madison Square Garden, the group on the New York Life Building, the Statue of Progress, Chicago, are among our earlier achievements.

We also make Fireproof Metal Windows, Skylights, Cornices, Finials, Metal Tile Roofing and Sheet Metal Ornamental Work of every description.

Tell us what you're interested in and we'll send the proper catalogs at once. Estimates promptly submitted on architect's drawings. Attractive prices. Quick, satisfactory service. Discounts to the trade on application.

The W. H. Mullins Co.
210 Franklin St., :: :: SALEM, O.



Mr. Carpenter and Builder

Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY
1442 N. Eighth St., ST. LOUIS, MO.

TAPERED TAPERED TAPERED.

LET THAT SOAK IN—IT MEANS SOMETHING

The WINTHROP ASPHALT SHINGLE

Is tapered—the asphalt is put where it is needed—on the exposed butt of the shingle. This feature is patented—no other manufacturer can do it. This shingle is not made from ready roofing—it's built like a pavement.

The Colors Are: RED, GREEN and NATURAL SLATE

GET A SAMPLE—WRITE NOW

THE WINTHROP ASPHALT SHINGLE CO.

10 Sixty-first Street ARGO, ILLINOIS

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

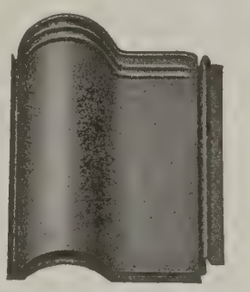


Don't Miss This Opportunity

We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing Others have made big profits simply devoting part of their time to selling and laying our Metal Spanish Tile.

Edwards Metal Spanish Tile





Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10 x 14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TO-DAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TO-DAY FOR OUR SPECIAL AGENTS' PROPOSITION.



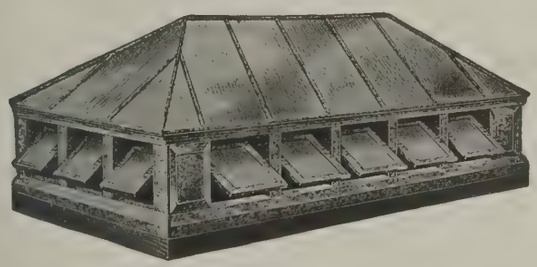
Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

430-450 Eggleston Ave. CINCINNATI, OHIO

THE WORLD'S LARGEST METAL ROOFING, METAL SHINGLES AND METAL CEILING MANUFACTURERS.



Willis Self-Installing Sky Lights

From Factory to Builder
No Other Labor Necessary

Willis Skylights are constructed so that any person handy with a hammer or screw driver can install them. It is not necessary to have a soldering outfit or tinners' tools.

They are shipped knocked down after being set up and tested in the factory, are watertight without the use of putty and designed to give the greatest amount of glass area. The ridge and gutter bars cannot sag, buckle or spread.

Send us your plans or a rough sketch with dimensions and we will furnish working drawings and an estimate. **You can install it yourself.**

Catalogue No. 6 gives our large line of other Sheet Metal Building Materials. Send for it.

WILLIS MFG. CO., Galesburg, Illinois



INVESTIGATE

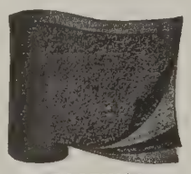
BEFORE YOU BUY

and you will find we can save you lots of money on anything in the line of HIGH GRADE sash, doors, frames, blinds, mouldings, inside trim, grilles, colonnades, stair and porch work, mantels, grates, tiling, art glass, paints, roofing and building papers, wall boards, hardware, hardwood and parquetry flooring, rolling partitions, screens steel ceilings, gutters, shingles, etc.

WINDOWS
42c and up



WINDOW BEAD—Best Yellow Pine
27c per 100 lin. ft.



ROOFINGS
64c and up

OUR NEW CATALOG MAILED FREE WILL CONVINCE.

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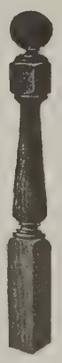
PROMPT SHIPMENTS AND MATERIALS ALL FIRST CLASS.



STAIR NEWELS
$1.50 and up



HARDWOOD MANTELS
$3.58 and up



PORCH NEWELS
42c and up

Let us send you our SPECIAL FIREPLACE CATALOG—showing unusual values.

THE HUBER BUILDERS MATERIAL CO.

39-43 VINE STREET CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

THE DOUBLE CLAW HAMMER



¶ Pulls the nail out straight without a block. ¶ Relieves the strain on your arm when doing scaffolding, siding and ceiling work. ¶ You hold on with your left hand while pulling with your right—this gives you more power and the nail is not rolled into a fish-hook, as with the old hammer. ¶ You drive the nail in again. For "finishing work" the Double Claw Hammer is a great aid, as 10% to 15% of all finishing nails start wrong and must be withdrawn.

Under strong competition you pay 75c for a good hammer. The high nailing feature of the Double Claw Hammer is worth 75c many times over. The straight and easy drawing of nails is worth another 75c. The ease and pleasure in using a tool like this cannot be measured by the slight additional cost. Better handle, better steel, better finish, the better mechanic uses it first.



ASK YOUR DEALER, or send $1.50 and we will pre-pay charges.

DOUBLE CLAW HAMMER COMPANY
453 Broadway - - - - - Brooklyn, N. Y.

The Double Claw has all the good features of the old hammer, and a lot more besides.

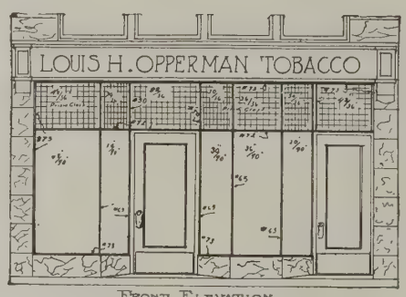


And You will Then be Able to Close Many a Contract that Would Otherwise be Lost

The demand for Architectural Perspective is increasing yearly because those who build are demanding, in addition to the plans, perspective drawings of their buildings. A well made perspective drawing, properly shaded and set off by a little landscape and secondary detail, pleases the eye, and is a valuable adjunct to the regular plans and elevations. Our correspondence course in ARCHITECTURAL PERSPECTIVE and DRAWING of BUILDINGS is complete, practical, and can be learned at home at odd times. Instruction likewise given in twelve separate, complete Art Courses, for pecuniary profit, or pleasure only, as desired. Year Book sent upon request.

SCHOOL OF APPLIED ART
Battle Creek, Mich. U.S.A.
677 APPLIED ART BUILDING

You Can Feel Safe with Petz Bars



FRONT ELEVATION

The architect, contractor or builder who wants to feel absolutely sure about the construction of his modern store front, will specify Petz Bars, and see that he gets them. Then he will have no need to make excuse afterward to his customer.

Petz Bars have style, strength and safety, with no danger of breaking glass. Petz Bars are easy to install, and cost no more than inferior bars.

Our booklet on "Modern Store Front Construction" describes our bars in detail, and gives the experience of prominent users. Write for a copy today.

Detroit Show Case Company, Sole Makers
481 Fort Street West, DETROIT, MICH.

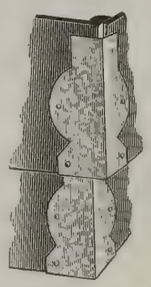
Something New—For You
METAL BUILDING CORNERS

Used with lap siding in place of corner boards.

They save the price of the boards besides most of the work of finishing the corners.

Give the popular mitre-corner effect without the slow accurate work of cutting and fitting. Make a stronger and neater job.

Write for samples.



F. D. Kees Mfg. Co.
Beatrice, Neb.
Box 811

Makers of Gossett Screen Hangers.



The Buckeye Electric Blue Printing Machine

Will eliminate all delays, making your blue prints at a moment's notice regardless of weather conditions. So simply and thoroughly constructed that a boy or girl can operate it, producing perfect prints at a cost of ½ cent per sq. ft. It is the most efficient and lowest priced machine on the market.

Write for Catalog N.

BUCKEYE ENGINE CO.
SALEM, OHIO

Taylor Portable Steel Derrick



Tested at factory, hoisted and swung complete circle 1900 lbs. Shipped ready to operate. No wrench or tools required to set derrick on job. Made in two sections. Beam section connects post by tipping in a vertical position and projects at such an angle to clear side wall of building and has sufficient height to hoist wheel-barrows, window frames and timbers. One man can climb a ladder with either section. Consider the durability of a derrick constructed entirely of malleable Iron and Steel and that of Wood, more compact, more powerful.

Derrick complete with three way block, channel steel brackets, bolts for attaching to building, price $40.00, and four and one-half cents per ft. for crucible steel cable attached. Drum capacity 300 ft.

Special platform and chains for attaching derrick to gondola railroad cars, price $15. Chains for hoisting wheelbarrows, price $2.00.

JOHN L. TAYLOR, Manufacturer
Taylor Portable Steel Derricks
Telephone Monroe 3066 1034 W. Lake St., Chicago

PEARSON'S AUTOMATIC SHINGLE NAILER
PAYS FOR ITSELF ON ONE FAIR-SIZED SHINGLING JOB



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.



PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼-in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented.

Write for Circular "N."

PEARSON MFG. CO., ROBBINSDALE, MINN.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Every Three Minutes an American House Catches Fire

A large proportion of them from flying sparks falling on the roof

Cortright Metal Shingles

ARE FIRE-PROOF

Read this letter from the owner of the house shown below:

Bremen, Indiana.

Gentlemen:

I am more than satisfied with the Cortright Metal Shingle Roof. They cost but little more than wood shingles to start with, and make a *fire* and *lightning proof* covering that looks 100 per cent better than wood shingles.

Yours very truly,
SAMUEL MUTTI.

Being fireproof, together with their many other advantages, Cortright Shingles please any house owner.

And why they are so popular with Contractors and Builders is because Cortright Shingles are much cheaper than slate, and as reasonable as wood in many sections of the country.

We have a good proposition to offer you. *Write us.*



Simply Sign and Mail the Attached Coupon Now

CORTRIGHT Metal Roofing Company
Philadelphia and Chicago.

CLIP, SIGN AND MAIL US THIS COUPON NOW

You may send me book *"Concerning that Roof"* as advertised in National Builder. 3-12.

Name .....

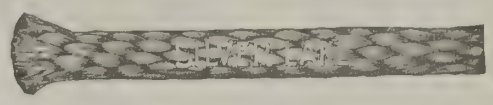
Street Address .....

City .....

Business .....

WHEN YOU GET TO **SASH CORD** USE **SILVER LAKE**

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.



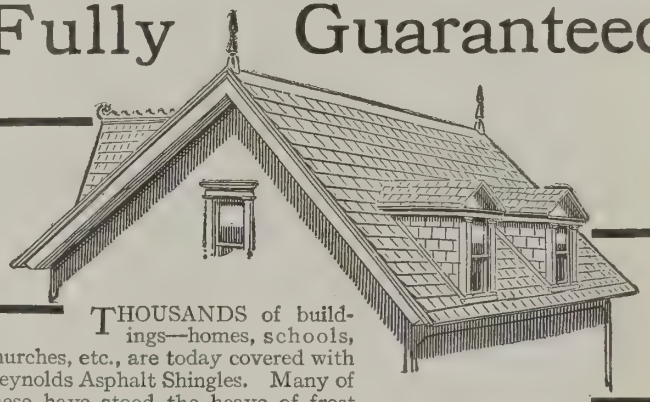
SILVER LAKE BRAIDED SASH CORD

was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869

These Shingles Are Fully Guaranteed



THOUSANDS of buildings—homes, schools, churches, etc., are today covered with Reynolds Asphalt Shingles. Many of these have stood the heave of frost and the wear and tear of storm for 10 years and are in every way as good as when first laid.

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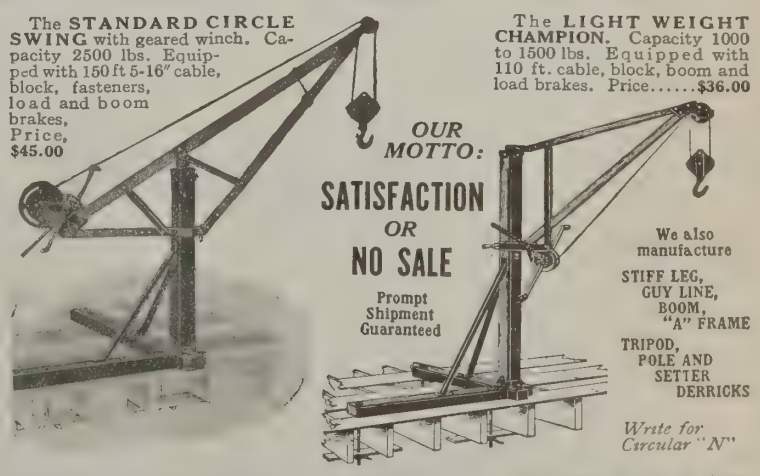
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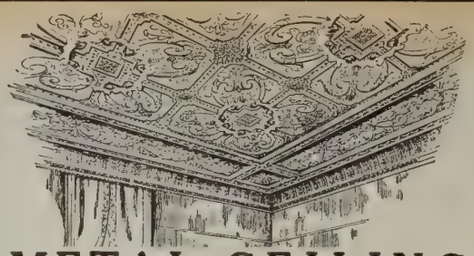
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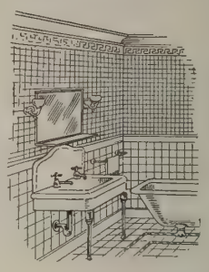
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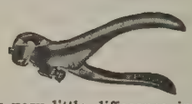
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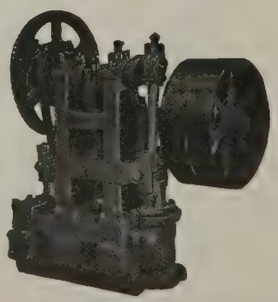
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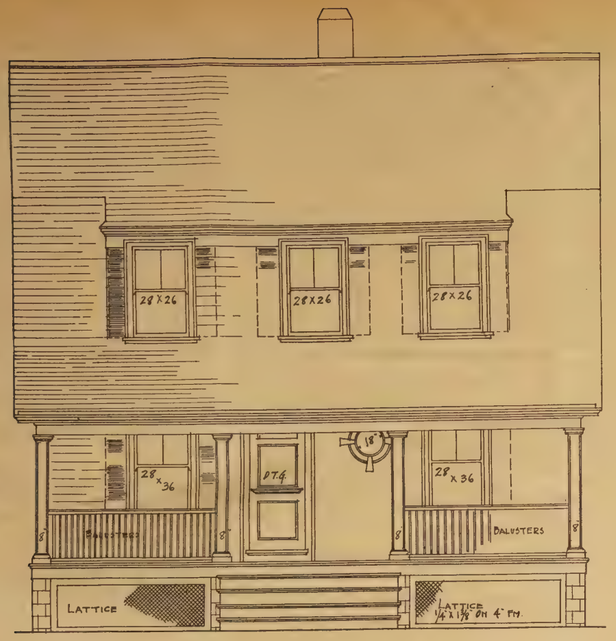
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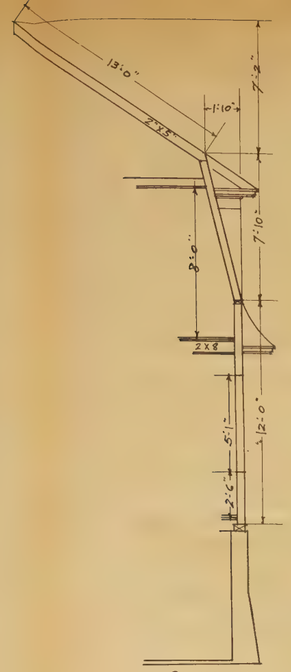
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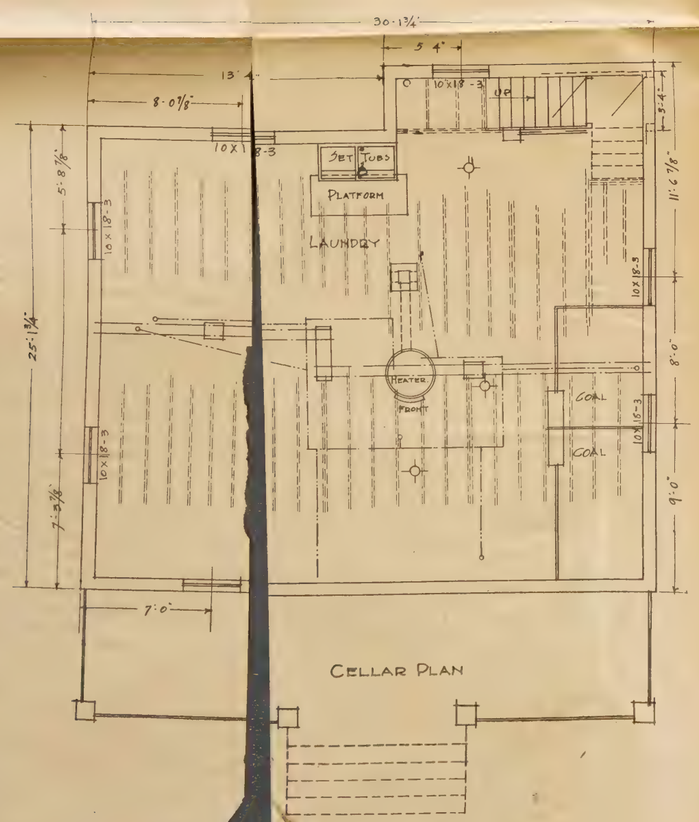
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MARCH, 1912

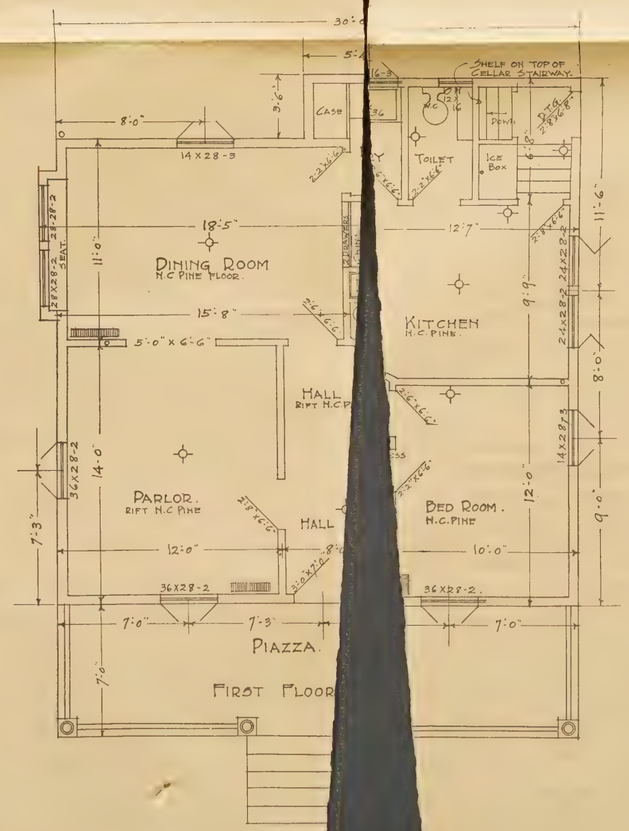
NATIONAL BUILDER DESIGN No. 351, THE MARCHANT RESIDENCE

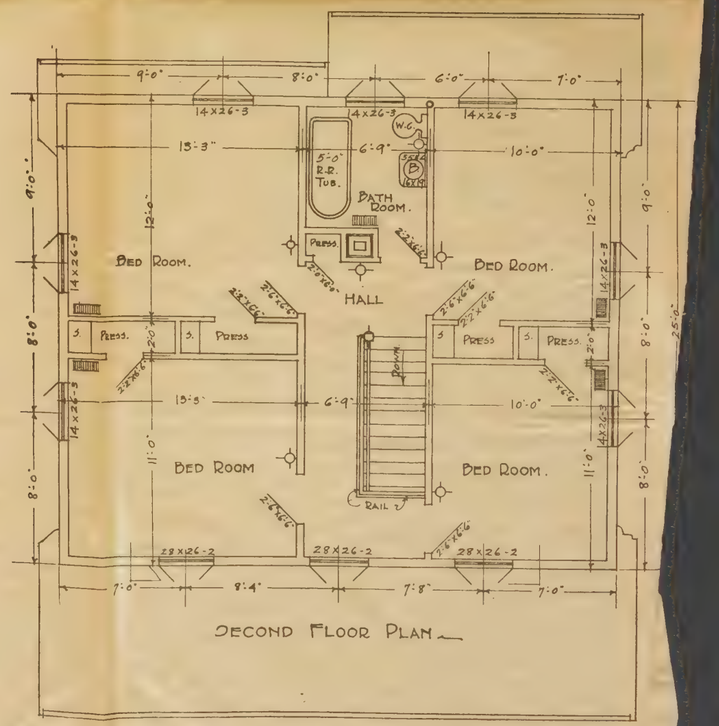
SCALE FOR FLOOR PLANS AND ELEVATIONS, ONE-FOURTH INCH EQUALS ONE FOOT

FOR ESTIMATE SEE PAGE 20



CELLAR PLAN





SECOND FLOOR PLAN

THE NATIONAL BUILDER

Vol. 53 CHICAGO, MARCH, 1912 No. 3



THE MARCHANT RESIDENCE built at Providence, R. I.

NATIONAL BUILDER DESIGN No. 351

Geo. I. Warfield, Architect, Allentown, Pa.

For Floor Plans and Elevations, see Supplement of this Number. Estimated Cost, Architect's Fees Not Included, $3.080.68

THE MARCHANT RESIDENCE

Economy in design can usually be accomplished by careful attention to details, without neglecting the appearance. This design is particularly pleasing and has proven very satisfactory as a residence.

It will be noted that the front porch is on the side, as the house is close to the street. Windows have been placed in the gables instead of the shingle panels, as shown on the elevations, thus providing ventilation for the small attic space.

Estimate of Marchant Residence *

BY I. P. HICKS

EXCAVATING AND MASONRY.

130 yards excavating, 35c	$ 45.50
550 cubic feet concrete wall, 25c	137.50
400 square feet 8-inch cement block wall, 23c	92.00

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

38 feet 8x12 flue chimney, $1.00	38.00
80 yards cement cellar floor, 50c	40.00
Total excavating and masonry	$353.00

LUMBER BILL.

	Ft.
8 4x6x16 ft. sills	256
1 6x8x18 ft. girder	72
1 6x8x12 ft. girder	48
4 6x6x8 ft. posts	96
25 2x8x14 ft. first floor joists	475
30 2x8x12 ft. first floor joists	480
14 2x8x14 ft. second floor joists	266
25 2x8x12 ft. second floor joists	400
12 2x8x10 ft. second floor joists	162
6 2x8x16 ft. second floor joists	126
26 2x4x14 ft. ceiling joists	234
26 2x4x10 ft. ceiling joists	169
25 2x4x16 ft. rafters	275
50 2x5x14 ft. rafters	450
50 2x4x12 ft. outside studs	400
40 2x4x18 ft. outside studs	480
24 2x4x10 ft. gable studs	156
56 2x4x18 ft. first story partitions	672
60 2x4x16 ft. second story partitions	660
26 2x4x16 ft. plates	286
20 2x4x12 ft. plates	160
18 2x6x10 ft. porch joists	180
4 2x6x14 ft. porch joists	56
18 2x4x10 ft. ceiling joists	113
4 2x4x14 ft. ceiling joists	36
20 2x4x10 ft. dormers	130
24 1x6x12 ft. braces, No. 1 com	144
20 1x4x12 ft. bridging, No. 1 com	80
Total feet framing lumber	7,022

7,022 ft. framing lumber at $26	$183.57
1,820 ft. 8 inch No. 2 lap, rough floors, $26	47.32
2,200 ft. 10 inch No. 2 sheathing, $26	57.20
1,650 ft. 6 inch No. 2 sheathing, roofs, $26	42.90
16,000 clear red cedar shingles, roof, $4	64.00
21,000 clear red cedar shingles, outside walls, $4	84.00
274 ft. 1x4x14 ft. flooring, $45	12.33
264 ft. 5/8x4x14 ft. ceiling, $32	8.44
1,950 ft. 7/8x2¼ face clear flg., $45	87.75
510 lineal ft. 1x4 finish cornice, $45	7.65
300 lineal ft. 1x6 finish cornice, $45	6.75
150 lineal ft. 1x8 finish cornice, $45	4.50
50 lineal ft. 1⅛x12x10 ft. steps, $45	2.25
Total lumber bill	$608.66

MILL WORK.

7 cellar window frames, 10x18, 3 lt., $1.75	$ 12.25
7 cellar sash, 10x18, 3 lt., $1.40	9.80
1 front door frame, 3 ft. 0 in. x 7 ft. 0 in. x 1¾	2.50
1 rear outside door frame, 2 ft. 8 in. x 6 ft. 8 in.	2.25
1 twin window frame, 28x28, 2 lt., divided	4.50
1 twin window frame, 24x28, 2 lt., divided	2.25
1 window frame, 36x28, 2 lt., divided	2.25
8 window frames, 28x26, 2 lt., divided, $2.25	18.00
2 window frames, 28x36, 2 lt., divided, $2.25	4.50
2 window frames, 28x28, 2 lt., divided, $2.25	4.50
1 window frame, 24x16, 2 lt., divided	2.00
1 sash frame, 16x12	.80
1 circle sash frame, 18 in. diameter	1.50
4 windows, 28x28, 2 lt., top divided, $2.50	10.00
1 window, 24x28, 2 lt., top divided	2.25
1 window, 36x28, 2 lt., top divided	2.75
8 windows, 28x26, 2 lt., top divided, $2.40	19.20
2 windows, 28x36, 2 lt., top divided, $2.75	5.50
1 window, 24x16, 2 lt., top divided	2.00
1 sash, 16x12	.90
1 circle sash, 18 in. diameter	1.25
1 set door jambs, 5 ft. 0 in. x 6 ft. 6 in.	1.00
1 set door jambs, 2 ft. 8 in. x 6 ft. 8 in.	.70
1 set door jambs, 2 ft. 8 in. x 6 ft. 6 in.	.70
8 set door jambs, 2 ft. 6 in. x 6 ft. 6 in., 70c	5.60
8 set door jambs, 2 ft. 2 in. x 6 ft. 6 in., 70c	5.60
1 front door, 3 ft. 0 in. x 7 ft. 0 in., 1¾ in.	14.00
1 rear outside door, 2 ft. 8 in. x 6 ft. 8 in., 1⅜ in.	3.00
1 door, 2 ft. 8 in., x 6 ft. 8 in., 1⅜ in.	2.60
1 door, 2 ft. 8 in. x 6 ft. 6 in., 1⅜ in.	2.60
8 doors, 2 ft. 6 in. x 6 ft. 6 in., 1⅜ in., $2.60	20.80
8 doors, 2 ft. 2 in. x 6 ft. 6 in., 1 ⅜ in., $2.50	20.00
1 china case	10.00
1 pantry case	8.00
Front stairs	65.00
568 ft. base, 3½c	12.88
568 ft. floor mold, ½c	2.84
340 ft. picture mold, 1½c	5.10
80 plinth blocks, 6c	4.80
480 ft. casing, 12 ft. for doors, 2c	9.60
228 ft. casing, 12 ft. for windows, 2c	4.56
250 ft. head casing, 2c	5.00
250 ft. cap mold, 2c	5.00
250 ft. fillet, 1c	2.50
88 ft. window stool, 2c	1.76
88 ft. apron, 2c	1.76
280 ft. window stops, 14 ft., 1c	2.80
320 ft. door stops, 14 ft., 1½c	4.80
Cellar stairs	10.00
300 ft. crown mold, 2c	6.00
380 ft. bed mold, 1c	3.80
60 ft. cove, ½c	.30
4 porch col., 8 in. square, $3	12.00
32 ft. porch bottom rail, 5c	1.60
32 ft. porch top rail, 5c	1.60
850 ft. lattice, 60 in	5.10
Total mill work	$375.35

CARPENTER LABOR.

7,022 ft. framing lumber, $8	$ 56.17
5,670 ft. sheathing, $8	43.36
39 M shingles, $2	78.00
538 ft. ceiling and porch floor, $15	8.07
1,950 ft. flooring, $20	39.00
1,600 ft. smoothing floors, $15	24.00
300 feet cornice, 12c	36.00
30 feet porch balustrade, 30c	9.00
Setting porch columns	2.00
Porch steps	5.00
Setting frames	10.00
Finishing 7 cellar windows, $1.25	8.75
Finishing 1 front door	4.50
Finishing 1 grade entrance door	4.00
Finishing 18 inside doors, $3	54.00
Finishing 1 cased opening	2.00
Finishing 19 windows, $2	38.00
568 ft. inside base, 5c	28.40
340 ft. picture mold, 1¼	4.25
Setting up stairs	25.00
Cellar stairs	6.00
China case	8.00
Pantry case	7.00
5 closets, $1.50	7.50
Total carpenter labor	$508.00

RECAPITULATION.

Excavating and masonry	$ 353.00
Lumber bill	608.66
Mill work	375.35
Carpenter labor	508.00
Hardware and nails	65.00
Tin work	20.00
Plastering 774 yds., 27c	208.98
Plumbing	260.00
Electric wiring	50.00
Painting	165.00
Heating plant (hot water)	320.00
Incidentals, 5%	146.69
Total estimate	$3,080.68

The cubic feet contained within the walls of this building is 21,000, making the cost of construction approximately 14 2-3 cents per cubic foot.

EDITORIAL NOTES AND COMMENTS

It is not the man who drops his hammer before he has driven the nail home, when the clock strikes 12 or 6, who gets much beyond ordinary wage.

The alert, bright fellow, who is always on the lookout for his employer's interests, and who never shirks his stunts, is the fellow who is made foreman when there is an opening, and gets all the choice jobs on the work.

From reliable news before us, we are inclined to believe that business in most of the Southern states is likely to be unusually brisk. By private dispatches from Birmingham, Ala., Memphis, and several other Southern cities, a number of important building and engineering contracts are under way, and a number of others are now under consideration.

A big slice, five miles long, is to be taken off each side of Broadway, New York, and will be the greatest cleaning-up the famous street has ever experienced. The Board of Estimate authorized the pruning process, aimed at the excessive decorations which have by slow degrees of decades been encroaching upon the busy thoroughfare. Excrescences upon the face of the street in the form of porches, signs, pillars, sidewalks stands and show cases, and perhaps even parts of fronts of buildings, will have to come off. The necessity of making all possible room for pedestrians who crowd varying portions of the long stretch of the street is given as the reason for the board's order.

The New York Record and Guide, in speaking of the inequalities of the cost of similar buildings in different cities, says, "that, with the simple exception of San Francisco, it has been said that it is more difficult to carry on building construction work in the city of New York than in any other city in the whole United States. In the case of the former city, the difficulties are those imposed by labor, while in New York City, the difficulties are due to complexity of building laws. In discussing this subject and that of simplifying legal building requirements, the writer gives some rather interesting figures showing the cost per cubic foot of construction in several of the leading cities. In New York construction is about 2 cents per cubic foot higher than in San Francisco, while in San Francisco construction costs run from 12 to 15 cents more than in other cities similarly situated with regard to shpping and railroad facilities."

As a matter of fact construction in both New York and San Francisco should be lower than in Chicago, Denver and New Orleans, yet the range of cost for average buildings in American cities is as follows:

Construction Costs.	Cents per cu. ft.
New York (Greater)	23 to 28
San Francisco	21 to 26
Chicago	20 to 25
Boston	20 to 23
Pittsburg	20 to 22
New Orleans	19 to 20
Oakland	18 to 21
New Haven	18 to 19
Philadelphia	16 to 18

From the above it is apparent that the local operator in Greater New York has to pay more for the legal requirements imposed upon his contractor than do operators in other cities, due allowance being made for the fact that union wages are higher in New York and in San Francisco than they are in any other city in the country.

The hygienic aspect of illumination have not yet received the attention which the importance of the subject deserves. But the recent establishment of the French government of a technical committee on this subject should have beneficial effects, not only in France, but in other countries also. The committee is a representative character, and includes medical men, representatives of gas and electric lighting, and inspectors of factories and workshops. Among its duties will be the study, from the standpoint of health, of various methods of artificial lighting; the examination of the effects of prejudicial gases; the fixing of a minimum of illumination favorable to vision; the study of methods of measuring illumination; investigating means of lighting for various industrial operations; reporting on impairments of vision; and the best methods of preventing these. It will be seen that the committee has an arduous as well as an important task before it.

SOMETHING OF SHERATON

THERE is a tendency abroad to furnish and finish interiors in the styles of Chippendale, Sheraton, Hepplewhite, Adams and other masters of English cabinet work. It is a little more difficult to distinguish Sheraton from Happlewhite's work than it is to recognize either of the two from the style of Chippendale. Sheraton was addicted to more profuse ornamentation than Hepplewhite, but both wrought well within the lines of good taste; and like the great master—Chippendale—often converted the simplest lines into "things of beauty" apparently without effort.

The illustration showing a bedroom furnished in Sheraton style, with a touch, here and there, of Hepplewhite, makes a charming and restful scheme for a bedroom, particularly when the items are made up of Cuban mahogany with bronze trimmings. The chair, desk and settee, are Sheraton, but the other furnishings carry the stamp of Hepplewhite, or if not his, they are exceedingly fine imitations.

If Sheraton had not been a cabinetmaker and designer in woodwork of reputation, he would have become famous as a mechanician, as he had the qualities, in a large degree, which go to make up a skillful and efficient mechanic.

He flourished in a period when bedrooms were frequently used as sitting rooms, and very many ingenious pieces of bedroom furniture were concealed in bookcase forms, of desks or writing stands. Even washstands folded up and became cabinets. It is well to remember that in 1750 thousands of silk weaving looms were established in England at Spitalsfield, Cheshire, Yorkshire, Essex, Derbyshire, Lancastershire and Norfolk. Moreover, at this period up to the beginning of the nineteenth century an enormous lot of Indian silk and cottons were used; in 1759 the manufacture of printed linens was authorized and encouraged by the French government.

Sheraton was a man of great originality and far in advance of the times, full of quaint combinations, hidden drawers, parts that were convertible, turning from one use into another, cleverly hidden accommodations for boxes or writing materials or toilet articles—desks that could be turned into a table, a chair or a lounge. He was not a good business man, he was an honest one, and would not allow a defective piece of work pass out of his hands. He would either destroy or thoroughly make the work over again, though the defect might be of so slight a nature as not to be noticed by the purchaser.



This is partly taken from the Grand Rapids Furniture Journal to whom we are indebted for the accompanying illustration.

WORTHY OF NOTICE

By G. D. CRAIN, JR.

"Mornin'," said the veteran contractor, as he entered the familiar office of the architect and began to look through the blueprints spread out on the table for the delectation of the builders who wanted to enter bids. "Keeping you at the drawing-board pretty steady these days, eh? Well, the more jobs the better for all of us, including your uncle Henry.

"I suppose you fresh young architects," he continued, looking up from his inspection of the drawing, "wonder how in the world we old boys who were putting up residences before you were doing more than chew on a pacifier, manage to keep up with the procession. I'll admit that things are different, and that the builder today has to 'wise up,' as the sporting editor of the Daily Bugle puts it, and find out what owners and architects are driving at with all of their cubby-holes and window seats and built-in buffets and things."

The old fellow settled himself in a chair and bit off the ends of a plug of Hold-Fast with a contemplative air.

"Nowadays," he went on, as the young draughtsman prepared to listen with proper respect for the ruminations of the old-timer, "the home is equipped with conveniences which we would have called luxuries in the old days. Distinction is the key-note. Every residence must be different in detail and yet possess qualities of comfort and convenience. I suppose you architects realize these facts, handling prospective builders with their fancies and individual ideas every day as you do.

"You would surely laugh at the ease with which the old-time architect could get up his plans. Residences were a big lure for investors in those days, and when a man inherited money, or scooped a pile in some manner, he would proceed to immortalize himself by erecting a row of houses to be known by his name. I remember that my first big contracting job was the erection of Quinn's row, just after the war. There were seven brick houses in that row, each with ten rooms, all absolutely alike and so similar in detail that I judge many a poor occupant had a terrible time picking out his own domicile the morning after the night before. The ceilings were high. There was lots of waste space in the halls and comfort was unknown in the terms applied to that luxury nowadays. We had big grates in every room, so that folks were steaming their faces the while they were freezing their backs, as James Whitcomb Reiley says.

"If you find two houses in the same neighborhood now that are of identically the same style outside and inside, you can put it down that those structures were erected at least fifteen or twenty years ago. The modern policy of builders is originality, and with the introduction of the numerous household conveniences, time and space-savers, the building interests certainly lose nothing by the latter-day notion. It naturally involves more time, trouble and expense to handle a thousand and one details when you are finishing a job, but the additional expenditure is something that the modern owner is willing to pay for, and in addition a man who takes pride in his work derives a lot of satisfaction from turning out an original job.

"The finish of a modern residence, both exterior and interior, requires more time now than it used to take to erect and complete an old-time home. When you have the roof on, the plastering done and the glass in, you are just beginning on the minute features, for then you have to watch the sub-contractors who are handling the woodwork, the men who are doing the wiring, and the plumbers, steam fitters and other workmen who are installing the multifarious incidentals in the modern home.

"There was a time when the same wood finish extended through the entire house. In fact, a man considered himself pretty lucky to have a stained wainscoting or a hardwood floor at all. Nowadays the finishes are indispensable, and furthermore they all have to be different. In view of the fact that people live all over a house, as the saying is, and do not confine themselves to the sitting-room, bedrooms, dining-room and kitchen, leaving the halls and parlors in bleak frigidity except when there is a special occasion, the public is demanding something different in every room.

"The drawing room, reception hall and library, possibly the dining-room, will be finished as richly as the owner can afford. The more public portions of his residence which are open for inspection all the time have to put up the best possible appearance. Accordingly, the parquetry in these apartments will probably be of mahogany and white maple, in fancy figures, and even the picture molding will harmonize with the effect.

"The dining-room, in line with the demand for Mission furniture, will probably be finished in Flemish oak, with heavy green burlap panels extending around the walls for about four feet, set in oak borders. Burlap is a very popular wall covering, and various shades, rich reds and greens and yellows, are used in mural panels everywhere from the dining-room and library to the nursery, where they can be ornamented with Mother Goose pictures or Teddy Bear decorations.

"Often the owner specifies that his bed-rooms be finished individually in separate schemes, to harmonize with new sets of furniture that will be installed. Therefore we have quartered oak and birdseye maple bed-chamber woodwork. I'll tell you, the expansion of art in this country is something terrific. You won't find a person nowadays who lacks in what we used to call 'taste,' but which is really appreciation of artistic values in the home.

"Then we have permanent wardrobes in bed-rooms. They are replacing the old-fashioned clothes' closets which were the bane of every architect's life. The owner, I remember, used to hammer away at the architect for more closets, and if there was anything the builder abhorred it was the unsanitary, obtrusive and all-around ugly storage place under the stairway or behind the door. But it's a comparatively easy matter to leave space in the wall for the permanent warddrobe and have the woodworkers set in a handsome case of suitable wood, ornamented with plate mirror doors.

"Another new wrinkle in interior finishing is the additional facility which is provided by electrical workers for consumption of current domestically. Ten years ago a man thought he was doing fine to have an electric chandelier in every room and perhaps a wall lamp or so for reading or writing. The current was formerly used only for lighting, but now the General Electric people, the Westinghouse company and other manufacturers in the world of ohms and amperes have boosted consumption of current in the home wonderfully. We have electric toasters, electric irons, hot water heaters, foot warmers, et cetera. Do you think that the public is going to switch off the light so that it can get a socket connection when it wants warm toast or a hot toddy? Not much. The electrician has to provide auxiliary sockets at convenient intervals through the house, so that the owner can run a connection any time without interfering with his illumination.

"Plumbing and heating have changed a lot, too. The call is now strong for individual lavatories in bed chambers. Wash-bowls are constructed upon such sanitary, easy-to-clean principles now that there is absolutely no danger when milady has a lavatory in the corner of her boudoir, and it is infinitely more convenient. Then again, steam heating has become an every-day institution and radiators from hot water furnaces have to be purchased in suitable shapes and designs so that they can be tucked away out of sight. Nowadays a man doesn't range a big radiator alongside the wall in his room as though he were in an office building. He secures a squat shape which can be shoved close under a window, and then he gets a window seat with an asbestos cover to place over the unsightly convenience. That's the way the whole story goes, comfort and artistic effect blending at every turn.

"One of the neatest tricks I have yet discovered in the way of consolidation in residence building is up in that park job I'm bound for now," concluded the contractor, as he deftly shot his quid into a nearby-by cuspidor and arose to don his coat. "The owner had your boss draw plans for a garage in the basement of his house, for the lot is small and he doesn't want to waste any space which can be beautified in summer. The entire structure is concrete, with a reinforced floor over that portion of the basement which is occupied as a garage, and there isn't a bit more fire hazard. I think you might call that the last word in compressed residences and garages. Come up and take a look at it some time—I've got to be going now.

"So long!"

CONSTRUCTION OF SQUAB HOUSES

By GEORGE RICE

MANY persons are going into the squab raising business, and the introduction of this profitable business has resulted in demands upon carpenters and builders for designs and constructions of buildings for this purpose. The squab house is erected differently from the common hen house. The squab structure has to be made to comply with certain conditions not demanded in the usual type of poultry house. Men who have designed and made poultry buildings for years, find that they have a few things to learn and consider, when they build squab houses. The site is first selected with a view of giving the place proper publicity. The dealer in squabs for the market depends upon a certain amount of advertising in order to dispose of his products. If he has the house erected in a remote place, he must depend greatly upon the general market for the sale of his products, but if he has his place on a

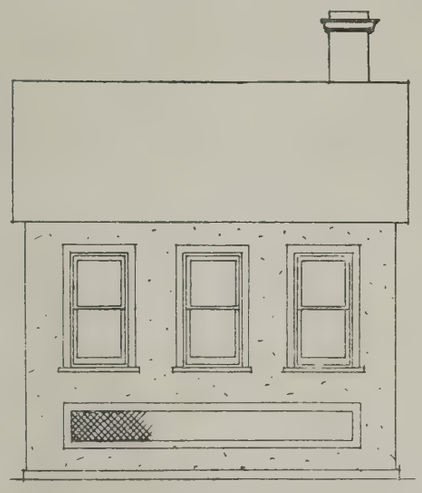


FIG. 2.

main street, where a neat looking front can be made, persons passing may notice the business, and hence advertising results and numerous sales occur. The builder of the house for the up-to-date patron, advises a location in a public thoroughfare. It is a good idea to have a concrete basement. The first floor of the squab house can be on the ground, but for purposes of storage and in order to get a dry floor for the stock, cellars can be made to good advantage. A general outline of the ground floor is shown in Figure 1. Ordinarily these houses are made for the accommodation of about one

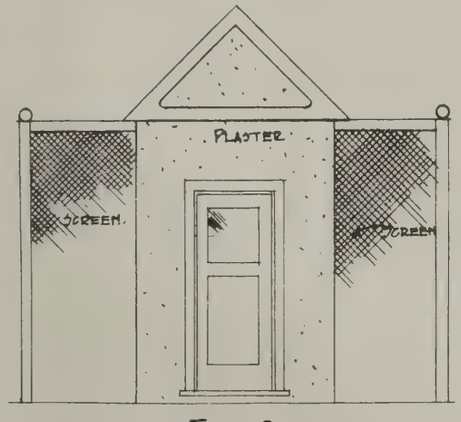
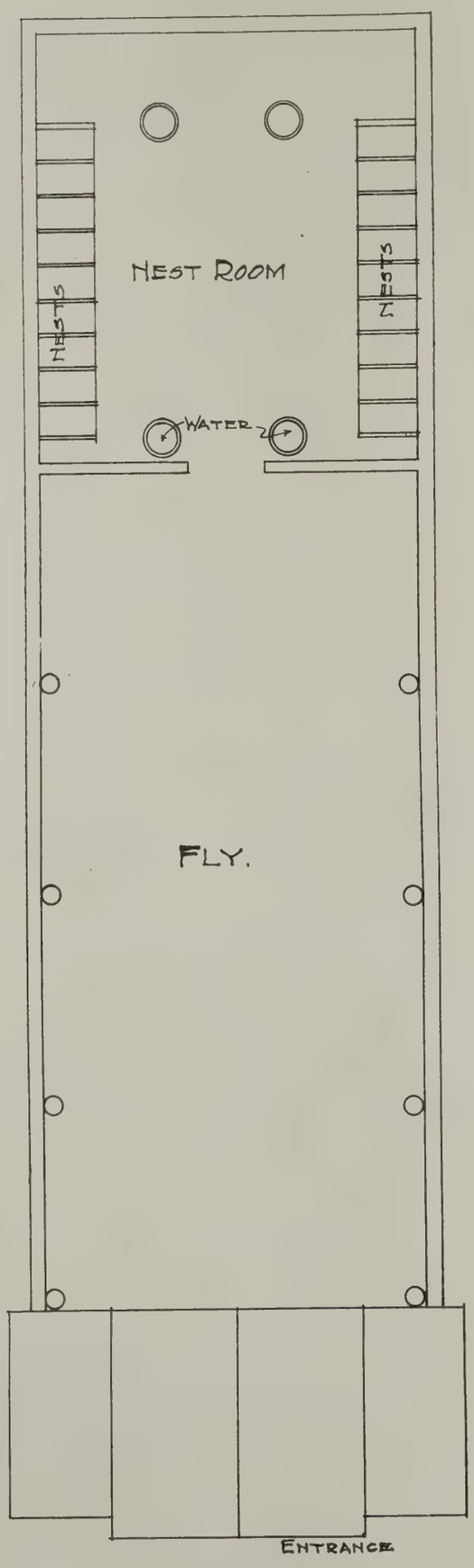


FIG. 3

hundred pairs of birds. This would call for a building about 60 feet long and about fifteen feet wide to harmonize well with the length and give the required dimensions for the interior fittings. Sometimes the entire length of the squab house is separated into divisions of about ten feet each, with the individual nests arranged in each of the divisions. In case of necessity, therefore, one or more divisions can be separated with doors of lattice work. In the presented diagram, however, there are no divisions, except the one at the back, forming the nest room. The nests are made in the usual tier form used in the making of nests for any poultry house.



PLAN
FIG. 1.

Each carpenter would have his individual design for a nest. In the nest room are the water tanks and in the front or main room the feed troughs as well as water tanks. But these articles are portable and can be arranged by the owner of the squab house to suit the conditions prevailing. Plenty of room is given in the main apartment for various reasons. The owner of the house must depend a good deal upon advertising his products and doing a profitable business in order to keep the industry alive. A wood or concrete floor is put in and on this persons can walk readily. The place may be kept quite neat if the flooring is hard. Hence the proprietor can invite prospective purchasers into the house to see how the birds are bred. In this age of inspection by large buyers, it pays to have plenty of air, ventilation and space in which stock is bred. Large buyers for the markets and the hotels make careful inspections of all products purchased by them, hence the squab man

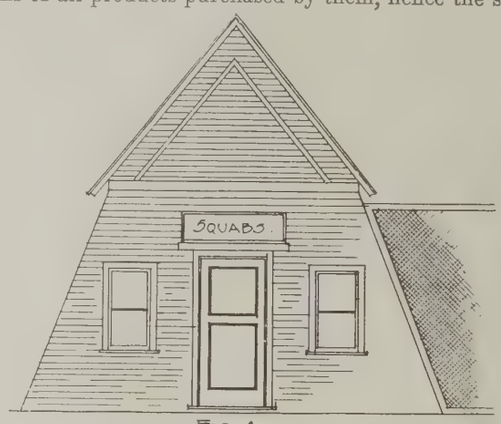
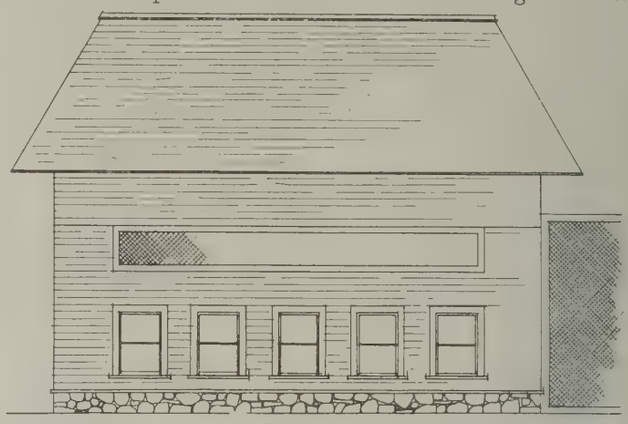


Fig 4

may be called upon sometimes to have his house so clean that ladies can be invited inside. All this advertises the business, and means profit to the owner.

The house should be lathed and plastered for northern climates. In the tropical climates, of course, this can be dispensed with. You need a tight roof on the house and shingles or metal will answer all purposes. The metal roof, however, would require an interior protection to prevent the heat in summer penetrating too much inside. A pen can be made inside for storing feed. Wire


Fig. 5

covered windows should be distributed about the building with a view of providing ample light. A good whitewashing inside helps to make the interior light and clean.

Concrete fronts with some artistic ornamentation are not at all out of the way. If possible, have the office and salesroom in the front section, which should be designed in attractive form, with concrete walls and plenty of windows, as shown in Figure 2. Or the front may be without the office and sales department, and can be arranged with a wire front, as in Figure 3. This is in case the fly for the stock extends along the front. Another form is shown in Figure 4 with the fly for the birds along the side. Still another type of building is shown in Figure 5. Buildings of this character with ample fly room for 100 pairs of birds, can be put up for $500. In fact, it is possible to erect moderate structures for much less.

BUILDING CONTRACTS

By W. J. STANTON

A WORKING CONTRACT is one under which work or labor is to be performed in the erection, construction or repair of same building, edifice, structure or other work. A mere request by the builder for bids or tenders for the erection or construction of particular works is not an offer on his part to accept any particular bid or tender, or to accept the lowest bid or tender, and without an express or implied acceptance of any bid or tender submitted there is no building contract. The acceptance of the bid must be unconditional and without change in the terms of the offer, and if the acceptance varies from the terms of the bid or tender the contractor is entitled only to consider such acceptance as a new offer to be accepted by him upon the terms thereof. Where a tender is not responsive to the proposal, it is an offer by this contractor to do the work according to the terms of the bid, and its acceptance by the builder creates a contract according to the terms of the bid.

A proposal for the construction of a particular work may be made as an offer, though made to no particular person, and if accepted by another before its withdrawal, will create a building contract. No particular form of words is necessary to constitute an acceptance of a bid or tender, provided the intention of the builder to acept is evidenced. There must exist such circumstances as will show an intention to accept the bid. A provision in the proposal for tenders stating that the bidders will be required to give security for the performance of the work may be waived by the builder, and a valid contract created upon the acceptance of a bid though no security is given by the bidder. A tender and acceptance may constitute a building contract, if so intended by the parties, although the acceptance may refer to a formal contract to be drawn up afterwards.

Where contracts for the construction of public works are to be let on competitive bids, public policy requires that competition in bid should be unrestrained and agreements between intending bidders to stifle competition in bids are illegal as against public policy. If such agreements result in letting the contracts at an unreasonable price to one of the parties to the agreement, the municipality may, on the ground of fraud be relieved from the contract.

To render a building contract valid there must be a mutual and real consent to the terms of the contract. Where one so conducts himself that a reasonable man would believe that he was assenting to the terms proposed by the other party, and the latter upon that belief performs the contract, the former cannot assert in fact that he did not intend to consent to the terms proposed. In making tenders, the fact that the contractor, through negligence in computing the cost of the work to be done, makes a mistake, it will not prevent a valid contract from arising upon the acceptance of the tender in good faith, or authorize a court of equity to grant to the contractor relief from the contract on the ground of mistake. Where the parties to a written building contract sign the same, the terms of the contract, in the absence of fraud, are binding upon both parties and one cannot escape liability on the ground that he made a mistake as to the terms of the contract.

A working contract may for the purpose of describing the work to be performed refer to particular plans and specifications or other writing. It is not necessary that such plans and specifications be signed by the parties, it will be sufficient if they are referred to with certainty. Where the working contract does not sufficiently describe the work to be done, but refers for such description to particular plans and specifications if the plans and specifications referred to cannot be identified the contract will be invalid for uncertainty. The fact that a building contract refers for a particular description of the work to be done to alleged plans and specifications not in existence will not constitute a fatal uncertainty if the contract itself sufficiently describes the work to be done.

A consideration is always necessary to the validity of a working contract. Thus where a building contract has been fully performed by a contractor his further agreement to perform extra work must, to be binding upon him, be supported by a consideration. Where the contractor refuses to perform his contract, and the builder promises to pay him additional compensation in consideration of the continued performance of the contract, the authorities are not agreed upon the question whether the promise for additional compensation is supported by a sufficient considera-

tion. The majority rule seems to be that such a promise is valid as an abandonment of the original contract and the creation of a new contract, where the contractor has agreed a particular work for a certain amount, his agreement while the work is in progress to take a smaller amount has been held to be without consideration.

Working contracts which provide for the performance of work and labor and the furnishing of materials are not as a general rule required to be in writing and where the parties verbally agree upon terms with the intention of creating a binding contract, the fact that the execution of a formal written contract is in the contemplation of the parties does not make the writing essential to the completeness of the contract. Where it is understood that the contract shall be reduced to writing before it shall become binding, it is of course, necessary that this be done before a binding contract is created. Where the contract is not to be performed within one year it must be in writing. Where the contract is in writing there must be a delivery of the written instrument, but such delivery must be to a third person for the benefit of both parties. Thus, a valid delivery may be made to the architect to hold for the benefit of both parties.

Working contracts may be implied as well as expressed. Thus, where one at the request of a builder performs work and labor without an express agreement for compensation, the law supplies a promise on the part of the builder to make a reasonable compensation therefor, and it has been held that where one stands by in silence and sees work done in the improvement of his premises, of which he accepts the benefit, a promise to pay therefor may be implied. Where, however, the contractor sublets his contract, the law will not imply any agreement on the part of the builder to compensate the sale contractor for the work and labor performed by him. Where an express working contract is invalid by reason of some formal requisite, the law will imply a contract to make a reasonable compensation for the work and labor performed thereunder.

Working contracts frequently refer to particular plans and specifications for the details of construction, and they thus become constructively a part of the contract. Where original plans and specifications are referred to and identified, the omission to annex a copy threof to the contract is immaterial though the contract expressly recites that a copy is annexed thereto. The contract may require the work to be constructed according to plans and specifications thereafter to be prepared by a particular person; where there is a difference between the contract and the plans and specifications referred to for details of construction, the contract controls, and where the contract refers to original plans and specifications, and recites that a copy thereof is annexed to the contract, in case there is a difference between the copy annexed and the originals the latter control. Where there is a variance between the plans or drawings and the written specifications, the latter will prevail.

(To be continued.)

"SEGMENT" FLOORS AND CEILINGS

By ROBERT GRIMSHAW, Ph. D.

THE name "Segment" floor is given by a well-known Weimar Architect, Herr Joh. Bermbach to a system composed of concrete segments of circular arcs of specified radius which may be combined in various manners according to the requirements

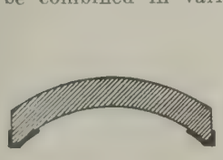


Fig. 1.

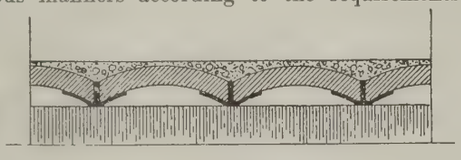


Fig. 2.

as regards load, insulation, etc.; it is also adapted to ceilings and walls. One of the special advantages claimed therefor is that it requires but little asphalt to be used in connection therewith, and

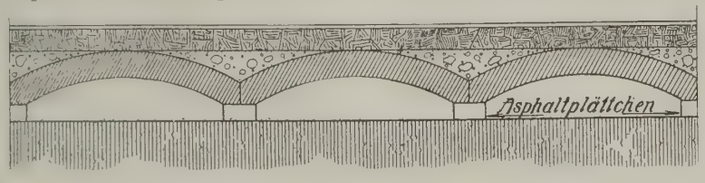


FIG. 3.

secures perfect immunity from moisture, as only the edges of the segments, as seen in Figure 1, require coating of the waterproofing composition. Figure 2 shows a floor built up in this manner. Of

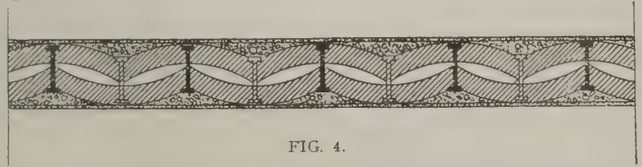


FIG. 4.

course, the curved-under outline of the segments contributes towards keeping out the sound.

The arrangement shown in Figure 3 in connection with asphalt strips of narrow slabs is preferred by some in cases where the amount of moisture is considerable.

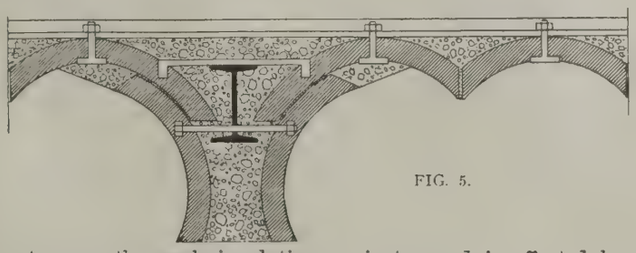


FIG. 5.

A more thorough insulation against sound is effected by an arrangement not here illustrated; where there are two layers of segments, the upper arches set staggering with regard to the lower one, thus forming two sets of hollows.

A further but rather more expensive system for walls, is that shown in Figure 4, where the protection against sound, and the insulation against the passage of heat, are still greater. The two sets of segments are united by irons at suitable points; the filling

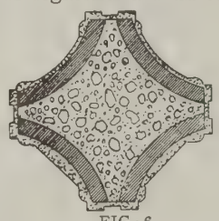


FIG. 6.





FIG. 8.

material closes the joints effectually; and the vertical character of the spaces makes them poor lodging places for vermin.

Figure 5 shows how walls may be built with such segments and







FIG. 7.

profile irons; for a given amount of material the lateral resistance to wind and driving snow is greater than that of thinner walls.

From the same segments arranged in two and fours as in

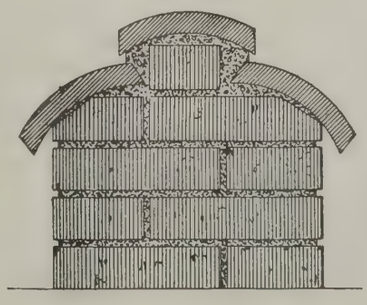


FIG. 9.

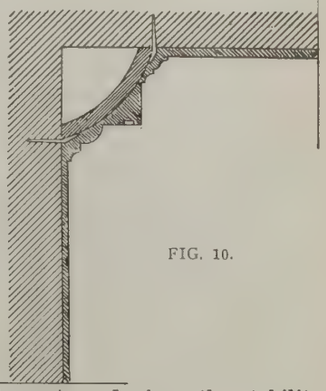
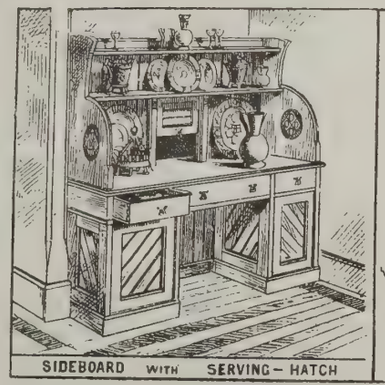
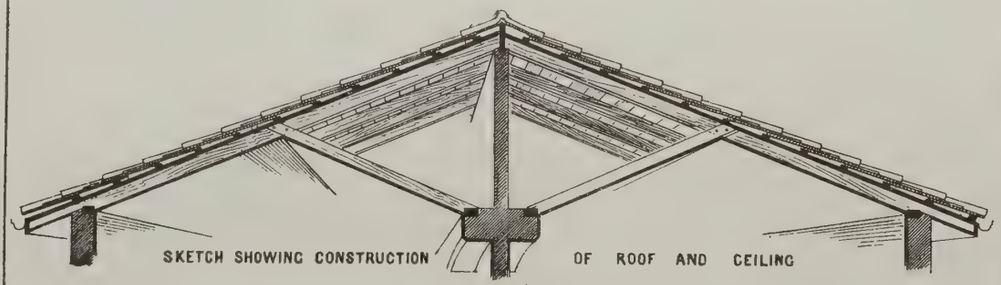


FIG. 10.

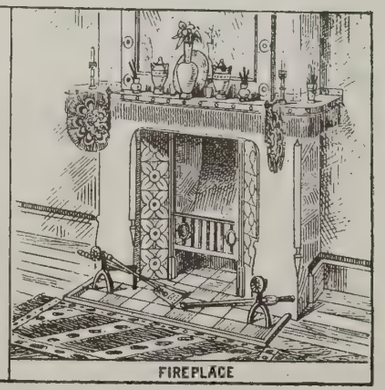
Figures 7 to 12 there may be made posts and piers, the stability of which may be increased by profile iron.



SIDEBOARD WITH SERVING-HATCH



SKETCH SHOWING CONSTRUCTION OF ROOF AND CEILING



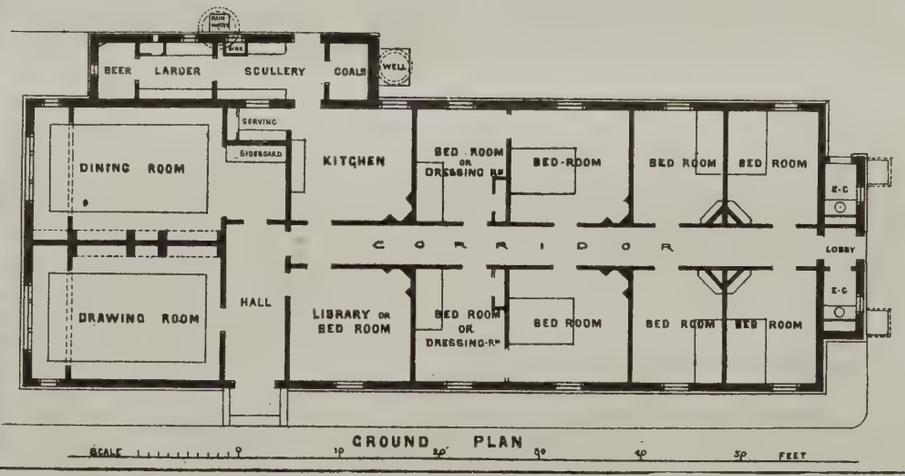
FIREPLACE

A BUNGALOW - AT WESTCLIFF-BIRCHINGTON-ON-SEA - ISLE OF THANET -

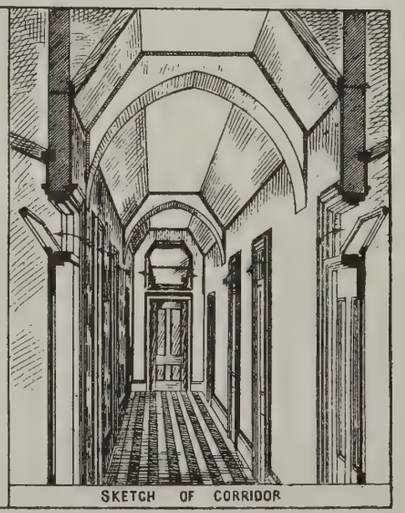
JOHN TAYLOR ARCHT 6 WHITEHALL SW



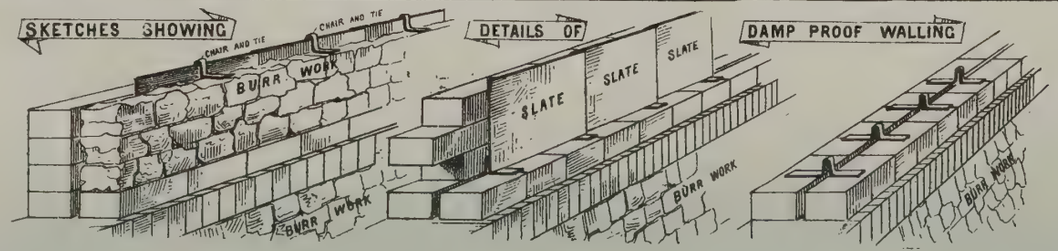
SKETCH OF DINING ROOM

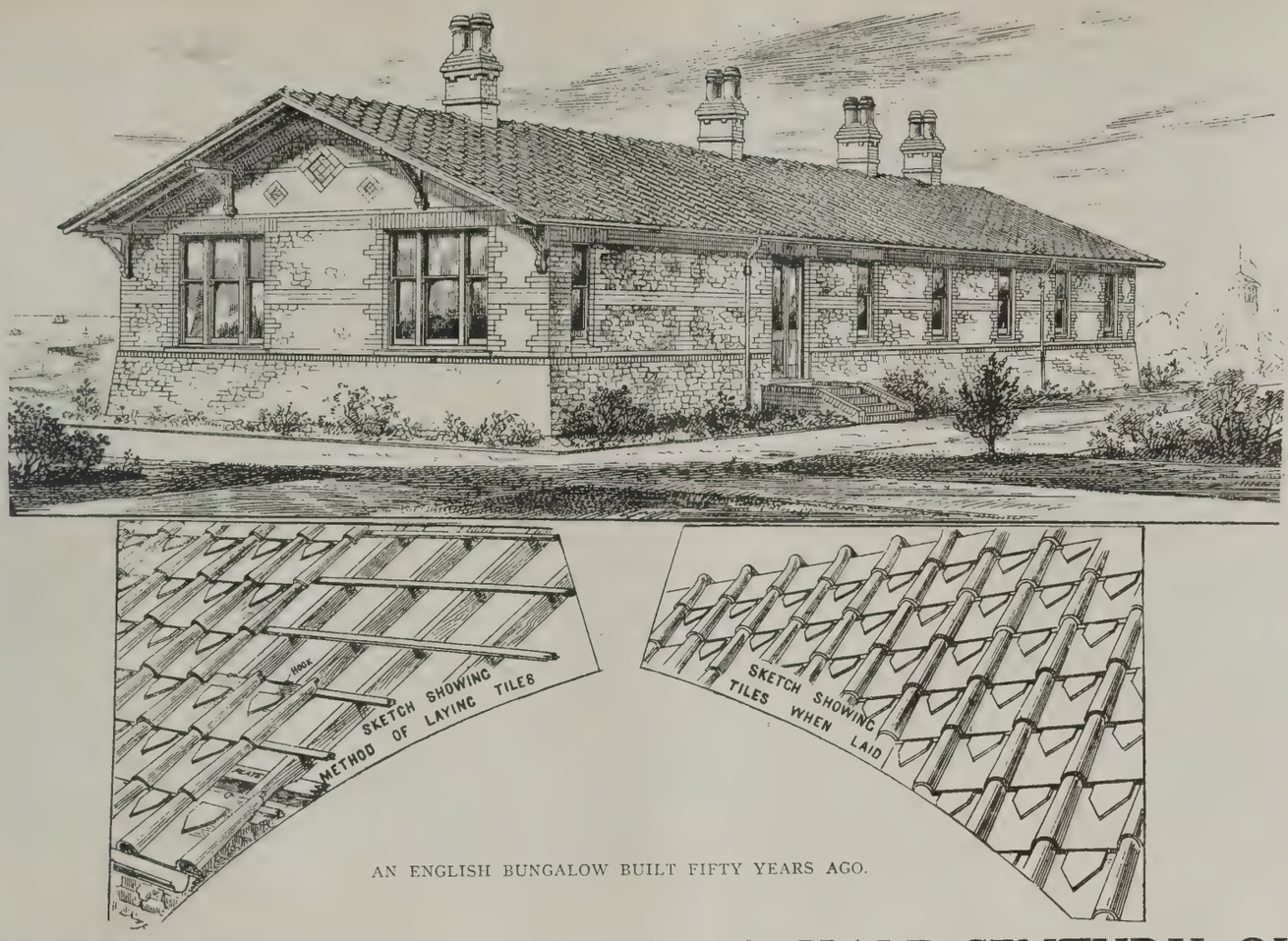


GROUND PLAN



SKETCH OF CORRIDOR





AN ENGLISH BUNGALOW BUILT FIFTY YEARS AGO.

AN ENGLISH BUNGALOW OVER HALF CENTURY OLD

THE plan perspective view and details of the bungalow shown in the illustrations exhibit a very roomy and complete building, and though built many years ago, for Professor Erasmus Wilson, embodies many things in its makeup that would prove useful and convenient at the present day,, and would bear imitating with profit. The Professor, in speaking of it, says: "I find everybody is charmed with my bungalows, and I believe if there were many bungalows there would be many buyers. The house is a novelty, very convenient, fitted for a single family, and easy as to price. The idea of bungalows seems to take people's minds immensely: they are novel, quaint, and pretty, and perfect as to sanitary qualities. The best sanitary house for a family is a bungalow."

Such praise, which we believe to be thoroughly merited, particularly the portion in italics coming from such an authority upon sanitary matters as Professor Erasmus Wilson, will, we doubt not, induce our readers to consider well the various points which are elucidated in our illustrations.

THE PERSONAL APPEARANCE OF THE SMALL CONTRACTOR

By BEN JOHNSON

Well, that depends on whether he is going to labor some as well as boss. If he is going to work on the job, he will need overalls. If he is going to do nothing but boss, he will not need to wear them.

To begin with, I think a contractor, whether he is a large or small one, should be mechanic enough to pick up the tools and do any pieec of work on the job. This calls to my mind a circumstance in which the writer figured as contractor, and is in favor of the overalls. My men were not much of mechanics, but what we call good, handy men. Well, some wise people tried to make trouble for me, by talking about things which did not concern them, as some people do. One party, a "wood butcher," told my customer that I did not have a mechanic in the gang. My customer told me of this and in reply, I said, "No I have not, and I could not get one in this town, for they are scarce around here," but, I said, "What my men can't do, I can." Well, I completed the job and my customer was well pleased. Now, in such cases as the above, I do not think the contractor would care to wear better than overalls.

Now, I wish to say that if a contractor has many men to oversee, let them be good or poor mechanics, he will have enough to do without working with tools.

Now, I think a contractor that does no work on the job should dress neatly and look respectable, but it should not be overdone. Clothes do not make the man, neither do they denote prosperity. I think the contractor should act as one of the boys while on the job and not as if he thought himself so much better than most people. The men will think more of him; they will do more work, and better work.

Now, as for my part of the contracting business, I will say that I do not contract on a very large scale. I contract and furnish everything, or take it by the day. I get all I can do, get my own price, employ some men, and then I have to turn off some jobs. I usually take the place of foreman on the job, and lay out most of the work. I do not dress much different from the other men, when on the work, but try to keep reasonably clean for one in my position. I always have my chest on the job, and when I can and have the time, I work along with the men. I enjoy working with tools.

I once knew an old contractor who would be working hard at ripping lumber, or doing some other hard work, while his men would be standing looking on. I am not that way. If there is any looking on to be done, I will do it.



ADDITION TO HOSPITAL, MONMOUTH, ILL. MEYER J. STURM, ARCHITECT.

HOSPITAL DESIGN AND CONSTRUCTION

ON THESE pages we show the floor plans and a photographic view of an addition to the hospital at Monmouth, Ill. As the ideals of hospital design, construction and operation are closely connected with the ideals in home building, as well as with other lines of civic institutions, we believe careful study of the plans will be of material benefit, not only to the architect, but to the builder and owner as well.

Although an addition to an already established hospital, the present building is practically complete in itself. The basement contains the regular service equipment, the main kitchen, dining rooms for the nurses and help, the laundry, stores, etc. It will be noticed that the stairways and elevator are in a shaft, separated from the rest of the building by fireproof walls and doors.

The upper floors are practically alike except that the third floor contains the operative room with its attendant offices. Each floor is, to a great degree, entirely independent of the others so that the necessity for going from one floor to another is almost entirely eliminated. As many of the patients are on special diet, these can be cared for without going to the main kitchen.

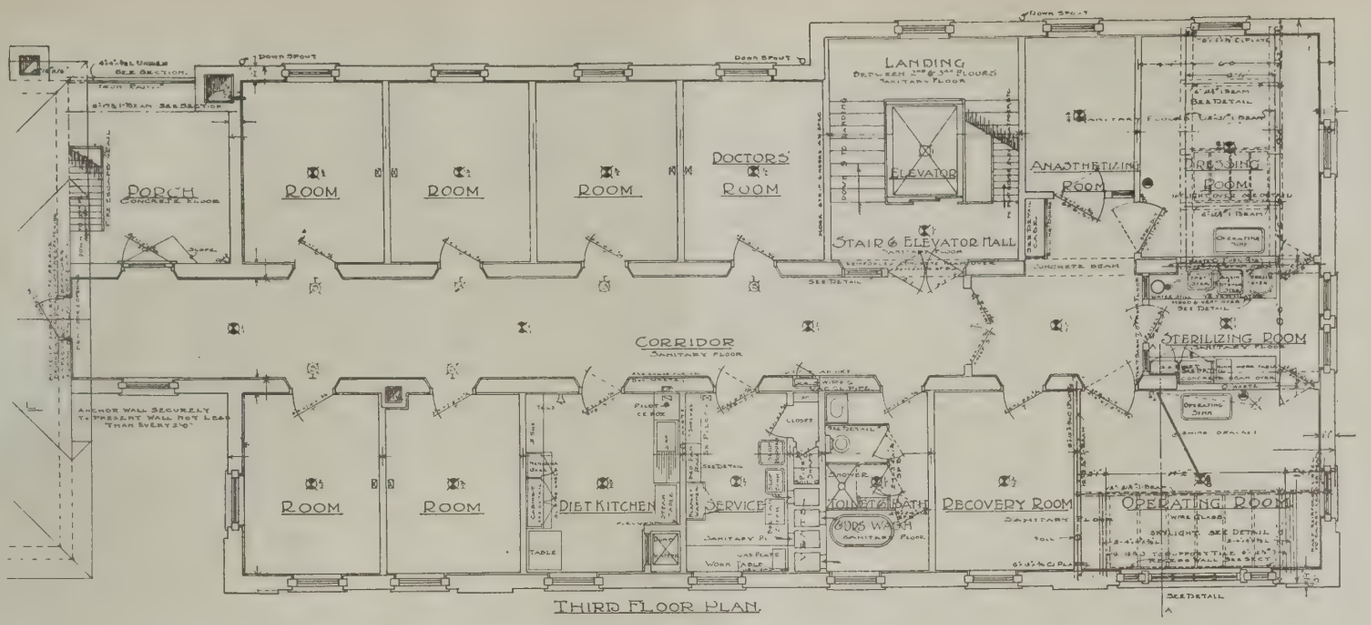
Needless to say, the entire addition is fireproof, the floors are concrete or sanitary with a covered base of the same material. The details of the woodwork is plain with rounded corners to lighten the labor of cleaning and prevent the harboring of the malicious germs. Throughout the building the idea has been to economize in maintenance and still have every facility for the special purpose for which the building is designed.

Designers of public or semi-public buildings, such as hospitals, have long been accustomed to the well-developed style of "monumental" building. Could the architect but divide his estimate, showing how much of the cost would come under the head of ornamentation and how much for necessary construction, it is probable many buildings would lack the cut stone "trimmings," gables, fancy roofs, carvings, which add nothing to the utility and much to the cost of the building. A certain amount of ornamentation, such as stone sills and lintels, brick piers laid to a design in a contrasting mortar, adds little to the cost of a building purely utilitarian, and saves much in maintenance.

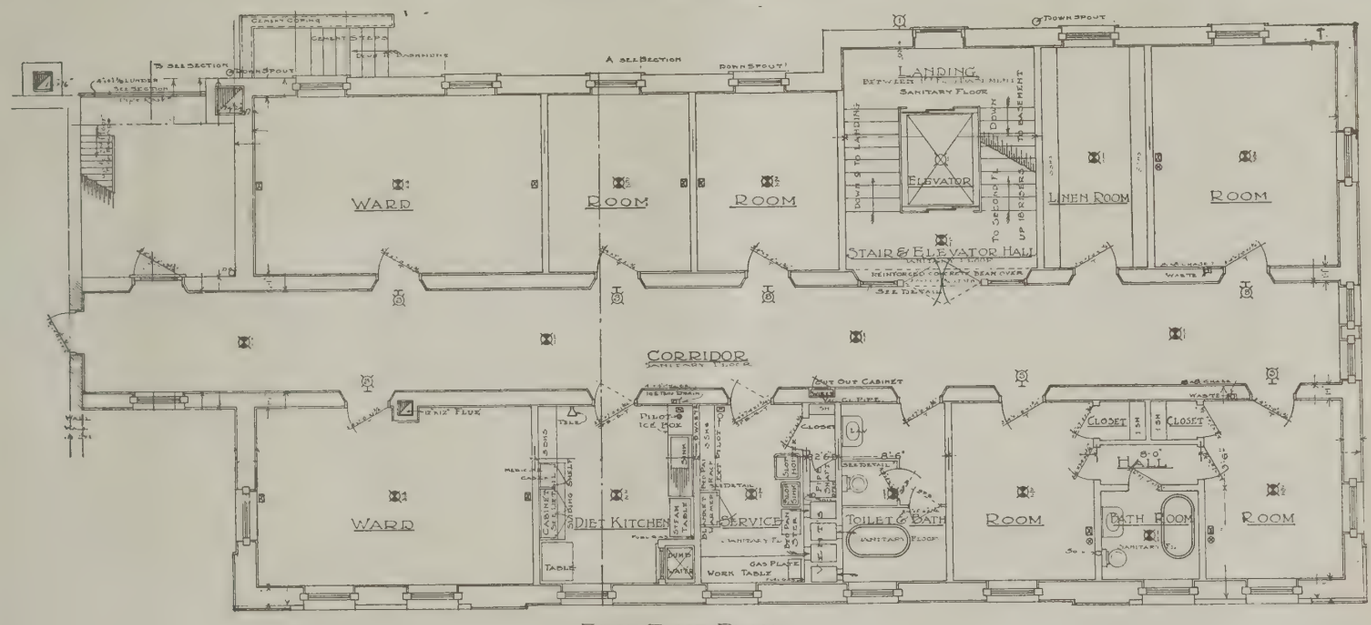
In the present building, it is apparent that the simplicity of the exterior is a real benefit to the interior, as the saving over a more elaborate front is enough to permit an additional story.

The fundamental principle in home building is protection, for preserving the good health of the occupants. When houses were simple and widely separated, this meant mainly protection from the elements. With the increase in population and complexity of building requirements many new dangers arose. Light and air were cut off, perfect ventilation was not secured, and all the evils of overcrowding were problems to be met and solved. How well this has been done is shown by the census reports, the statistics showing that the cities are becoming healthier than the country. This is largely a result of ventilation, sanitation, pure water supply, drainage, etc. About one-half of the death rate of the country is directly attributable to bad air diseases, i. e., bad ventilation, and therefore preventable. Many of our farming communities are notoriously deficient in preventatives, and almost criminally careless in their lack of precaution against the spread of contamination. Laws have been made by the cities compelling the farmers to observe many sanitary rules before their milk will be permitted in the city, and it is due to such laws that the health of the cities is maintained.

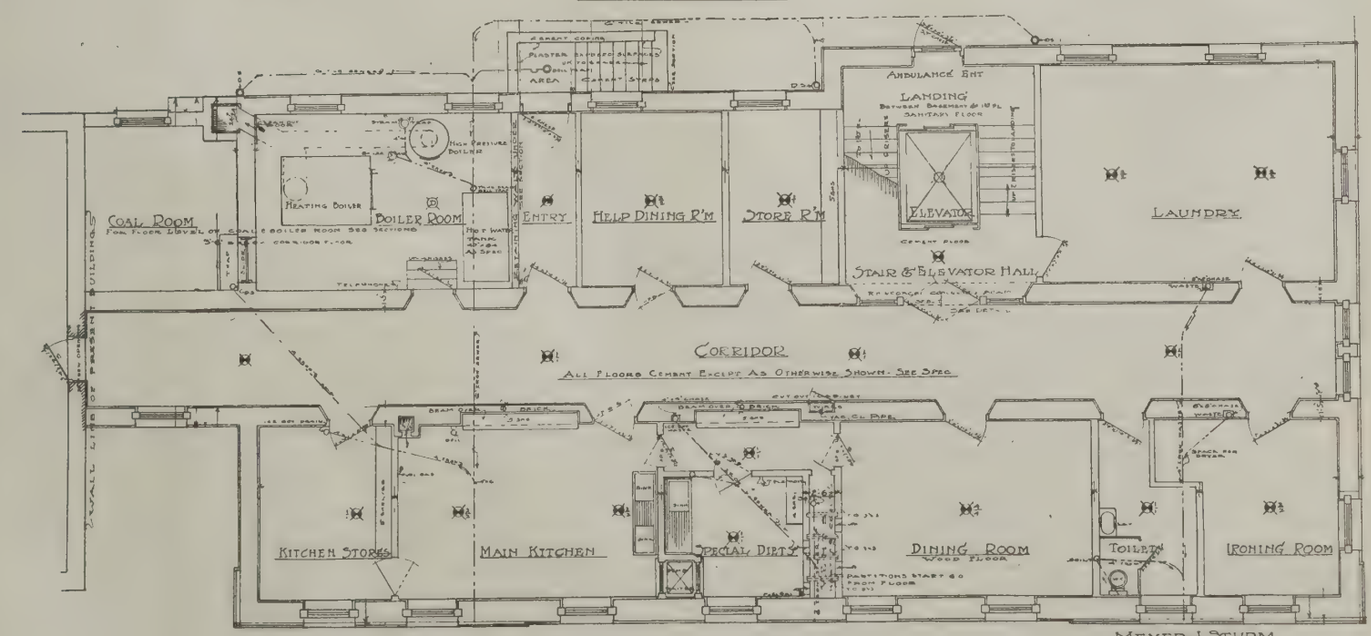
Wherein lies the similarities and differences between modern hospital construction and the better class of private residences? Each must be complete in itself, the one designed to restore health, the other to preserve it. The well-ordered household has facilities for heating, lighting and ventilating, probably as complete as the hospital, and the kitchen and dining rooms are as necessary in one as in the other. In the residences, however, there is every convenience for enjoyment of life and society, with the opportunity for the meeting of the entire family and guests in one room. In the hospital, the main idea is to restore health of those who are



THIRD FLOOR PLAN.



FIRST FLOOR PLAN.



BASEMENT FLOOR PLAN.

MEYER J. STURM.
HOSPITAL ARCHITECT

ill or injured and who require isolation and quiet rather than otherwise. Special diets are required instead of course dinners, and careful sterilizing takes the place of ordinary cleaning.

Where operations are necessary, there must be furniture and equipment entirely foreign to the ordinary household and the surgeons with their attendants and nurses require special rooms and facilities not generally found outside established hospitals.

The danger from infection and contagion, present in even the simpler ailments, can best be reduced to a minimum in hospitals on account of the simplicity of the construction. The prevailing idea in home construction permits many lodging places for dust and germs; carpets, rugs and lace curtains are notorious collectors, and by eliminating these, the work of destroying the germs is greatly simplified.

When it is understood that germ life has no means of locomotion, their destruction becomes a matter of preventing their being distributed by mechanical means. Dusting and sweeping are probably responsible for as much spread as any one thing and when this is done by a vacuum process with proper provision for disposing of the dust, the germ danger is greatly reduced.

Flies and insects are well known as distributers of germs, as they require little space for entrance, and from numbers, are hard to combat. By properly screening the danger from this source is brought within safe limits.

There is, in hospital work, one important factor which is rather less in the private residence. This is the cost of maintenance. Every additional step necessary to perform the work in a hospital adds to the maintenance charge, and this is a constant expense which frequently makes operation costly. The ideal hospital is that one which gives the greatest amount of serviceability at the lowest cost consistent with a first-class structure, and at the minimum fixed and maintenance charges for the maximum work to be done.

It will be readily seen that the same principle applies in our household affairs, and the high cost of high living is easily raised when to the necessary operating expenses there is added the cost of keeping up unnecessary rooms, lights, grounds, etc., all of which are refinement demanded by appearance only and add nothing to the comfort of inmates or guests. On the contrary, the cost of keeping up these unnecessary luxuries must be deducted from the operating fund, to the real detriment of the service.

So it will be seen that by following the example of the hospital in reducing the danger from the harboring and spread of germs, our homes can be made more sanitary, and by the careful planning to permit relative isolation with good heating and ventilating, the need for hospitals will be less, for the health will be better preserved and better able to resist the mild attacks of the simpler diseases.

THE MOST DURABLE PAINT

By A. ASHMUN KELLY

(Continued from February, 1912.)

The finish never is any better than the foundation, which is the first or priming coat. If a paint is to prove durable on the surface, the coats under it must be right. There is a certain way to apply the priming and other coats, and a special method of mixing the coats. This is why ready mixed paints fail to please the expert painter; it is made to fit one coating, and cannot fit all. That is, it will not serve both as a primer and finish. This is why painters prefer hand mixing, in spite of the time and labor involved.

The durability of an exterior paint depends upon the oil incorporated with it. The best oil for this paint is pure raw linseed oil, and this oil has no successful substitute. The more oil that can be incorporated with a paint without making it too thin for covering properly the more durable the paint. The oil alone will not give as good protection as when combined with the pigment. The oil is not perfectly waterproof, but the addition of lead increases its water resisting power. In fact, the addition of any pigment will do this, by making a denser compound.

No paint can be durable, when exposed to the weather, that contains an oil other than pure linseed oil. Rosin oil will make it dry sticky, and the paint will crack and become like an alligator's skin. Petroleum oil will cause paint to peel. Fish oil will act much like rosin oil. Cottonseed oil and all oils of its class fail to dry.

Paint For Salt Water Exposure

Seashore painting is, perhaps, attended with more unsatisfactory results than painting under any other exterior conditions. The salt laden air, more especially during misty or foggy conditions, is very destructive to ordinary outside paint, and the matter has been well discussed by leading master painters, both those who do painting at the seashore and painters from interior parts of the country. Of course, it is the man who deals with the subject in a practical way, right on the spot, that can tell most about it, or whose ideas will be worth something, all else being merely theory. By the way, there is no lack of theory regarding paint and painting, and while very good in its way, yet valuless unless backed up by practical experience.

Painters tell of success and want of success, in the matter of seashore painting, and, of course, both conditions may easily exist, it depending upon the man and his method of dealing with the problem. But it seems to have been pretty well established that a paint composed of white lead and zinc white, mixed with raw linseed oil, will give the most satisfactory results as to wearing and holding color. The amount of zinc proposed varies with painters, some placing a few pounds, say ten, as the limit, whilst others will go from that on up to one-third or more. My impression is that the painter who did the great pier at Atlantic City used a lead zinc compound paint. And if my memory is not at fault I may say that he is an earnest advocate of lead and zinc mixed paint for the seaside. Nevertheless, there are many painters who decry the use of any zinc with white lead, whether at the seashore or in interior parts. The effect of the zinc is to make a harder paint than lead alone will make, and so the harder surface is thought to afford more protection against the wind blown sand, and misty and always salt laden air of the ocean. Just what effect salt has on paint I do not know, but think it is the dampness it causes that injures the paint.

It would seem, to resort to theory now, that the harder the surface of a paint the better it would wear against salt and sand. If, therefore, assuming this to be correct, we should add some good hard copal gum varnish to the paint, as we do in some cases, as when seeking to make a damp resist paint, it would seem that greater durability could be secured. Linseed oil itself is not proof against moisture, a well known fact, hence even though protected by the pigments of the paint it will fail to stand well excepting under average good conditions. Zinc white will, as previously stated, make a harder paint, but then it also tends to produce a surface so inelastic that cracking or scaling may follow. To avoid this we would simply reduce the amount of zinc to one that would not unduly harden the paint. Lead, even in the form of the carbonate, is a soft substance, and white lead paint is inclined to chalk or flour off, when it loses the oil binding it together. In one respect this is desirable, as it leaves a good surface for repainting on. But the addition of, say ten per cent of zinc, would, I believe, greatly improve the quality of a paint for seaside exposures. And no doubt a composite paint, as it is called, or one containing certain proportions of white lead, zinc white, barytes or finely pulverized and floated silica, with whatever pigment might be desired for coloring, and the necessary amount of raw linseed oil, or equal parts of raw and boiled oil, as some advocate, would prove a good paint.

Great things are claimed for China wood oil by some paint makers, and no doubt when it is properly prepared for use in paint in connection with linseed oil good results will follow. It seems to stand against many things that linseed oil paint goes down before. In varnish I have seen it perfectly unaffected by boiling water, hot irons, and strong acids. Leaving a slat coated with it in boiling water for a time had no effect even upon its luster. Alcohol did not affect it. Why, then, should it not prove serviceable for seaside painting? The oil may be bought now, in proper condition for mixing with paint, and hence any painter may try it out anywhere, and so determine for himself at least its real value as a salt water resister.

METAL ROOFING—TILE

By H. M. SANDERS

IN OUR last article we took up the subject of metal shingles, which are made of tin, galvanized sheet metal and sheet copper. Metal shingles, so called, are presumed to supercede the use of wood shingles on the cheaper class of our buildings, more especially residences with steep roofs.

Metal tile roofing is another phase of this subject, but in its use and in applying it to buildings, its general features of construction are the same as those of the metal shingles. It has the same

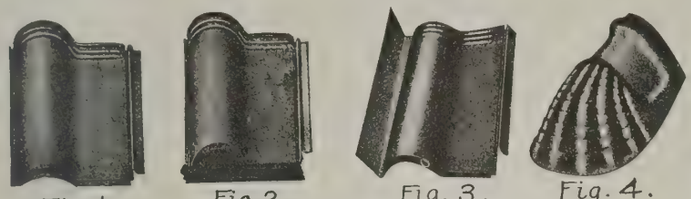


Fig. 1. Fig. 2. Fig. 3. Fig. 4.

interlocking seam at the side of the tile extending its full length, as in the side of the metal shingle, as shown in Fig. 11. The top and bottom ends of the tile have the same finish with beads, etc., and lap the same as the shingles. It differs in general form from the shingle, which is comparatively flat. One-half of the tile is flat, while the other half is pressed into a circular form, and herein lies its conformity to the shape of the "Spanish tile," from which it is named.

Sheet copper is the ideal metal for tile, as its ductility permits it to be worked or pressed into almost any shape without cracking or breaking.

The illustrations here given of this copper tiling represent the Spanish tile of the boldest type that is now on the market; that is, in outline finish with slight variations in detail as regard the interlocking of the side, vertical or upright seams.

Fig. 1 shows one of the tile which forms the body of the roof, with both ends open. Fig. 2 is the same tile as Fig. 1, except that the lower end is closed. This is why it is called the "starter." This tile lies along the eaves as shown in Fig. 5, hence the lower end needs to be filled in with copper, as shown, and locked to a copper strip nailed to the eave with an edge turned out ¾ of an inch to

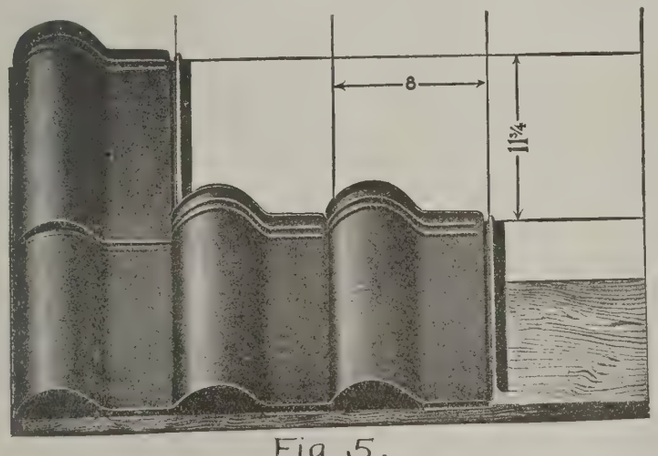
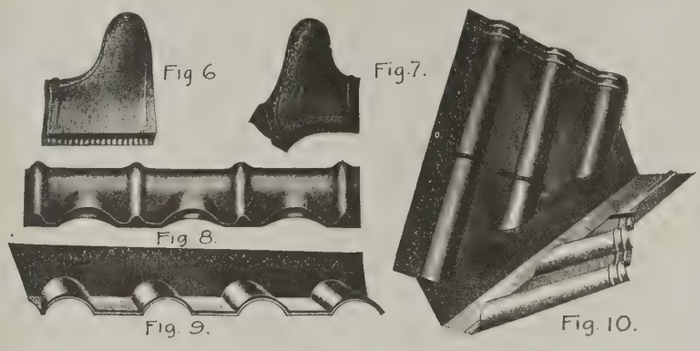


Fig. 5.

receive it. The tile at the left in Fig. 5 are gable end finish, turned down over roof boards and nailed to the end gable. Fig. 3 represents a tile where the roof flashes up against a side wall. Fig. 4 is the hip starter; that is, it is the bottom finish to the hip mould and the first piece to set when starting the hip roll, as shown in Fig. 12. Fig. 6 is a gable end finish for a ridge roll, and Fig. 7 is the finish where two hips intersect the end of the ridge course. Fig. 8 is a section of the top ridge, the same practically as shown in Fig. 12. Fig. 9 is a section of the tile finish where the top of the roof finishes against a brick wall.

An important feature in these tile roofs is where there are valleys to be flashed into. This is shown in Fig. 10. The end of the tile where it locks into the valley or that portion of it which rises above the roof line must be closed in with metal and soldered to the valley. This valley is the same as for the metal shingles where the roof shingle locks into it.

In laying tile, commence at the lower left hand corner. But first lay off the roof, as shown in Fig. 5, for securing straight lines for each course across the roof and to hold right position vertically. Where these starting courses at the eaves lock into an angle piece



of metal nailed to the eave, either as a strip nailed on to receive them or by turning them out ¾ of an inch of the back of the gutter at the top, the woodwork itself along the eave must be true and level.



Fig. 11

Fig. 11 is one form of interlocking device used on the sides of the tile, the same as adopted for the metal shingles.

The nailing of these tile to the roof boards is through the flange of the lower tile, as shown in Fig. 11, practically at the same point as for the metal shingles, one nail near the top, one in the center and one 2½ or 3 inches from the bottom of the tile. Copper nails should be used on the copper tile. The barbed wire nail is more serviceable than the cut wire nail, as it is not so soft, and less likely to bend when driving.

Chimneys, scuttles, skylights, and other openings through the roof are finished at the bottom with a flashing similar to Fig. 9.

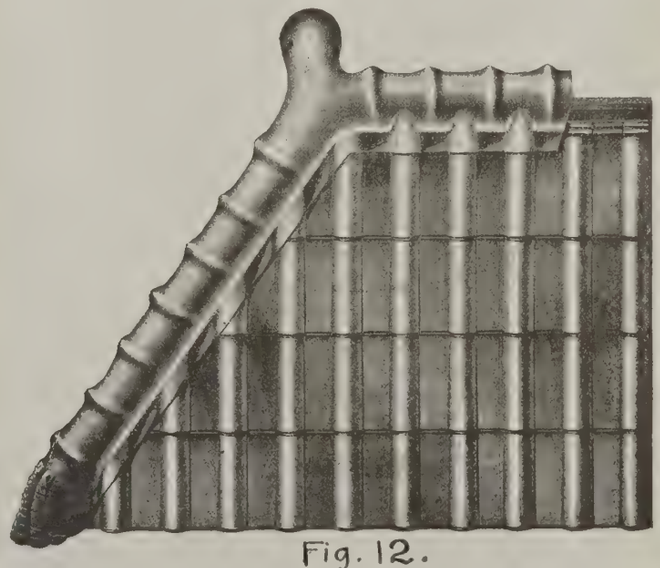


Fig. 12.

At the sides, a flashing similar to Fig. 3 to meet the run of the courses is used. At the top or back of the opening, the saddle boards are covered with copper and the tile roof locked into it at the valleys created by the intersection of the boards with the main part of the roof. The bottom end of the tile toward the chimney; that is, the projecting round end, must have a head soldered in, the same as shown in the valley, Fig. 10. After the roof is put on, give it a good coat of linseed oil.

BUILDERS' REFERENCE TABLES

By J. GRANT ROBINSON, Architect

(Continued from February, 1912.)

To find the thickness of the plate we will use the formula, for cast iron $t = .03\ P\ \sqrt{load}$;
for steel $t = .0137\ P\ \sqrt{load}$.
(t equals thickness of slab.)

P is the projection on one side of girder, and the square root of 250 (the load per square inch on the concrete footings, in this case), is about 16 in., so we have $.03 \times 2 = .06 \times 16 = 96/100$ of an inch thick; call it 1 inch; therefore the plate will be 1x 6x12 inches; steel plate will be $.0137 \times 2 = 274 \times 16 = .4384$ of an inch, or 44/100 in., say, 7/16 in. thick. A stone plate will be two times P or $2 \times 2 = 4$ in. thick.

WOOD COLUMNS.

Wood columns may be calculated from two different formulas. In the first the length of a column in inches divided by the least side of a rectangular, or the least diameter of a round column, equals twelve or less. In the second the ratio is usually more than twelve. The first is from tests made by the Forestry Division of the United States Department of Agriculture, and the second from tests on full size timbers at the Watertown arsenal. Both formulas are given in simplified form but are correct and absolutely safe. Either can be used, but the second method is the most convenient and adaptable to any condition, therefore preferable for general use.

First Method: The tables on plate 3 give all the sizes and length that will be ordinarily met with in general practice, their maximum safe loads, and the dimensions for their shoes or base plates. The formula is based on the ultimate strength of the different woods, and this ultimate strength is called the coefficient, or "C," for each wood.

The formula used is: $\text{Safe load} = \dfrac{\text{area of cross sections} \times C}{\text{factor of safety}}$

The value of C for the various woods is as follows:

Long leaf or Georgia yellow pine.....5,000
Short leaf and Texas yellow pine and Oregon pine.....4,500
Norway pine and oak.....4,000
White pine, spruce and California redwood.....3,500

Use a factor of safety of 5 with the above values.

Example: To find the safe load for a 10x10 spruce column 10 ft. 0 in. long. 10×10 equals $100 \times C$ (3,500) equals 350,000, divided by 5 equals 70,000 lbs., which is the safe load. If required, any other factor of safety may be used. Where inferior material only can be had, it is sometimes advisable to use a factor of safety of 8 or 10. Note that in the tables the length divided by the least dimension equals twelve.

Second Method: The safe carrying capacity of long columns is determined by first dividing the length in inches by the least side in inches, the ratio found being expressed as $\frac{l}{d}$.

The safe loads for the different woods have the following values per square inch of cross section:

A Long leaf yellow pine.....$1{,}000 - \dfrac{10 \times l}{d}$

B Short leaf, Texas yellow pine and Oregon pine..$850 - \dfrac{8\frac{1}{2} \times l}{d}$

D Norway pine and oak.....$750 - \dfrac{7\frac{1}{2} \times l}{d}$

E White pine, spruce and California redwood....$625 - \dfrac{6 \times l}{d}$

Example: To find the safe carrying capacity of an Oregon pine column 10x10x12 ft. 6 in. long. Twelve ft. 6 in. equals 150 inches, divided by 10 equals 15. Now $15 \times 8\frac{1}{2}$ equals $127\frac{1}{2}$, deduct this from 850 equals $722\frac{1}{2}$ pounds per square inch. The area of the column is 10×10 equals 100, and with $722\frac{1}{2}$ lbs. equals 72,250 pounds as the safe load for the column. This system applies to any value of l/d for any wood.

The following table shows the safe carrying capacity per square inch of section for any value of l divided by d, the letters A, B, D and E referring to the woods in the previous table:

$\frac{l}{d}$	A	B	D	E
8	920	782	690	577
9	910	773½	682½	571
10	900	765	775	565
11	890	756½	667½	559
12	880	748	660	553
13	870	739½	652½	547
14	860	731	645	541
15	850	722½	637½	535
16	840	714	630	529
17	830	705½	622½	523
18	820	797	615	517
19	810	688½	607½	511
20	800	680	600	505
21	790	671½	592½	499
22	780	663	585	493
23	770	654½	577½	487
24	760	646	570	481
25	750	637½	562½	475
26	740	629	555	469
27	730	620½	547½	463
28	720	612	540	457
29	710	603½	532½	451
30	700	595	525	445
31	690	586½	517½	439
32	680	578	510	433
33	670	569½	502½	427
34	660	561	495	421
35	650	552½	487½	415
36	640	544	480	409
37	630	535½	472½	403

The safe load for any size or length of column can be readily computed by the use of the table of the values of 1/d.

Example: To find the safe load for a 10x10 spruce column 22 ft. 1 in. long. Twenty-two ft. 1 in. equals 265 inches, divided by 10 equals 26½; now look in table under column E; at 26 you will find 469, so 26½ would be about 466. The area of the column is 10 × 10 equals 100, gives 46,600 as the safe load.

Another example: Take an 8 in. by 12 in. by 16 ft. 0 in. oak; now the length (1) is 192 in., the least side is 8 in., the ratio 1/ gives us 24. On this line, under column D, we find 570 pounds per square inch; $570 \times 8 \times 12$ equals 51,840 lbs. as the safe load.

To compute the loads on columns, we will assume a three-story and cellar warehouse, 44 ft. 0 in. wide, with two lines of columns spaced equally each way, assuming the cellar wall to be stone, 24 in. thick, the first and second stories 16-in. brick, the third story 12-in. brick, and the heights of the stories to be: cellar, 8 ft. 0 in.; first floor, 12 ft. 0 in.; second and third stories each 10 ft. 0 in. Therefore the spacing of the columns in the width of the building will be determined on the first floor which will be 44 ft. 0 in. less walls, divided by three equals about 14 ft. 6 in. center to center. This will make spaces between posts, and posts and walls very nearly the same. We will assume the live load on the second and third floors to be 250 lbs. pr sq. ft, and 330 lbs. for the first floor, and the roof 40 lbs. per sq. ft.; the dead load on roof will be 25 lbs., second and third floors 30 lbs., and first floor 35 lbs. (See January number for notes on live and dead loads.)

Beginning at the roof, as each column will support 14 ft. 6 in. by 14 ft. 6 in. of roof or floor area, the column on the third floor will have a load of 210 square feet times 40 plus 25, or 65 lbs. equals 13,650 lbs. We will select a spruce, 5-in., round column, which will have 33 square inches in area; 10 ft. 0 in. or 120 in. divided by 5 equals 24. Looking for the value of 1/d in column E, we find this post stronger than required.

The column on the second floor will carry the 13,650 lbs. of the column above, also 210 square feet of the third floor by 250 plus 30 equals 280 lbs., making a total of 72,400 pounds. We will take a long leaf yellow pine square post. Assuming 1/d equals 13, this column will carry 870 pounds per square inch;

Table giving the safe carrying capacity of wood columns when the length in inches, divided by the shortest side (or diameter of a round column) equals twelve.

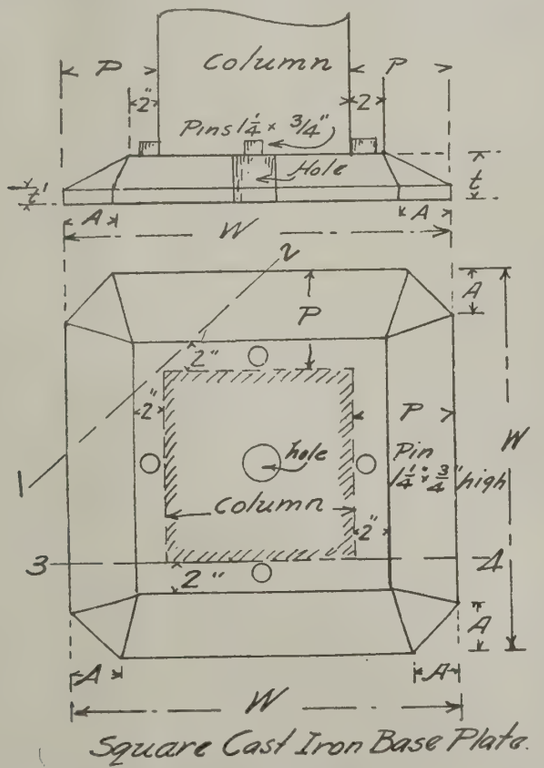
Also the size, thickness and other principal dimensions of cast iron, steel and stone base plates or shoes, for the different loads, figuring the loads on the footings at 250 pounds per square inch.

			Long Leaf Yellow Pine						Texas, Short Leaf Yellow Pine and Oregon Pine						Oak and Norway Pine						Spruce, White Pine and California Redwood						
Length	Size	Area	Safe Load in Pounds	P	Size of Base	Cast Iron t'	Cast Iron t	Steel	Stone	Safe Load in Pounds	P	Size of Base	Cast Iron t'	Cast Iron t	Steel	Stone	Safe Load in Pounds	P	Size of Base	Cast Iron t'	Cast Iron t	Steel	Stone	Safe Load in Pounds	P	Size of Base	Cast Iron t'	Cast Iron t	Steel	Stone	A
6'0"	6"×6"	36	36000	3¼	12½×12½	¾	1 9/16	¾	6½	32400	3	12"×12"	¾	1½	⅝	6	28500	2½	11"×11"	¾	⅛	9/16	5	25200	2½	11"×11"	¾	1¼	9/16	5"	2"×2"
8'0	8×8	64	64000	4¼	16½×16½	"	2	⅞	8½	57600	3¾	15½×15½	"	1¾	13/16	7½	51200	3¼	14½×14½	"	1 9/16	¾	6½	44800	3	14×14	"	1½	11/16	6	2×2
10'0	10×10	100	100000	5½	20×20	1	2½	1⅛	10	90000	4¾	19½×19½	1¼	2¼	1	9½	80000	4¼	18½×18½	1¼	2 1/16	15/16	8½	70000	3¾	17½×17½	"	1 1/16	¾	7½	3×3
10'0	10×18	180	180000	6¾	23½×31½	1½	3¼	1½	13½	162000	6	22×30	1½	3	1 5/16	12	145000	5½	21×29	"	2 9/16	1 3/16	11	126000	4	18×26	"	1⅞	⅞	8	4×4
12'0	12×12	144	144000	6¼	24½×24½	"	3	1¼	12½	129000	5½	23×23	1¼	2⅝	1¼	11	115200	5	22×22	"	2 7/16	1"	10	100800	4¼	20½×20½	1"	2⅛	1	8½	3×3
12'0	12×20	240	240000	7¾	27½×35½	"	3¾	1 13/16	15½	216000	8½	29×37	2	4¼	1⅞	17	172000	6¼	24½×32½	1½	3	1⅜	12½	168000	5¼	22½×30½	"	2½	1⅛	10½	4×4
14'0	14×14	196	196000	7¼	28½×28½	"	3½	1⅝	14½	176000	6½	27×27	1½	3¼	1 7/16	13	156500	5¾	25½×25½	"	2¾	1¼	11½	137200	5	24×24	"	2⅜	1 1/16	10	3×3
14'0	14×22	308	308000	9	32×40	2	4⅜	2	18	277000	8	30×38	2	3⅞	1¾	16	246400	7	28×36	"	3⅜	1 9/16	14	215600	5¾	25½×33½	1¼	2¾	1¼	11½	5×5
16'0	16×16	256	256000	8	32×32	1½	3⅞	1¾	16	230400	7¾	31½×31½	1½	3¾	1 11/16	15½	240500	8	32×36	"	3⅛	1¾	16	175200	"	27½×27½	"	"	"	"	5×5
16'0	16×24	384	384000	10	36×44	2	4⅞	2¼	20	345600	9	34×42	2	4⅜	2	18	307000	8	32×40	2	"	"	16	268800	7½	31×39	1½	3⅝	1⅝	15	6×6
18'0	18×18	324	324000	9½	37×37	"	4 9/16	2⅛	19	291600	8½	35×35	2	4¼	1⅞	17	259200	7¾	33½×33½	1½	3¾	1 11/16	15½	246500	"	33×33	"	"	"	"	6×6
18'0	18×26	468	468000	11	40×48	"	5¼	2 7/16	22	421200	10	38×46	2	4⅞	2¼	20	374400	9	36×44	2	4⅜	1 15/16	18	327600	7¾	33½×41½	"	3¾	1½	15½	6×6
For Round Columns																															
5'6	5½	33	33000	3¼	12	¾	1 9/16	¾	6½	29700	3	11½×11½	¾	1½	⅝	6	26400	1¾	11"	¾	1"	5/16	3½	23100	2¼	10"	¾	1⅛	½	4½	
7'6	7½	44	44000	"	14	"	1 9/16	"	"	39600	2¾	13×13	"	1⅜	"	5½	35200	2¾	13	"	1 5/16	½	5½	30800	2	11½	"	1	7/16	4	
9'6	9½	70.8	70800	3¾	17	"	1¾	1 3/16	7½	63700	3½	16½×16½	"	1⅝	¾	7	56640	3	15½	"	1 7/16	⅝	6	49560	2½	14½	"	1¼	9/16	5	
11'6	11½	1038	103800	4¼	21	"	2	⅞	8½	93420	4¼	20×20	"	2	⅞	8½	83040	3¾	19	"	1 13/16	¾	7½	72660	3	17½	"	1½	⅝	6	

divide 72,400 by 870 gives about 84 square inches, or a little over 9 inches square, but a 10x10 column should be used.

See table of value of l/d, for the use of columns in which the length is more than twelve times the shortest dimension.

The column on the first floor will have to carry 72,400 lbs. plus 58,800, total 131,200 lbs. We will use a square long leaf yellow pine post with a value of l/d equal to 12, with a safe load



Square Cast Iron Base Plate.

of 880 lbs. per sq. in.; divide 131,200 by 880 gives, say, 150 sq. in., which would require a post 12x14 inches, although if the timber was particularly good a 12x12 would probably be safe enough.

The load on the column in the cellar will be 131,200 plus 70,350 lbs., or 201,550 lbs. As we used a column 12 in. on the least side on the floor above we will do the same in the cellar, of long leaf yellow pine; now 8 ft. 0 in. or 96 in. divided by 12 gives the value of 8 for l/d. We find in column A and in line 8, 920. Divide 201,550 by 920 and we have 220 square inches, which would give a column 12x18⅓, in which case it will be safe to use a 12x18 in. In practice the weight of the girders, floor joists, and all items of dead loads should be carefully computed.

CAST IRON BASE PLATES.

The holes in the plates should be from 1½ to 3 in. in diameter, according to the size of the plates and should be in the center, as a hole anywhere else weakens the plate.

The angles "A" are cut off, but their area is added to the size of the plate.

The lines where fractures usually occur in cast iron and stone plates are shown at 1-2 and 3-4. For cast iron and stone these lines are generally straight.

FORMULA FOR SHOES OR BASE PLATES.

Pr = permissible pressure on footing, for Portland cement equals 250 pounds.

L = load on column in pounds per square inch.

A = area of plate in inches.

B = least side of plate in inches.

D = diameter of round or side of square plate in inches.

a = area of base—area of column.

p = projection of plate from edge of column.

t = thickness of plate in inches.

Then

$$A = \frac{Pr}{L}$$

$$B = \sqrt{A}$$

$$P = \frac{B - D}{2}$$

$$t = \sqrt{\frac{Pr \times P \times a}{D}} \div 80 \text{ for cast iron.}$$

or $.30P \sqrt{\text{load.}}$

$$t = \sqrt{\frac{Pr \times P \times a}{D}} \div 220 \text{ (for steel).}$$

or $.0137 \times P \times \sqrt{\text{load.}}$

t = 2 × P (for stone).

Example: What is the safe load on a long leaf yellow pine post 8 in. by 8 in. by 8 ft. 0 in. long? 8 × 8 = 64 × 5,000 = 320,000 ÷ 5 = 64,000.

To find the size and thickness of a cast iron plate for an 8 in. by. 8 in. y. p. column carrying 64,000 pounds.

L (64,000) ÷ Pr (250) = 256 sq. in. plus angles A (12 sq. in.) = 268 sq. in.

B = √268 = 16½ square.

P = 16½ — 8 ÷ 2 = 4¼ in.

t = .03 × P √Pr (250) = .03 × 16 × 4¼ = 2.04, say 2 in. beveled at edge as shown.

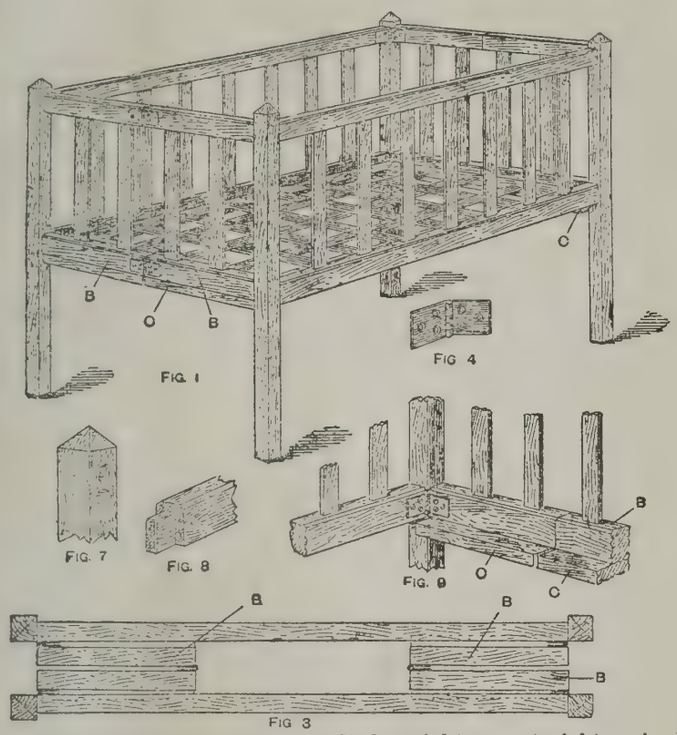
(To be continued.)

Future Parish House
E.G.W.Dietrich ..... Architect
Design for St Luke's Church

MAKING A CHILD'S COT

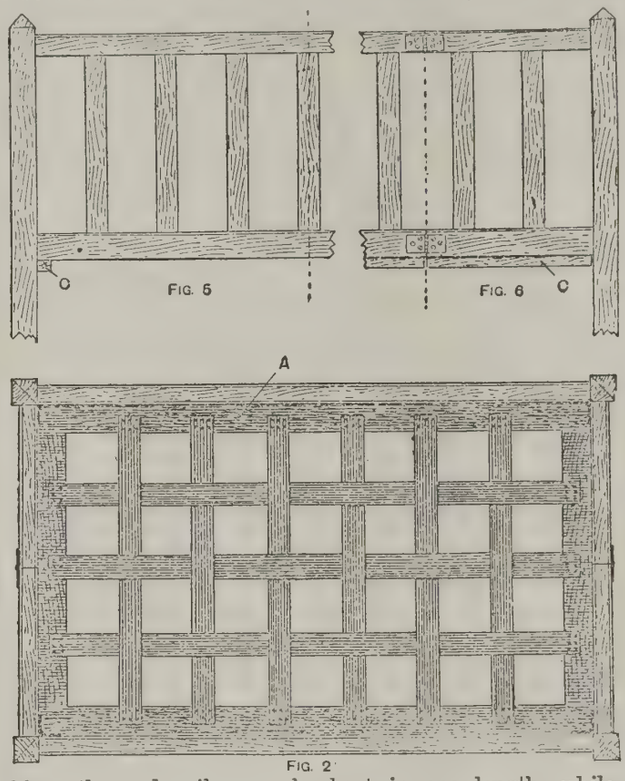
By J. D. B.

THE child's cot illustrated in Fig. 1 is very simple in construction, and merely requires the ability to dress stuff to width and thickness, and to mortise the legs and form tenons on the ends of the side rails. When not in use the cot can be folded up and placed against a wall. The bottom of the cot (see A, Fig. 2) serves to keep the cot open as in Fig. 1. When the bottom is lifted out, the hinged ends B (Fig. 1) are folded inwards as shown in the plan Fig. 3.



As the cot has to carry very little weight, any straight-grained wood free from knots may be used, such as pine or poplar, varnished or French polished. But for good appearance, mahogany finished with French polish is recommended. To save expense, iron flap hinges (Fig. 4) 1¼ inches wide, may be used, but brass hinges will look better and will not rust. To insure accuracy of working, it is advisable to make full size drawings of the plan (Fig. 2), also of half the side elevation (Fig. 5), and half the end elevation as in Fig. 6. These figures are drawn to the scale of 1 inch to a foot. The dimensions of the cot are: Length, 3 feet 6 inches; width, 2 feet 3 inches; height to top rails, 2 feet 6 inches; height to top edges of rails B (Fig. 1), 1 foot 4 inches; legs, 1⅝ inches square; top rails, 1½ inches wide and 1⅞ inches thick; lower rails B, 2 inches wide by 1⅛ inches thick; balusters, 1½ inches wide and ⅜ inch thick. In the framing of the bottom of the cot the side rails and the ends rails are 2 inches by 1⅛ inches.

In making, first dress up all the wood to width and thickness, and shape the upper ends of the legs as in Fig. 7. The upper edges of the top and the lower rails are chamfered as in Fig. 8. In marking the legs for the mortises, place all the legs side by side, and draw the lines across with the aid of a square. The same method should be used in marking the tenons on the side rails. It will be seen that the end rails have no tenons, and to facilitate



working, the end rails may be kept in one length, while the balusters are fitted and glued together. Then they may be cut in two parts, and the hinges fixed as shown in Fig. 1. The various positions of the hinges are shown in Figs. 1, 2 and 3. To provide support for the bottom framing of the cot, strips of wood C (Fig. 9), 2 inches wide and ¾ inch thick, are fixed with screws to the under sides of the end rails. In folding the ends as in Fig. 3, the strips C (Figs. 1 and 9) slide under the side rails. To allow for the free working of the strips, the bottom edges of the end rails should be about 1-16 inch below the level of the side rails. The bottom framing A (Fig. 2) may now be mortised and tenoned together, and then fitted into position, so that it can easily be dropped in or lifted out. When the framing is polished, the webbing may be tacked on as in Fig. 2. A suitable webbing is that used by upholsterers for chairs.

STREET PAVEMENT

They took a little gravel,
And they took a little tar,
With various ingredients
Imported from afar;
They hammered it and rolled it,
And when they went away
They said they had a pavement
That would last for many a day.
But they came back with picks and smote it
To lay a water main;
And then they called the workmen
To put it back again.
To run a railway cable
They took it up once more;
And they put it back again,
Just where it was before.
They took it up for conduit
To run the telephone;
And then they put it back again
As hard as any stone.
They took it up for wires
To feed the 'lectric light;
And then they put it back again,
Which was no more than right.
Oh, the pavement's full of furrows,
There are patches everywhere:
You'd like to ride upon it,
But it's seldom that you dare.
It's a very handsome pavement,
A credit to the town;
They's always diggin' of it up,
Or puttin' of it down.

—Washington (D. C.) Star.

"Ma'am, here's a man at the door with a parcel for you."

"What is it, Bridget"

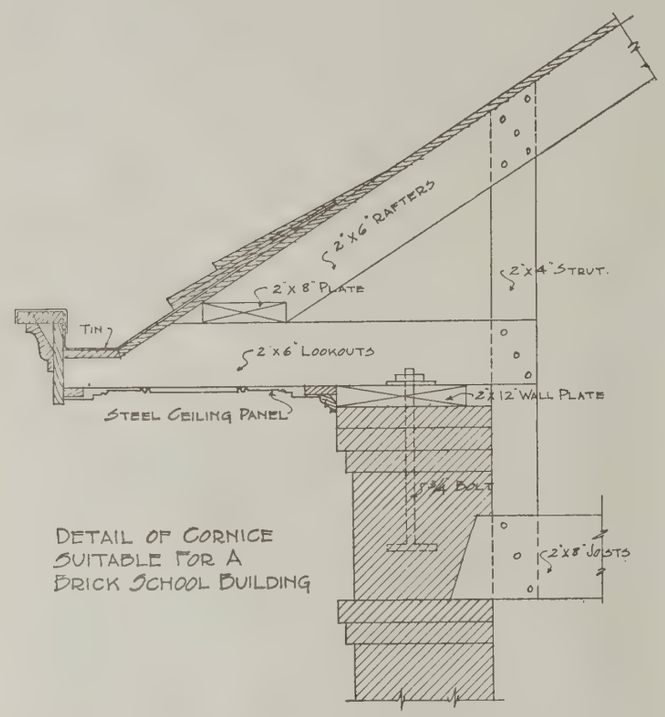
"It's a fish, ma'am, and it's marked C. O. D."

"Then make the man take it straight back to the dealer. I ordered trout."

CORNICE FOR A BRICK SCHOOL

By I. P. HICKS

OUR illustration shows in detail a heavy cornice suitable for a brick school building or other similar work where a heavy looking cornice is desired. In the drawing the brick work is projected out to form the frieze. A 2x12 is bolted to the brick wall with ¾-inch bolts extending well down in the wall, one bolt at each corner and one every 4 feet thereafter. Next comes the 2x6 lookouts upon which is run a 2x8 plate for the foot of rafters to rest upon. The lookouts extend 4 inches past the inside of the wall, and then a 2x4 upright is spiked to the rafter, to the lookout and the ceiling joists below, thus tying all together in a very strong and substantial manner, so that nothing short of a cyclone could unroof the building.



DETAIL OF CORNICE SUITABLE FOR A BRICK SCHOOL BUILDING

A special feature of this cornice is the plancier, which is made as follows: A 1x3 strip is nailed to the lookouts next to the brick wall and a 1x2 at the outer end next to the fascia and the lookouts are cut past the right length to take a steel ceiling panel so that the bed mold will make the finish next to the brick. A regular stock pattern of steel ceiling 24x24 inches can be used for the plancier and it makes a fine looking job.

The fascia crown mold and cap pieces are of wood. The gutter is to be lined with tin.

The cost per lineal foot for this kind of a cornice is about as follows:

The metal ceiling, per lineal foot	20c
The tin gutter	17c
Fascia	3c
Crown mold	2½c
Cap piece, per lineal foot	2c
Sheathing in gutter, per lineal foot	3c
Furring strips, per lineal foot	2c
Bed mold, per lineal foot	1½c

LABOR.

Putting on metal ceiling, per lineal foot	5c
Furring strips	2c
Bed mold	1c
Crown mold	2c
Fascia	2c
Gutter boards	4c
Cap piece	2c
Total estimated cost, per lineal foot	60c

Thus, it will be seen that this cornice figured in a conservative manner is worth 60 to 70 cents per lineal foot; and the above figures do not include the bolts, lookouts, plates, or any of the rough frame work. After all, considering everything, it makes a very good cornice and is not high in price for the proportions of it. It projects from the building all told about 2 ft. 5 in., which is sufficient to look well on the average building of this kind.

FRAMING HIP ROOFS

By A. L. HIGGINS

I have been asked many times how I framed hip roofs and especially as to getting side bevels and lengths of jack rafters. I always use the steel square, which I consider the most reliable.

To illustrate: If I have a roof—plates, say 10 feet x 20 feet, to make it easy, I first select a good straight stick for a pattern for my main rafter. I may want, say four (4) inches on my plumb cut above the plate. My pitch is, say 9 inches to the foot run. The sketch will illustrate. With 12 inches on the body, and 9 inches on the tongue of the square, I measure in on the rafter to the center of the building

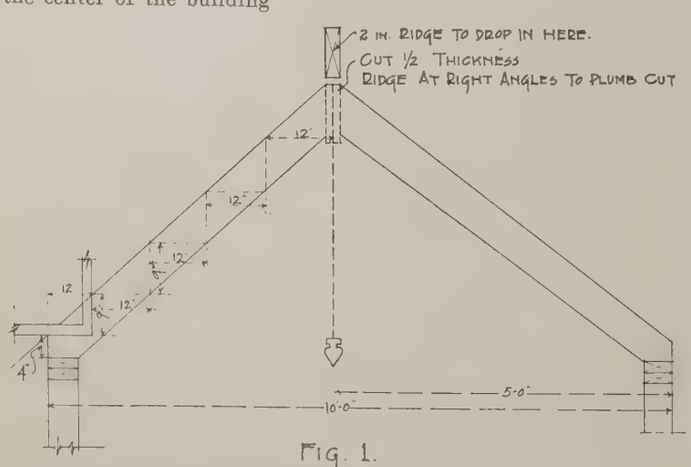
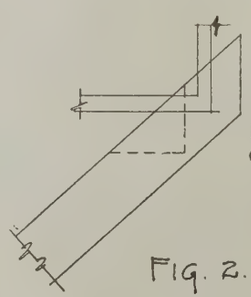


FIG. 1.

Next, I select my ridge, which should always be two or more inches wider than the stock for the main rafters. Subtract the width of the building from the length, and add the thickness of this ridge, which will give the length, which in the example herewith is 10 feet 2 inches. Then I space this ridge and get the required number of main rafters, allowing for two mains at the ends and openings for dormers, etc. The next comes the hips.



FRACTIONS OF FEET IN WIDTH OF BUILDING CAN BE OBTAINED IN THIS WAY.

FIG. 2.

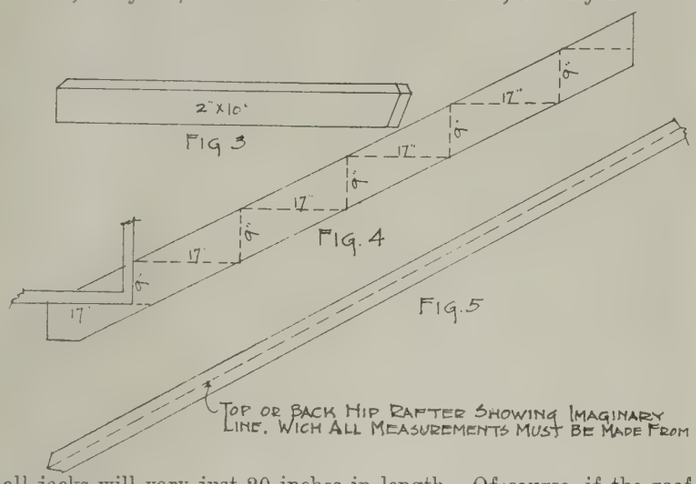
Down here we never "back" the hips as we think it is labor for nothing. Half the width of the building being 5 feet, I take 17 inches on the body of square (17 inches being the hypothenuse of 12 inches base and 12 inches up) and the rise of main rafter (9 inches) and run in five times to center, as in Figs. 3, 4 and 5.

After cutting bevel on upper end of the hip, which bevel must center on the imaginary line, I then cut off one-half thickness of ridge, which must be parallel with top of the ridge when in place, viz.: Fig. 6.

Next is the jack rafters. First we must find the length of each set, which, of course, must be mated or paired. If my roof, as in this case, is 9 inches pitch, I measure across the body of the square at 12 inches, and the tongue at 9 inches, which in this case is 15 inches. See Fig. 7.

Now, if my main rafters are 12 inches on centers, my first set of "jacks" will be that hypothenuse, or 15 inches shorter than the

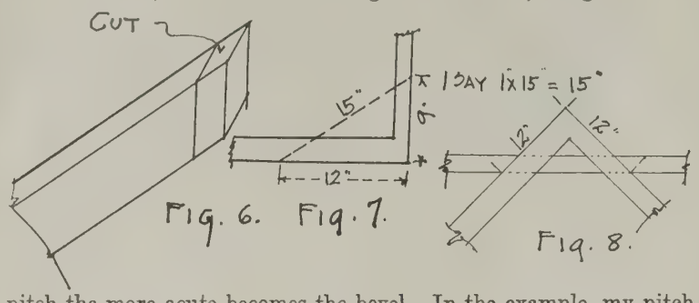
main rafter, and each following set 15 inches shorter than the first, and so on. If my mains are 18 inches on centers, or 1½ feet, I say 1½ times 15 inches = 22½ inches, and my jacks accordingly will be so much shorter than the mains. If the mains are 16 inches on centers, I say 1 1/3 times 15 inches = 20 inches, and my first and



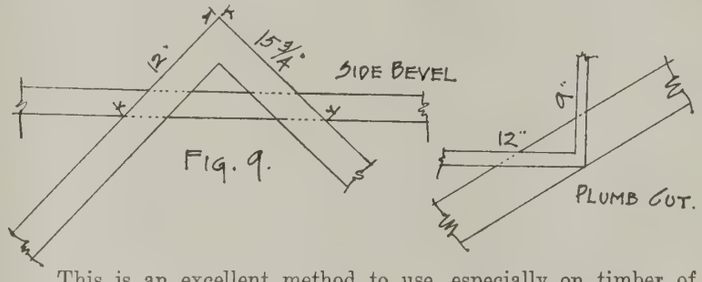
all jacks will vary just 20 inches in length. Of course, if the roof is 6 inches to the foot, I measure across square at 12 inches and 6 inches.

Now, with regard to cutting side bevels for jacks on the hips. There are several ways, but I have never seen any way used in any books, or by builders, although it may be. We all know that if our hips, mains and jacks lay flat upon the floor, 12 inches and 12 inches on the square or a mitre would make us an exact fit. The following would be it. See Fig. 8.

Now raise the rafters 1 inch to the foot and throw the tongue over on the stick to 12 5/12 inches, always holding the body of the square at 12 inches, and for every succeeding inch to the foot pitch, add an extra 5/12 inches to the tongue. Of course, the greater the



pitch the more acute becomes the bevel. In the example, my pitch being 9 inches, I say 9x5/12 = 45/12 or 3¾ inches. The bevel in this case would be 12 inches on the body and 12 + 3¾ or 15¾ inches on the tongue, viz.:



This is an excellent method to use, especially on timber of variable thickness.

SIZES and QUANTITIES, SIGNS and SYMBOLS

By JOHN UPTON

WE ARE frequently puzzled by things that we do not understand because we have never become acquainted with them in the technical dress. This is true in speaking of the terms used in lumber and then there is apt to be confusion because some one does not quite understand what some one else wants or the man who does may not be just sure himself what or how much he wants.

Let us suppose that we want flooring for a room 12x15. How much should we order?

That will depend on the width of the material and also somewhat on its length and whether it is end matched so that almost none need be wasted or whether it must be cut to fit the joists and so waste more or less. First, as to width. A board eight inches wide in the rough after being planed and matched will lay or cover seven and one-fourth inches and there would be the same amount of loss on each board in narrow stuff, so that for four-inch material we will need to make twice as much allowance as for the eight-inch. So, we may figure it out, that to cover one hundred square feet with lumber of various stock width would require as follows:

8 inches	110 feet.
7 inches	112 feet.
6 inches	115 feet.
5 inches	118 feet.
4 inches	126 feet.
3 inches	134 feet.

These figures, however, are sufficient only where there is absolutely no waste besides the matching. If there is any other, even the slight amount for end matching, ½ inch on each piece, we must allow a little more; 5 per cent would probably be sufficient to allow for end matched material, but if it needed to be cut on joists there would be a chance to waste a few inches on some half the pieces, so we should add some 10 per cent to the above figures.

For siding, that is, clapboards, there is less apparent but more actual waste, for while the difference between the trade size, the amount paid for and the actual width, is only one-half inch, there must be a further allowance made for the lap in laying so that a board figured as six inches wide will cover only five inches and the same for narrow ones. Then the waste by sawing for use may be considerable, as they are generally cut to bring joints over the studs and of course must be cut between the casings.

It will generally be safe to allow for covering one square, with six inch, 130 feet; five inch, 140 feet, and four inch, 150 feet.

All other matched stuff as ceiling, barn siding, coping, figure as the same flooring.

Finishing lumber will be only seven-eights or three-fourths inches thick instead of a full inch, owing to having been planed, and shrinkage. There will also be a slight shrinkage in width.

And right here let me call your attention to a little matter which some might learn only by experience. You know that corner boards, water tables, outside base, outside window and door casings are all inch and one-eighth lumber? Yes. Well, did it ever occur to you that the frieze board for gables should also be one and one-eighth inch, but that which goes under the eaves is only seven-eighth inch?

When it comes to ordering sash, some of us are like the man who wanted a dozen of a certain article, so he ordered one tailor's goose and eleven others. He knew what he wanted and told it so that the other men knew also. Suppose you had a window frame or opening 28 inches wide and 24 inches high. If you gave the order incorrectly you might get a sash 24 inches wide and 28 inches high or you might get one with the glass 24x28, the 24 for width and the width of the sash added to these figures. If you order this sash to fill an opening 28x24, or with glass, 24x20, you should get what you desire.

For the rules to be remembered are to give width first, then length, then thickness and number of lights to the entire window, whether it is one sash or two.

The symbols S1S, S2S, S4S and D4S mean dressed, one, two, or on four sides.

Lumber is graded as clean and select, or as No. 1, 2, or 3. Clean means that there are no defects, as knots, sap stains, etc., or defects made by machines; in fact is supposed to be so good that all of it can be used for even the best work.

Select grade comes next, and may contain defects which can be cut out without much waste.

No. 1 grade may contain a few very small knots and some light sap stain.

No. 2 grade may have considerable stain, small sound knots, and machine defects.

No. 3 grade contains stain, several knots, and small defects, but should not waste over ten per cent in any piece.

These rules apply to stuff up to four inches wide. Wider stuff may have more defects as it is more difficult to get stock which is free from defects.



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

BROKEN PLASTER CEILING.

From "Plasterer," St. Louis, Mo., replying to "General Reader," Midletown, N.Y.:

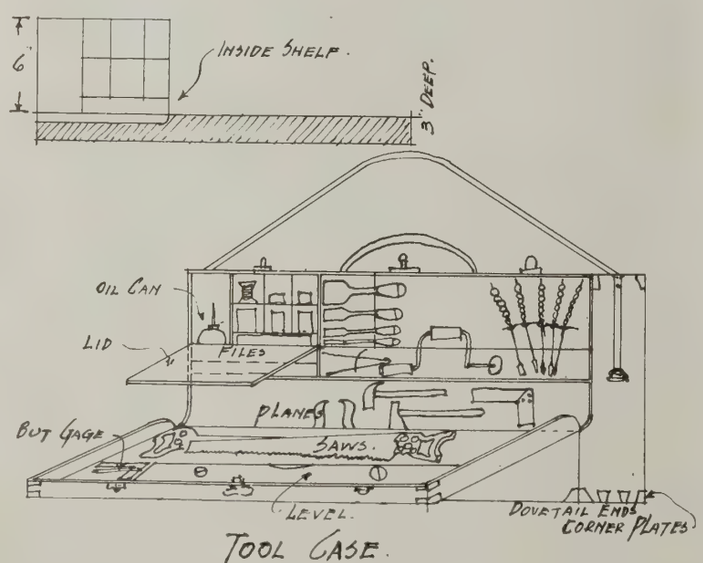
I would not advise placing Compo board on surfaces of broken plaster, for practical reasons. First: The nailing up of the Compo board will crumble the old plaster to such an extent that it will fall and lodge on the upper side of the Compo board, and sooner or later will find its way into the rooms below, and will also hide the ceiling joists to which the Compo board must be nailed. You can, however, tear off the old plaster, thus exposing the joists to view, and the lathes will form a background and stiffen the Compo board.

If, as you say, the plastering has been on the walls for fifty years, there is no reason why a new job of the same kind of plastering should not last just as long, and I would advise you to have the old work examined by a good plasterer who will recover the old lath with either lime mortar or any good brand of hard plaster, as the cost of such a job is insignificant as compared to the quality of good work.

SUIT CASE TOOL BOX.

In reply to L. D. G., Calgary, Alta.:

Here is a tool case, on the order of a suit case in every respect. This is one of my own make, of which I have been using for two years. This case is 2 ft. 8in. long, 18 in. high, 7 in. wide. In



TOOL CASE.

the lid of this case, as you can see by diagram, you can place your level, 1 Stanley butt gauge and two saws, 1 rip and 1 cross-cut, directly over each other. The teeth should be up next to level. In the back left-hand corner you see a divided box for oil can, oil stone, line, chalk, wax, brads and screws. Under this box you see a small space for files, saw set and so on. To your right, brace bits, chisels, compass and such stuff as you may desire. In the bottom your planes hatchets, hammer, tri-square and a Nicholl's take-down square.

TIMBER FRAMING.

From "O'Gee," Edmonton, Sask., Canada:

If Jas. McL. will write Department of Agriculture in the province or state of Saskatchewan, he will receive a budget of excellent pamphlets that will give him a lot of information regarding timber localities, rising towns, railways and other matter. Address "Minister of Agriculture, Edmonton, Sask., Canada."

A BRICK CISTERN.

From "Bricklayer," Montclair, N. J.:

"J. B.," Lancaster, Pa., might make his cistern about ten feet deep in the clear. A four-inch wall built of good hard-burned bricks, well backed and puddled with clay, or strong loam, would do very well but the foundation of the whole bottom must be good and solid. I would much rather have a nine-inch wall—well backed. Proportion of cement for inside finish would do very well, with one and a half sand and one of cement. Lay bricks in same cement. Plaster same as ordinary work. Couldn't give you an estimate of the cost, not knowing price of labor or materials in your neighborhood.

BONDING NEW BRICKWORK TO OLD.

From "Bricklayer," Montclair, N. J.:

C. V. L. of Indian Springs, Tenn., does not say to what part of the old work he wants to connect the new. If it is to a corner, the matter is quite simple, as the bricks on the old wall may be taken out or "toothed"—latter may be taken down in blocks, and "stepped" so that the new wall can be built in "step by step," which will make a good solid connection. If the junction is to take place on a flat wall, the proper plan will be to cut "chases" or grooves in the old wall, about 18 inches or two feet long, and the same distance apart, on the ends. The chases to be one width of brick wide and half a brick deep in the old wall. This will give you a good chance to work in your new wall without showing a break. Care must be taken to allow for settlement of new wall, so that it will not press too heavily on the old walls wherever it happens to rest on them.

From W. A. T., Weedsport, N. Y.:

I wish to call attention to the error in the design of a truss shown in your February issue, submitted by "Builder" of Green Bay, in reply to question of A. B. C. of Marcus, Wash. In the truss mentioned, the second strut from each end should run from the bottom of the vertical rod to the top of the next rod. As shown, it would become loose at the first loading, and of course, would become useless as a strut. I also note that it is suggested that the girders could be built up, using six 2x12 planks laid flat on top of each other. This method would make a very weak girder. The deflection would be very great even under no load except its own weight. In using built up girders, the plank should always be placed on edge to carry a load, and on the flat only when it is desired to resist pressure.

Editorial note: It is apparent that "Builder" meant that the truss should be built up or assembled on the ground and so laid flat. The planks would then be on top of each other.

QUESTIONS

From H. A. C., Cleveland, Ohio:

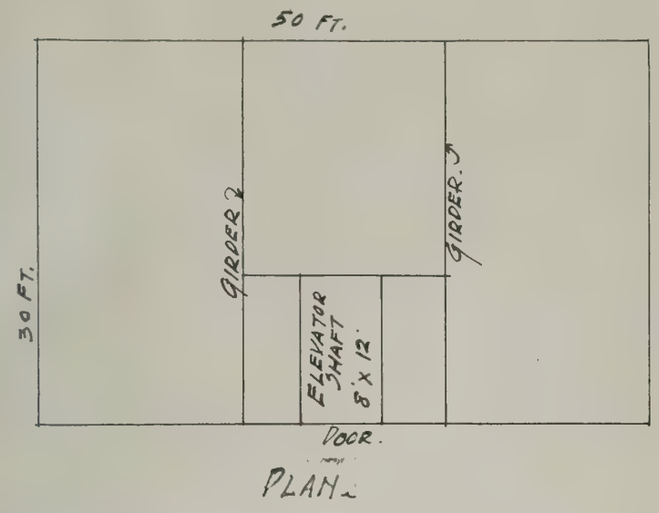
Can plaster be considered unsatisfactory if it cracks in places, although it is solid and does not drop off? What is usually the trouble when plaster cracks and what will remedy this trouble?

Is it reasonable to ask any sash and door company to make good or replace any windows that cracked due to the action of the wood?

DETAIL FOR SHOP ELEVATOR.

From Lloyd S., York, Pa.:

Here is a concise plan of a blacksmith shop. Can I get some information from your paper as how to erect an elevator directly



PLAN.

inside of the door? Must run by hand and carry not less than 2½ tons. Height of shop to square is 18 ft., is to have a peak roof, or will it be necessary to erect a dormer in roof? Please advise what material to be used. There are no posts on first floor.

From C. B., Medina, Ohio:

I am about to build a grandfather's clock, above the dial of which I wish to carve an inscription. Will some reader please give me a suitable one for the purpose. I request, however, that it be only a sentence containing no more than twenty-five letters.

From P. C. S., Chicago:

I have two makes of hand scrapers and each one always jumps while in the act of scraping. What is the reason and what is the remedy?

From C. G. L., Marshall, Tex.:

I am preparing plans to remodel an old brick building and expect to let the walls remain. The walls have been painted a number of times with, I suppose, lead and oil paint. The paint is scaling off badly and it looks hardly possible to make a good job by repainting the old surface, as I fear the paint will scale off again, especially over the mortar joints, as the worst part of the wall seems to be over the mortar joints. Please give me your idea as to the best treatment of the old wall. Will it not be best to burn off the old paint, or remove it in some other way? The mortar in some of the joints is rather inclined to be soft, that is, it is not hard but seems to be more in the shape of a powder or dust.

ARCHES.

From "Beginner," Chicago, Ill.:

I began learning to be a "bricklayer" a year or so ago, and have noticed a lot of good examples of brickwork in THE NATIONAL BUILDER, and have learned a good deal from them, but I have not seen many examples of arches for small openings, as ordinary doors and windows; and, as I am interested in that kind of work—flat, elliptical, circular and other forms, I would like to see published in this department of the paper, examples that can be used in every day work. My first attempt at laying bricks, was on the Blackstone Hotel, this city.

ROOF PAINTING.

From "Carpenters' Wife," Duluth, Minn.:

Our tin roof over a back shed, leaks, in some small spots, and we cannot discover where the defects are. The holes must be very small and I wonder if a coat of good thick paint, or two, would stop up the little holes or cracks so as to prevent the water from getting through? The roof has not been painted for over ten years, what kind of a paint should I use? The old paint seems to have been a sort of oxide and is coffee colored.

NAILING ON ARTIFICIAL PLASTER BOARD.

From "Jack-o-All-Trades," Newark, N. J.:

I have several seaside cottages to build this coming season, and at my suggestion—influenced by several of your editorials on the subject—the owners have decided to make use of some one or other, or more—of the artificial covering boards, advertised in THE NATIONAL BUILDER, instead of plastering the walls according to the old way. I would like to know something about fastening the material on the walls and ceilings, and what preparations are required to prepare the grounds to receive the coverings?

ROOF FRAMING

By A. A. STAFFORD

In my illustrations, it has been my aim to show what can be done in roof framing with a common pocket rule and a square. As to getting lengths and cuts at this time I wish to call some attention to the trouble some people have getting the length of a common jack rafter. The way I reason this, the jack travels or lies in exactly the same direction as a common rafter, so why should

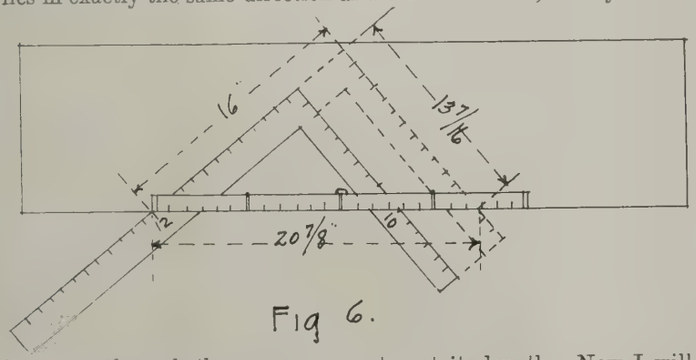


Fig 6.

it not go through the same process to get its length. Now I will take the same 10 in. rise to one foot run that I have been using on a 12 in. rise. I could measure across from corner of square 16 in. less 16 in. and get length of jack spaced 16 in. on centers, but for any pitch off 45°, I take the method of getting difference in length of jacks, shown in Fig. 6. Lay square on good straight edge of board as shown in cut. For 12 in. less 10 in., pitch 12 in. run to 10 in. rise, mark along 12 in. side. Now, if you have jacks spaced 16 in. on centers slide square along the mark till 16 in. is the reading instead of 12 in.; look on the other arm, at the edge of board and you will find it reads 13 7/16 in. Now, if you measure across to 16 in. you will read on your rule 20⅞ in., it being the length of jack. Why? Because when you slide the square on one foot run up to 16 in., the spacing of the jacks, you still retain pitch line from 10 in. up to 13 7/16 in., where it would intersect with hip line. Now take common rafter length less 20⅞ in., and besides this enough to allow one-half thickness hip rafter, and you have the length of longest jack. From this one take 20⅞ in. for next jack, and so on. Or, if you wish to start from the shortest jack, fit the first jack where you want it, then add 20⅞ in. to each one. This rule works on any pitch. Be sure and lay square 12 in. one side all the time and mark and slide on this side up to jack space, no matter how many inches on the other arm of square is always the pitch, and , as per slide in illustration, gives reading on rule what difference jack lengths are. Then, of course, you must allow side cut, and what is above plate edge. A very good way for young framers and some older heads, too, to get this roof work well in their minds is to take some 2x4 S4S and build a small hip roof, say 4x6 feet plate, and 10½ in. pitch. That will give you a chance to think when you measure across the corner of your square. Set your plate level, and have it up on something, and at your home where you can be by yourself to work and study on it. You can divide and make two different pitches on the same plate if you wish or put a deck in one end. These methods will give you a chance to lay the square on the work after it is up, and illustrate just the idea you want. This may look foolish, but by the time you have built all you can on the top of your 4x6 ft. plate, you will know more about roof framing.

BUILDERS' MILL WORK

THERE have been a number of changes in the mill work industry within the past few years that demand notice by everyone interested therein, and there are developments that are worthy of consideration.

These changes not only embody a difference in the styles, the finish and the character of the stock used, but have included as well other changes that are in reality more marked on account of the essentials making possible the change. In other words, they have demanded a certain specializing which has increased until the advent of what we might call the mill work specialist, and he has in reality become a need and a fixture. His place has been made for him, in a way, without his knowledge and his being able to fully grasp it. For this very reason, he must come to a fuller understanding of its importance in the building industry.

If we are to define this term, "mill work specialist," it refers to an operator who is able to anticipate the desires and needs of the building industry, or who can put into execution ideas conceived by others that embody feature designs. The fact that both the interior and exterior of buildings have undergone changes, and many of these important and radical, is conceded by every thinking operator in this line. But just what the changes constitute is the important detail that must be mastered by either the man who manufactures or who places mill work in position on the structure. Both have their bearings on the development of the industry, and each must acquaint himself with the matter in a way that will serve him best in making possible a greater development.

Let us take, for instance, the matter of doors and windows. The styles and sizes have become vastly different from those of a generation ago. The designs are changed, the sizes more general, and the finish has become so diversified that there is no room for comparison with the styles in vogue a few years ago. Further than this, many people today want something that is in a number of respects different from what they have noted elsewhere. They have grown so accustomed to seeing styles copied that they are ever seeking something that will make their structure different from others in this respect. This is applicable to other portions of the building as well, and the matter of interior finish has become one of many varying styles. New patterns are wanted, and coupled with these are requests for something new in the design of the finish.

Some plants have undertaken this newer feature of the industry and are today advertising themselves as manufacturers of special designs and odd sizes, as wanted by the architect or contractor, but they are able to submit designs that are entirely of their own conception. These have a special value in themselves. They not only fill the demands for new designs and odd sizes, as wanted by the architect or the builder. They make a study of the changes that are going on in all sections of the country, and with a modern plant and skilled workmen are in a position to take care of orders for unique designs and odd specimens of both exterior and interior finish.

They have been keeping in touch with the whole situation, seeing ahead as it were, and being able to foretell what would prove of value as an artistic pattern for those who were in the market for something out of the ordinary run of mill work to which many plants now devote their attention.

There was a time when the doors, window sash, blinds, and other mill work were confined to a comparatively limited number of sizes and designs. Any special design or size was made a special order, and was paid for accordingly. The number of such cases was rather small, and it did not pay an operator to arrange in advance for such demands. He could make up any amount of customary sizes in the same stock, and could be reasonably certain of selling them. There was no likelihood of the stock becoming a burden, or that it would become a loss from storing it. He knew pretty much what was wanted, and in this way he was able to utilize considerable stock and fill up the dull hours of the winter months. He could operate his plant for a long period in this way. This was a sensible move on his part, because in this way he was able to keep his usual force at work all the year, and on the other hand was ready to meet the demand when it came.

To a great degree this condition has undergone a change, and the man who gives all his attention to the ordinary sizes in made up mill work is running a risk that may prove costly to him later. Where formerly there was a demand for mill work that varied in no great particular as to size, style and quality, now the orders are so general as to often require a special design for much of the work that is to be turned out, and he will have on hand only a limited supply of those kinds that are known to be staples. For ordinary house construction, the styles and sizes are much the same as they have been, and there will still be a limited demand for them. But the growth of special lines has become such a factor of late that the industry has advanced along new lines, and the conditions will have to be met by the operator who wishes to increase his business.

There are other considerations in mill work than new designs and sizes, and that is in the quality of the stock. People are becoming more particular as to the finish of the stock, and to the value of the same as well. Green lumber or inferior kiln dried stock are things that must be avoided by the mill work man and the contractor. The stock must be up to the highest standard, where an order demands the best, and the finish must be given as much care as possible. A special design demands special care in the workmanship, and this cannot be had without the greatest painstaking on the part of the operator. This necessitates able workmen who appreciate the position in which they are placed. An inferior workman can spoil more stock in a day than a good man would in a year. So this is a feature that must be looked after carefully by the man who is going to specialize on mill work.

Veneers are now entering largely into the finish of much of our modern mill work, and the selection of the veneer has much to do with the finished job. If an operator is to do his own veneer finishing, that is, if he is to glue up his stock and do the part of the work that is sometimes done by the veneer plants, then he must be able to understand the importance of the work, and in this way avoid many serious errors. He will require for this certain equipment and intelligent help, so that his efforts will be fruitful and his labors count for more than experiments. It is sometimes a safe plan to have this work done by the veneer plant, because this is a branch of the mill work industry that rightfully comes under a separate head and should be done in a way that will not prove a series of costly blunders.

INJURIES FROM FALLING SCAFFOLD

By W. J. STANTON

An experienced painter in the employment of a contractor was ordered, with another painter, to paint a porch ceiling, and they erected a scaffold by resting a plank on two stepladders placed 12 or 15 feet apart. There was considerable bending and springing of the plank due to the weight and movement of the men upon it. In 20 or 30 minutes the stepladder placed by plaintiff tipped over and plaintiff was thrown to the floor and injured. A rope was attached to the legs of the stepladder to prevent them from spreading beyond a certain distance, but no appliance to prevent the legs from coming together. The ladder did not break or give way in any part. The testimony showed that some stepladders, when being used as this ladder was being used in a scaffold, "walk" or "creep"—that is, the motion of the plank resting on the ladder will cause the legs of the ladder to work together. If the ladder is standing on a smooth floor, the weight upon the plank causes the legs to slip apart again; but on a rough surface the legs may gradually approach until the ladder falls. The porch floor was cement. The plaintiff did not know the tendency of the ladder to creep. The defendant did not direct the use of this ladder on the porch, and was not present while it was being so used.

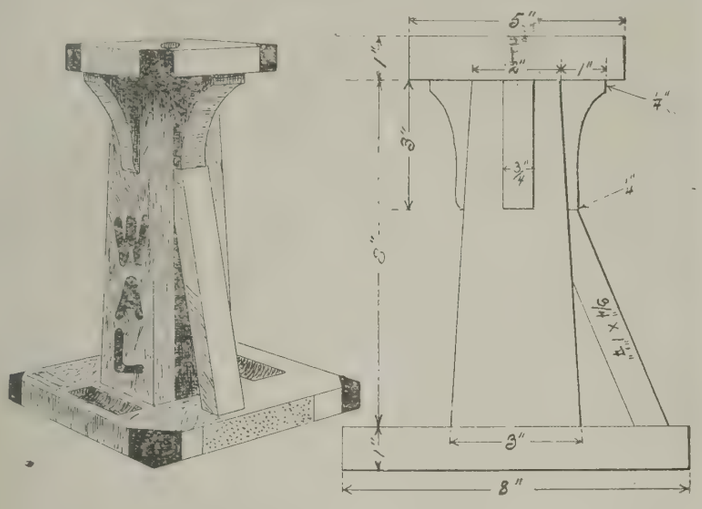
The supreme court of Minnesota held that the facts did not show any negligence on the part of the defendant causing plaintiff's injury. The court says: "A stepladder was the usual and proper support for this kind of a scaffold. It is a simple appliance, understood not only by painters, but by every person of ordinary experience. The condition of this ladder was apparent to plaintiff. There was no concealed defect in its construction. Neither under the rule applicable to simple appliances, nor under the rule requiring reasonable inspection from time to time, would these facts show that plaintiff's injury resulted from a failure on the part of the defendant in any duty owing to plaintiff." The court also says: "He had knowledge of the exact condition of the ladder, a simple appliance, and had an opportunity to observe its action while being used on this floor. The accident resulting to plaintiff, if not attributable to ordinary care on the plaintiff's part, is due to a risk assumed by plaintiff in using a simple appliance in its then obvious condition."

MISSION CANDLESTICK

By E. C. LANE

THE lines of this candlestick are very simple, yet when properly constructed it is a pleasing bit of handicraft. This one is to be made of oak in a dark shade and waxed. The corners are of thin pieces of copper, and at either side of the base are deep grooves for holding matches. At the back is glued a strip of sandpaper on which to strike the match.

One's initials, or if preferred, monogram, may be cut from thin copper and securely fastened down one side, as shown. Small



screws are best for the fastenings, as they hold well and are not objectionable in themselves.

A candlestick is always useful, and possesses a quaint, old-time charm. For a young girl's own room, where the furnishings are all in one color—say a soft leaf green, this candlestick could be made of plain wood, stained the required shade, and the corners and initials of brass, and pure white wax candles used.

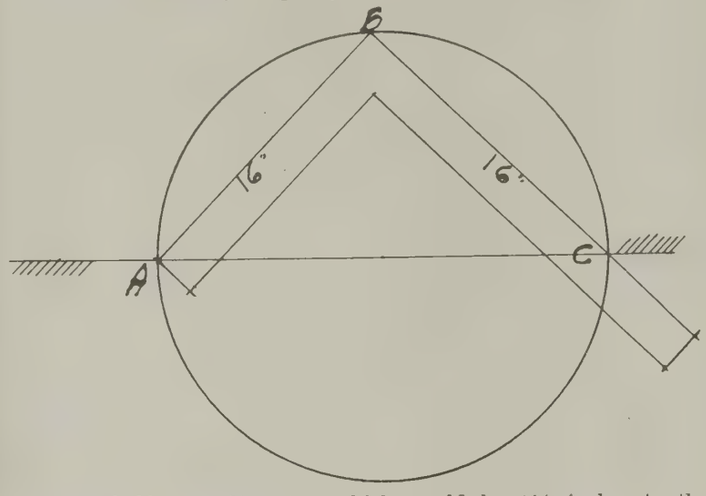
For a boy's room, it should harmonize with his own furniture, and a soft, deep crimson-colored candle would brighten his mind and serve as a beacon to draw him closer to his "Ain Fireside."

OPPOSITE POINTS ON A CIRCLE

By N. E. DUFFY

The following illustration shows a plain and simple method of getting directly opposite points on any circle, column, pipe or pulley, and the diameter of the same.

Lay square on pulley or circle, and when the distance on blade is the same as tongue you have your direct center, as for instance, the distance on the tongue is 6 inches and 6 inches on blade, you have the center of your pulley, which is 8½ inches in diameter



and one-half your diameter, which would be 4¼ inches to the center of shaft or circle. If your pulley or circle or pipe is 8½ inches on tongue and same on blade, you will have a pulley, pipe or circle 12 inches in diameter.

The same principle can be used in getting any number of points by shifting the square from A to B, when the distance at C will give you D. Any mechanic who knows the figures in inches can use it.

I have seen three machines and three men standing idle while the measurements of a pulley were taken and the methods pursued took almost one-half hour, meaning one and a half hours for three men and three machines. Try it in the mill and on the job and see how many men can give you the opposite center of a nail keg.

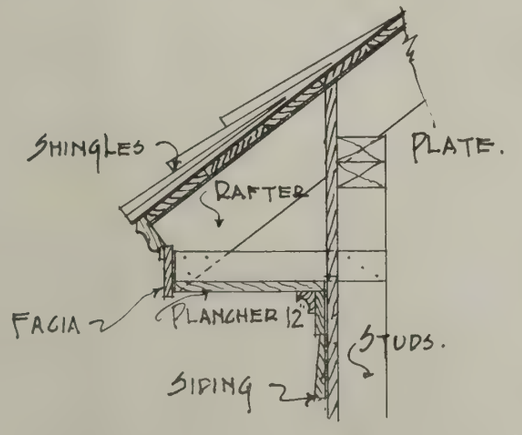
CORNICE DETAILS

By J. BARRY

BOX CORNICE WITH PLANCHER OR (PLANCIER) LEVEL.

The principal object in designing the eaves of a building (as in the projection and finish of the same) is a watertight job, also provision must be made for carrying off rain and snow.

In the two sketches I send you, No. 1 represents what is known as a "Box Cornice," the ends of the rafters being boxed in, the plancher being nailed up to short pieces of ceiling joist, nailed from studs to rafter ends, as shown in Fig. 1, care being



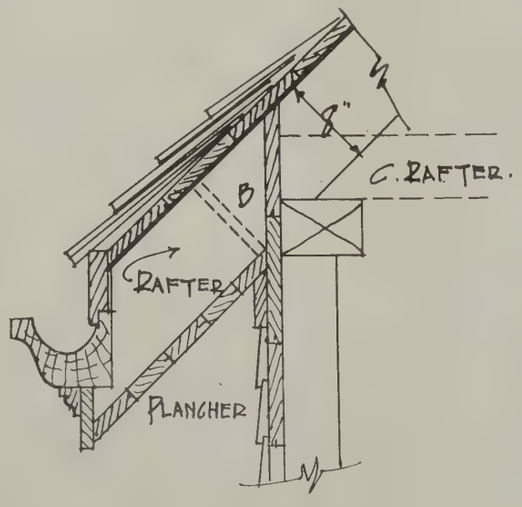
taken to nail facia straight after those short joists have been cut off to line.

I have omitted gutters in this cornice, although galvanized iron troughs can be used on iron brackets, screwed to facia.

Be sure and have such gutters well below projection of shingles so that snow may slide over.

SHOWING INCLINED PLANCHER.

In sektch No. 2 I have shown the plancher nailed to bottom of rafters as ⅞-inch stuff, one board being shown, or tongued and grooved stuff can be used. One-half-inch ceiling can also be used to advantage, or plancher may be dispensed with altogether by nailing a board tightly between rafters as shown at B. A cover or bed moulding should be nailed up tight along inside edge of plancher.



The wooden gutter shown in sketch is quite common in the eastern states, being made of cypress, specially cored, the cores being used for downpipe.

Tin must be used up under the shingles a couple of feet in order to make a good job.

Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	New York, N. Y.	Los Angeles, California, by Courtesy of B. & C.
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM Rough	M ft. BM R G
2"x4" to 8" up to 16', No. 1	yp $20.00	yp. $30.00	op $22.00 to 24.00
2"x4" to 8" up to 16', No. 2	16.00	*	21.00
2"x4" to 8" 18 & 20', No. 1	21.00	30.00	23.00
2"x10" up to 16', No. 1	21.00	34.00	24.00
2"x12" up to 16', No. 1	22.00	34.00	24.00
2"x14" up to 16', No. 1	24.00	38.00	25.00
Each 2 ft. over 20 ft., add per M	1.00	For Dressing 3.00	1.00
Select stock as above, add per M	5.00		10.00
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
1"x8" to 1"x8", No. 1	yp $35.00	wp $45.00	rw $35.00
1"x10", No. 1	35.00	cyp 58.00	36.00
1"x12", No. 1	40.00		37.00
1¼"x8" to 1¼"x12", No. 1	42.00		50.00
1½" and 2" same as above	42.00		52.00
1" drop siding, No. 1	25.00	wp 45.00	26.00 to 30.00
½" lap siding, No. 1	18.00	cdr 30.00	18.00 to 20.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft. BM S Rough	M ft. BM D 2 S
1"x6" to 1"x8", No. 1	yp $18.00	s $32.50	op $25.00 to 30.00
1 x8" to 1"x10", No. 1	18.00	1x6 27.50	25.00 to 30.00
1"x10", No. 1	18.00	1x8 28.00	30.00 to 35.00
1"x10", No. 2	15.00	1x10 30.00	25.00 to 30.00
Interior Finish, Flooring, Ceiling, Etc	M ft. BM D S.	M ft. BM. D 4 S.	M ft. BM D 4 S.
⅛", T. & G. Flooring No. 1	yp $30.00	yp. $32.00	op $40.00
⅛", T. & G. Flooring No. 2	25.00	26.00	35.00
Add for ceiling per M	1.00	wc 9.00	1.50
Add for partition per M	2.00	wc 9.00	2.50
⅜"x6", Ceiling No. 1	25.00	wc 25.00	27.50
	100 ft. run	Flooring	100 ft run
4¼" Moulded Casing	yp $1.85	yp No. 1 $32.00	rw or op $3.00
4¾" Moulded Casing	2.10	yp No. 2 26.00	3.50
7¼" Moulded Base	3.25	Maple No. 1 52.00	6.00
⅞"x2¼" Moulded Base	3.75	" No. 2 46.00	8.00
1⅛"x4½" Moulded Window Stool	3.00	Oak No. 1 65.00	7.50
		Oak No. 2 52.00	
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	re $3.50	rc $5.75	rw $2.75
Shingles, No. 2	3.00	cdr 4.00	1.75
Shingles, fancy	5.00	cyp 11.00	rw 3.75
Lath, 4 ft., No. 1	yp 3.60	4.25	4.50
Lath, 4 ft., No. 2	2.75	*	3.50
Pickets, 1"x3"x4' 6", dressed	40.00	*	25.00
Pickets, 1 x3"x4' 6", rough	*	*	20.00
	Piece.	Piece.	Piece.
6"x8' Post split	Odr $0.13	.28	re $0.30
8"x8' Post split	.20	.32	.40
8"x8' Post whole	.44	.50	.50
6"x8' Post whole	.25	.45	.40
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$3.50	$2.25	$3.00
Nails, cut, common	4.00	2.10	3.10
Nails, wire, fine finishing	1.60	2.50	3.50
Sash Weights, cast iron	1.50	New 1.50 S. H. .90	1.60
Tarred Felt Paper, best 2-ply	Roll *	Roll $1.25	Roll *
Tarred Felt Paper, 3-ply	*	1000' 0.95	*
Red Rosin, Atlas brand	.90	1000' 1.15	*
Red Rosin, durable brand	.75	Per lb. .02¼	*
Black Neponset		250 ft. 1.15	*
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	$6.50	$9.00
Brick, blue, at kilns, No.	*	6.00	6.50
Brick, blue, at kilns, No. 2	7.50	Pressed 22.00	6.00
Brick, waite, delivered, face	7.00	" 25.00	*
Brick, red, delivered, backing	7.00	14.00	*
Brick, dedvered, dry pressed	18.00	25.00	*
Brick, vitrified, dry pressed	*	18.00	*
Lime, best gray	bbl. $1.30	bbl. $1.40	bbl. $1.80
Lime, best white	1.40	145 to 190 Atlas-	2.00
Cement, Portland	0.95	1.50 pr bbl.in wood	2.15
Plaster, calcined	2.40	(In bags $1.80 per	2.25
Hair, 8 lb. per bush	.25	bbl., 4 bags to bbl., with rebate of 7½ per bag.)	0.48

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

BUILDING TRADES INTERESTS IN THE COURTS.

Payment on account of the contract price of certain painting is not necessarily evidence of acceptance of the work.—Schweitzer v. St. Leo's Catholic Church of Irvington, 78 A. (N. J.) 400.

Interest is properly allowed on the penalty of a contractor's bond, where the penalty is less than the amount of the damages caused by breach of the bond.—Rowe v. Town of Peabody, 93 N. E. (Mass.) 604.

A contractor, agreeing to remodel houses to the "perfect satisfaction" of the owner, must perform the work in such a manner that the owner, acting as a reasonable man under the circumstances, must be satisfied with it.—Tobin v. Kells, 93 N. E. (Mass.) 596.

While a building contractor is not the owner's agent so as to bind him in all respects, the principle on which he binds the owner's property, to the extent of the market value of materials furnished, is that of an implied agency for the owner.—O'Neil Lumber Co. v. Greffet, 133 S. W. (Mo.) 113.

Where a contractor to paint a church failed to procure an architect's certificate, which the contract made a condition precedent to his right to payment of the contract price, and did not otherwise show that the work had been accepted, defendant in an action for the price was entitled to a nonsuit.—Schweitzer v. St. Leo's Catholic Church of Irvington, 78 A. (N. J.) 400.

In determining the percentage to which each of several subcontractors claiming a mechanic's lien is entitled, the amount of unpaid bills for labor and materials for which no liens have been filed, or, if filed, have been abandoned, must be excluded, since the owner is not liable therefor.—Frohlich v. Ashton, 129 N. W. (Mich.) 18.

A subcontractor guaranteeing the performance of the original contract, and directing the making of payments to the principal contractor, is estopped from enforcing a mechanic's lien, and the fact that subsequent to the decree in the trial court denying relief to him the owner has acquired the subcontractor's lien does not affect the question.—Frohlich v. Ashton, 129 N. W. (Mich.) 18.

Where a contractor to remodel houses informed the owner that, since he was unable to obtain money from a third person for use on the work, he would have to abandon the contract unless the owner modified the terms thereof as to payments, a modification agreed on by the parties was supported by a good consideration, and was valid.—Tobin v. Kells, 93 N. E. (Mass.) 596.

Judgment against a husband for building material furnished on his and the contractor's credit, and used on his wife's property, and against her enforcing the lien, is proper, though the contractor be not a party to the judgment, where the debt was contracted by the husband as undisclosed agent for his wife; he being ostensibly owner of the property.—O'Neil Lumber Co. v. Greffet, 133 S. W. (Mo.) 113.

Upon default of a contractor, the sureties upon his bond undertook the completion of his contract, and to borrow money from a copartnership executed their joint note. Even though one of the sureties, a member of the firm to which the note was given had agreed to indemnify the other sureties against loss, a consideration for the note passed to each signer. Nor is any such surety signing the note entitled to be considered merely an accommodation maker."—Noyes v. Ostrom, 129 N. W. (Minn.) 143.

Where, in an action by an architect for making plans for a dwelling, it appeared that the original agreement called for plans for a dwelling not to cost more than $3,000, but that subsequently the cost limit was abandoned by defendant notifying the architect that he wanted a house which would suit, no matter what the cost, the architect was entitled to recover, though he admitted that his original plans called for a house costing more than $3,000.—Bowell v. Draper, 129 N. W. (Iowa) 54.

Where, in an action by an architect for making plans for a dwelling, the evidence showed that he should receive 2½ per cent on the cost of the building, and that the original agreement provided that the building should not cost over $3,000 and the verdict was limited to a recovery of 2½ per cent on $3,000, defendant was not prejudiced by reason of the fact that the plans called for a house which could not be completed for $3,000.—Bowell v. Draper, 129 N. W. (Iowa) 54.

Where, in an action by an architect for compensation for preparing plans for a dwelling, the parties did not agree as to what should be included in the plans, defendant contending that they were to be for a dwelling house complete, including foundation, while the architect testified that the foundation was eliminated by express agreement, the architect was entitled to rely on the elimination without pleading a waiver by defendant of the failure to prepare plans including the foundation.—Bowell v. Draper, 129 N. W. (Iowa) 54.

Where an architect employed to make plans for a dwelling delivered plans to defendant who took them away with him and subsequently, returned them and stated that he could not use them because it would cost too much money to build after them, and subsequently, defendant changed his mind, after giving his directions to the architect regarding the plans and placed his land in the hands of an agent for sale, the architect was relieved from making a tender or from doing anything further in the matter.—Bowell v. Draper, 129 N. W. (Iowa) 54.

The statute gives a lien to any one contracting with the owner of land or his agent for materials furnished or work done in repairing or improving a building thereon, and where the owner rents his property to another and stipulates in the lease that improvements may be made on the property by the lessee and the expense thereof deducted from the rentals to be paid by him, the lessee may be regarded as the agent of the owner and those doing the work and furnishing the material for improving the property will be entitled to a lien on the interest and estate of the lessee and the owner.—Potter v. Conley, 112 (Kans.) 608.

BOOK NOTICES

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. Money and address must accompany all orders.)

THE CHILDREN'S LIBRARY OF WORK AND PLAY.—Ten volumes, published by Doubleday, Page & Co., Garden City, N. Y. Price, complete, $17.50.

This work forms a complete library for young folks—of both sexes—who wish to know how to make, mend or create things, such as may be required about a house, stable, barn, garden, lawn, fences, walks, and similar works. The book also contains simple instructions for housework of all kinds, needlewoork, and for making many kinds of those dainty things girls take a delight in making. We cannot, for lack of space, give anything like a fair idea of what the contents of the books are; but we can assure our readers that every page covers something of value. The fallowing titles of the ten volumes, may help somewhat to convey an idea of the intention of the work: "Carpentry and Woodwork," "Mechanics—Indoors and Out," "Working in Metals," "Housekeeping," "Needlecraft," "Home Decoration," "Gardening and Farming," "Indoor Sports and Games," "Electricity and Its Everyday Uses," "Out-Door Work."

The following are the names of the authors, many of whom are well known to the reading public:

John F. Woodhull, Charles F. Warner, Edwin W. Foster, Mary Rodgers Miller, Ellen Eddy Shaw, Charles C. Sleffel, Claude H. Miller, Fred T. Hodgson, Elizabeth Hale Gilman, Effie Archer Archer.

The books are well and handsomely bound, and the paper and print are all that could be desired. The library can only be obtained in complete sets—ten volumes—and may be purchased from the office of publication, or from this office by remitting the price, $17.50.

HAND-FORGING AND WROUGHT-IRON ORNAMENTAL WORK.—By Thos F. Googerty, instructor of forge work at Stout Institution, summer school of forging. 208 pages. 122 illustrations. 12 mo. Printed on a special grade of book paper and bound durably in extra cloth. Published by "Popular Mechanics," 318 West Washington street, Chicago, Ill. Price, postpaid, $1.00.

Like all books published by this firm, the handbook before us is about as practical as it is possible for a book of this kind to be made, and we are sure that manual training instructors, students and all who are interested in technical progress, will welcome this work, partly because of the need of just such a work, but more because of its real practical utility and understandable nethods of presentation—an inportant matter in all manuals intended for the training of young minds. It is written so that the amateur can readily understand all the points involved, and is in no sense a theoretical treatise, but a practical working handbook; the stimulation of original work being the one aim of the author.

As for equipment for doing the work, the ordinary forge shop and tools are all that are necessary. The manner in which the book is illustrated is especially helpful in explaining the text; the correct positions of holding the tools when working the materials being clearly shown. Scarcely a page is without one or more illustrations.

HILL'S REFERENCE GUIDE FOR LAND SEEKERS, TRAVELERS, SCHOOLS, TOURISTS, EMIGRANTS AND GENERAL READERS.—Including description and outline maps with new methods of quick finding locations, in each state, of any city or village of 200 population or more. An original book containing history of each state, climate, irrigated regions, opportunities for new settlers, shape and position of all countries, with location and 1910 population of 23,664 cities and villages of the United States. Maps of states prepared, countries numbered and all states described. By Thomas E. Hill, author of "Hill's Manual of Social and Business Forms" and other reference works.

"Back to the land" has been a familiar cry for some years. Easy to say, but how difficult to do, for the available land is fast being taken up and the city dweller does not know how to reach land within his prices. Farm life requires a certain training, just as vigorous as bookkeeping to make a success. Farming is now fast becoming a science, with the farmer students studying the composition of the soils, percentages of cream, and following a definite rotation of crops with a fixed purpose, laid out for years in advance.

It is an interesting study, to plan for years and working see the plans materialize. In this work, the author, who has spent a long lifetime in the study of economic conditions, shows where the farms and farming land are available in the various states, the crops generally grown, and a fund of information along the same lines. The book is equally valuable to the young merchant or mechanic planning to settle in some new country, as it shows the resources and possibilities of every state in the Union.

This work can be obtained from this office, at the price of $3.50 for full morocco, or $2.50 for silk cloth.

A HISTORY OF ARCHITECTURAL DEVELOPMENT.—By F. M. Simpson, architect, professor of architecture in the University of London and Liverpool, Royal Academy travelers' student, etc. The renaissance in Italy, France and England. 268 illustrations. 359 pages. Well bound in fine English buckram cloth. Vol. III, published by Longmans, Green & Co., New York, N. Y. Price, postage paid, $6.00.

This is one of three volumes and forms part of "The Architect's Library," which is being published by the well-known publishing firm of Longmans, Green & Co., of 39 Paternoster Row, London, England. The previous volumes, I and II, being devoted to (Vol. I) "Ancient Early Christian and Byzantine Architecture and Art," with 100 illustrations. Vol. II, to "Mediaeval Architecture and Art," with 257 illustrations. Vol. III being devoted to "Renaissance in Italy, France and England," with 268 illustrations, paper, binding, press work and illustrations are all exceptionally good, the illustrations being much above the average, clear and nicely presented. The subject matter is given to readers in a very artistic and concise style and the subjects are dealt with in a masterly manner. While somewhat on the same lines as the works of Ferguson and Sturgis, it has some new features and much new matter of importance is introduced that will be of interest to the architectural student, and is quite a valuable addition to architectural literature.

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THE CHICAGO HARDWARE SHOW.

It is a good sign where the largest exhibition hall in a city like Chicago is crowded to the doors with exhibits of hardware, and visitors are glad to pay to see what is new in the hardware lines.

Such was the condition in Chicago on February 13-16. It was a pleasure to wander through the aisles and see the familiar names and faces, familiar to our readers as well as ourselves.

The Alabastine Company gave exhibitions of the practical value of their goods, showing how the walls and ceilings could be made beautiful, at the same time sanitary at a slight cost.

E. C. Atkins & Co. passed around miniature many-colored buzz-buttons of interest to the children (and older folks as well) while impressing on everyone that Silver Steel was the "Finest-on-Earth."

Geo. H. Bishop & Co. displayed to advantage not only their "Grey Hound" saws, but a full line of other saws, as well as plasterers' trowels and other tools.

Bommer Brothers, the spring hinge people, had more kinds of hinges on exhibition than the average hardware man knew existed, and the Diamond Expansion Bolts were fastened so securely to a block of concrete that none were picked up for souvenirs.

Russell Jennings Bits of various styles and sizes were seen in action; piles of nice clean chips marking the progress of even boring.

The Ford Augur Bit Company and the Rehm Hardware Company had a spirited unofficial boring contest which bid fair to exhaust the supply of lignumvitae, but just who won could not be learned, although it is rumored that the Evil One himself was seen backing the Rehm outfit.

A large crowd seemed interested in an immense Simonds circular saw, but the slow speed prevented anyone touching the edge "to see if it was going."

We spent a little time with the Stanley Rule & Level Company, looking over enough fine tools to scuttle a ship, and we promised to speak a good word for the Stanley works, but every carpenter knows

how good they are and what a complete line they make, from ball-bearing hinges with non-rising pins to corrugated T-hinges and screen door fasteners.

Some interesting "lines" were displayed by the Silver Lake Company, and the Samson Cordage Works were also present with a fine line of "Spots," so familiar to the carpenter and contractor.

One of the busiest men in the place was Mr. Chas. Luther, the grinder man, and we never did find him, but we found a nice resting place with the Simmons Hardware Company. Their large booth was a finely appointed rest room, for they figured they couldn't show all their goods, anyway, so didn't show anything. Their catalogues were handy, but were not used near as much as their cigars and easy chairs.

MATERIAL HOISTS.

"More Brick," cries the bricklayer on the fourth story front. The hod-carrier is not always to blame, for lack of hoisting facilities delays the work; runs the cost up; and annoys architect, owner, contractor and mechanic alike.

It is hard to realize a building of any size being erected today without the use of power hoists. The cost of the entire plant is so low no contractor can afford to be without one, provided his jobs are two or more stories.

A well-designed hoist can be erected in the regular elevator shaft or on the outside of the building, if necessary, keeping the hoist and



its frame entirely separate from the building. In this way, even the furniture for an office building or hotel can be taken up before taking down the hoist.

The Universal Hoist & Manufacturing Company, 180 State street, Cedar Falls, Iowa, make a hoist for contractor's use which seems to meet the requirements in excellent shape, as it is adapted for building materials, ice, coal, ore, etc., and takes the place of an expensive elevator. As will be seen from the illustration, the machine is mounted on a heavy frame, permitting easy moving and setting up. The engine can be used for other purposes when desired, such as operating a concrete mixer, stone crusher, saws, etc.

Some contractors are in doubt as to the possibilities of a machine of this character, and to all such the Universal Hoist & Manufacturing Company will be glad to describe more fully their equipment.

NIAGARA HARDWARE SPECIALTIES.

There are a great many small items about the modern building very necessary to good construction, but costing little in themselves. Among these we have wall ties, for use in binding brick walls, whether for a veneer facing, or for strengthening a wall where there is danger of cracks or openings occuring from faulty foundations, imperfections in laying brick or other conditions. With concrete blocks, their use adds greatly to the strength and permanence of the buildings, for the hollow blocks frequently need reinforcement to be permanent.

When a brick wall must be furred for lathing, etc., another problem confronts the builder. Either he must build in wood blocks, decreasing the strength of the wall or he must "plug" it with wood plugs which, to be effective, must be large and driven in so as to take the entire load of the wall. This method is more exact but more expensive than the first. The ideal way is to build in galvanized wall plugs at the proper places. These occupy only the space of the mortar joint and when once in cannot become loose. A nail driven into them holds far better than into end wood. These plugs should be used wherever it is necessary to fasten anything to a masonry wall, and they are especially valuable for base, chair rail, mouldings, window and door frames, etc.

When cement mortar is used it is almost impossible to get a nail into the wall unless a plug of this character is used.

The Niagara Falls Metal Stamping Works, Niagara Falls, N. Y., manufacture a complete line of specialties for the builder, among them being wall ties, plugs, sash chains, metal numbers, etc. This catalogue, 54-56B, is of interest to every contractor and builder.

CHICAGO TECHNICAL COLLEGE.

Books are often impractical, or lose their value to the beginner by being too theoretical. If the architectural student, for example, can examine all the plans, details, specifications, contracts, etc., for a large office building, he will acquire a vast fund of information not obtainable in any other manner. Purely academic drawings are valueless to the mechanic and have little more value to those who must prepare drawings and instructions for the mechanic. The drawings showing work actually carried out are of far greater value than theoretical sketches.

The Chicago Technical College aims to teach those who want instructions in practical work in Architecture, Civil and Mechanical Engineering, and its allied branches. Although designed for a resident school, with day and evening classes, a complete correspondence course is prepared for those unable to come to the school.

The demand for capable men in these lines is never filled. The growing country is calling for engineers, architects, and draftsmen who have a solid foundation of knowledge. The courses of the Chicago Technical College would indicate a thorough preparation for work in these lines. A catalogue showing the courses, requirements, etc., can be obtained from the Chicago Technical College, 655 Athenaeum Building, Chicago, Ill.

THE ATTIC STAIRWAY.

Is it not a fact that in planning the arrangement and size of rooms, halls, etc., for the ordinary dwelling, the space required for an attic stairway is usually needed to fill out a room or closet? There often seems no place when the attic stairs may be placed without great inconvenience to some of the other rooms.

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The Bessler Movable Stairway was designed to fill the need in such cases as above mentioned. It consists of a well built stairway in one flight from floor to ceiling, but so arranged that it is easily raised to the attic, showing only a nicely finished panel in the ceiling of the hall or room below. This allows the free use of the room or hall except when the stairs are used and at the same time provides stairs when and where wanted.

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HIGH STANDARD PAINT.



An animated discussion between two hod-carriers concerning the purpose of the mortar they carried. One argued it held the brick together while the other was equally sure it held them apart.

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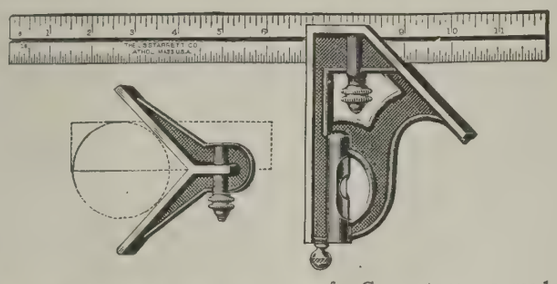
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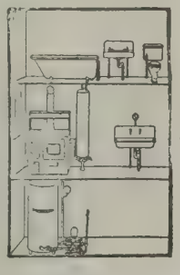
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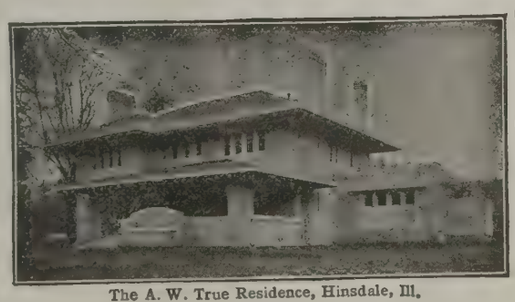
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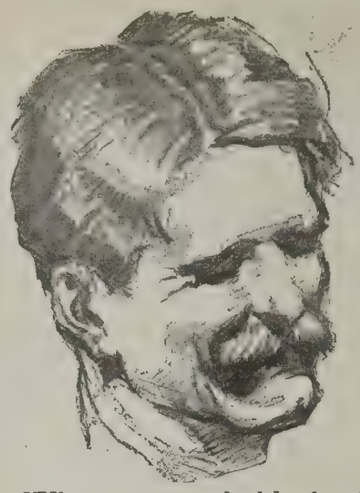


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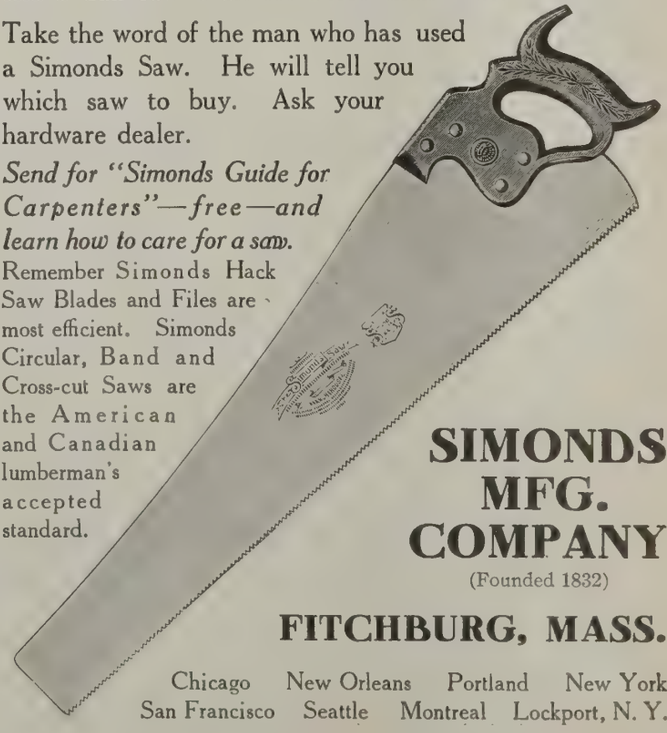
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Concrete has come to stay, but not all concrete stays. Poor materials, incompetent workmen and imperfect or insufficient machinery quickly reduces the possible strength and permanence of what would otherwise be of the greatest strength and endurance.

Who is to blame? Certainly there are enough good cements made; good stone, sand or gravel are found everywhere and a little care in selection, washing and screening furnishes an abundance of material. The contractor is himself incompetent who permits any but the best workmanship on the job. In the selection of the necessary machinery the contractor or builder has a wide range of reliable concerns which he may patronize. Concrete is now so prominent a building material that many of them devote practically all their shops to the manufacture of concrete machinery. Among these no concern enjoys a better reputation than the Northwestern Steel and Iron Works, 1029 Spring street, Eau Claire, Wis. Their products include practically everything needed by the concrete contractor or builder, such as mixers operated by steam, electric, gasoline or hand, block and drain pipe machines, gasoline engines, saw rigs, etc.

The Northwestern Company have perfected a waterproof compound which they claim renders concrete absolutely and permanently waterproof. The advantage of such a substance is readily apparent to every one familiar with concrete.

Their catalogue shows in great detail the construction of their machines and the class of work which they will do, as well as a great deal of information for the concrete worker. This catalogue is sent free on request, and they should receive a request from everyone interested in better work with concrete.

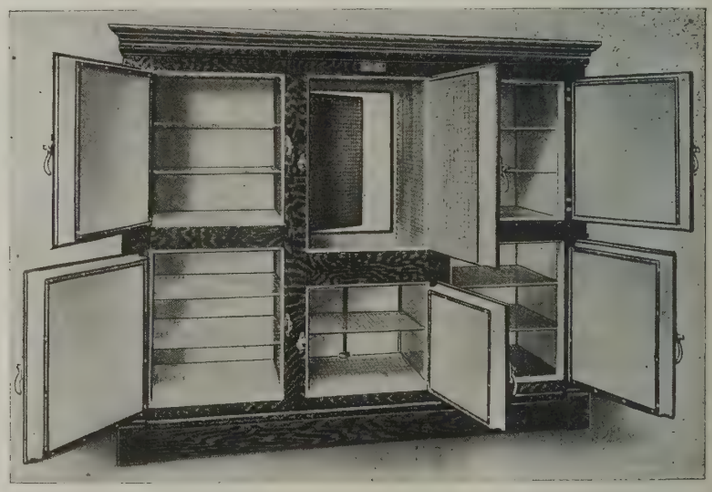
MODERN RESIDENCE REFRIGERATORS.

Under the present customs, very few modern houses are planned without providing for a refrigerator. Homes in which the refrigerator was formerly considered a luxury now use them as a necessity, and as such they are entitled to even more consideration than the interior finish or other furniture, for as they serve health, convenience and economy, are they not more necessary?

Few people recognize the great advance made in the detail construction of a modern refrigerator, and also in other articles used in the home for health and comfort, so that instead of the old style ice box practically without insulation or circulation, we now have the luxurious and sanitary icing refrigerator built on scientific lines.

The only consideration formerly given a refrigerator was to merely provide standing room for it. The result was the refrigerator or "ice box" was frequently stored in the basement or on the back porch for several months of the year, causing the appearance and usefulness to be greatly injured. Today it is possible for the woman of the house to point with pride to the refrigerator as a piece of furniture free from mould or taint, keeping the food in the highest state of preservation and a sanitary storage for the most delicate foods.

The advance in the scientific construction of ice boxes and refrigerators has been such that it is folly for the contractor or builder to think of building one himself and doing all the insulating, etc., necessary. The cost in this way would be far in excess of what a first-class ready-made refrigerator would be, and would more than



pay for a built in refrigerator as made by the best manufacturers, and the appearance would in no way compare with the finish which can be given them by those in the business.

Architects, designing the better class and even the low-priced bungalows and cottages, recognize the sanitary importance of the refrigerator and are providing spaces designed to have the refrigerator built in place, thus providing it with proper connections to the sewerage system and eliminating the places where dust or rubbish can cling above or under it. Many houses are, therefore, provided with means of putting in the ice from the outside, so that there is no occasion whatever for the iceman to come into the house

The Herrick Refrigerator & Cold Storage Company, Waterloo, Iowa, have been manufacturing high grade refrigerators for twenty years. While their refrigerator catalogue shows a great many styles of refrigerators, they also have a special department to assist architects and house owners in the preparation for the installation of refrigerators. We show on this page one style of built-in refrigerator having a door in the center for the ice, opening both on the outside and inside.

The Herrick Refrigerator & Cold Storage Company will be glad to send their catalogue to those interested and assist the house owner, contractor and architect in every possible way to secure a sanitary and economical installation.

Glidden

M. P. Durable Interior and M. P. Durable Floor

There is only one reason why you should specify Glidden's M. P. Durable Interior in preference to any other interior varnish on the market, and that reason is Quality. If there were any other interior varnish made so light in color, with such wonderful flowing and brushing properties and such remarkable elasticity and durability, the one real reason would not exist.

When you specify a floor varnish, write into your specifications Glidden's M. P. Durable Floor, for the one real reason—Quality. Its hard and quick drying properties, its elasticity and its incomparable durability make it the essential floor varnish—the floor varnish that is impervious to water—the floor varnish that will not mar—the floor varnish that will not scratch white.



The Glidden Varnish Company

Factories: Cleveland, Ohio; Toronto, Canada

Branches. New York—Chicago—London

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PACIFIC COAST HOMES combine individuality of design with artistic and economical construction. Western Homes are of absorbing interest in exteriors and plans. Genuine Bungalows especially appeal to everyone and are a popular and profitable form of investment. Our two books contain plans, descriptions, and cost estimates of low-cost houses suitable for any climate.

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"WEST COAST BUNGALOWS." Price 50 Cents. A book of 50 one-story, very artistic, inexpensive Bungalows of four to six rooms costing $500 to $2000.

BUILDERS' SUPPLEMENT No. 1. Price 10 Cents. *FREE with orders for two books*

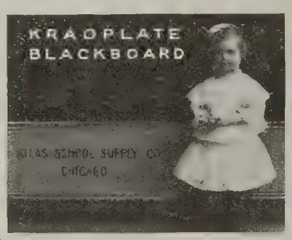
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Electric and Hand Power Safety

ELEVATORS



and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa

Reliable "Erie" Portable Contractor's Hoist

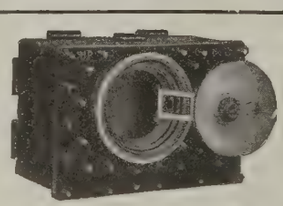


Buy this staunch portable Hoist with frame 7 ft. long on which you can mount an electric motor or gasoline engine to drive it. Rated capacity 600 lbs. but it will lift 1000 lbs. This is just the Hoist you have been waiting for.

Can be operated from a distance. Simple, compact, absolutely reliable and easy to handle. Sold complete with long frame, pulley, hand and foot lever, ready for use. Weighs 325 lbs. A high grade Hoist at the price you are willing to pay. Send your order today, you cannot afford to be without it. Catalogue H 1 for the asking.

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Friction Clutches and Pulleys, Bone Cutter and Feed Grinders
Established 1873 ERIE, PA., U. S. A.

The Gale Wall Safe



It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

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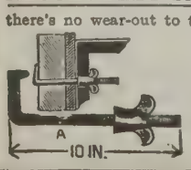
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$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)

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ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



Write for Catalogue of Builders' Specialties

JAMES L. TAYLOR MFG. CO.
POUGHKEEPSIE, N. Y.

STEEL TAPES.

Accuracy is demanded in modern construction as much as skill and rapidity. The foreman or mechanic who can measure once, and be sure of his dimensions, is just twice as valuable as one who must go over his work twice.

To insure accuracy in measurements, the rules, tapes, etc., must be extremely accurate, and free from any chance to become otherwise. The use of a steel rule or tape overcomes any tendency to error due to the tape stretching, or the figures becoming illegible.

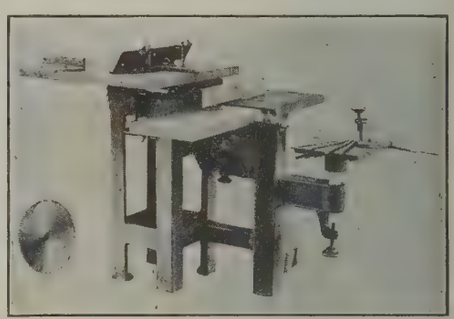
How much better it is to have a dependable tape than one which must be used only in fair weather. If a measurement is to be taken, why not get it accurate?

The Lufkin Rule Company, Saginaw, Mich., make a line of steel tapes such as contractors and builders require. Their catalogue No. 12 describes in detail their large line, and should be found in the catalogue file of every contractor and builder.

THE TANNEWITZ TYPE "C" WOODWORKER

The time has come when the individual contractor can be practically independent of the planing mill. Heretofore it has been necessary to run to the mill for every little sash and for every little piece of moulding. In case the mill happens to be around the corner, it is very convenient, but when it is a mile or more away a loss of time occurs, which would soon equal the cost of a machine at the work.

The Tannewitz Type "C" Woodworker is one of the machines calculated to save the contractor time, money and material. By the use of a machine of this character a great deal of waste material can be worked up into moulding, bridging, nailing blocks, furring, etc. This is a double saving, as it reduces the waste and saves the expense of new lumber.



Tannewitz Type "C" Woodworker.

A machine of this character must be, adaptable to a great variety of work. It must be equipped with satisfactory cross cut and rip saw blades, jointer knives, gauges, bits, etc. Where a considerable amount of work is required, it must also have some sort of power provided, gasoline or electric. Above all, the machine must be self-contained, adjustable and portable.

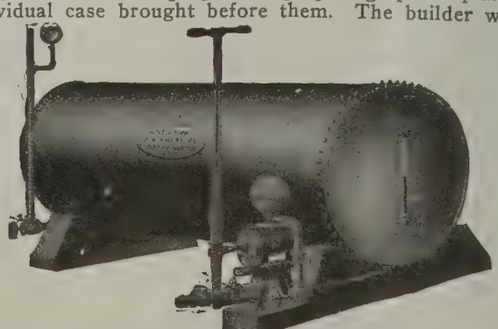
The Tannewitz Works, 41 S. Front St., Grand Rapids, Mich., believe that their machine is ideal in all these respects and that this woodworker gives the contractor a complete mill and a reliable power plant at very little cost. Their catalogue describing this outfit and other working machinery will be sent upon request.

SANITARY ENGINEERING

A modern household must be a complete arrangement with many improvements not found in the old-time houses. In the cities, the problem is simpler than in the country, for we have water, gas, electricity and sometimes even steam and hot water brought to the doors; in the country districts, however, all of these must be provided for by the owner himself independent of what his neighbor has. The designs of the systems for furnishing water, heat, etc., are a matter for careful study by a competent engineer in order to have them all work harmoniously.

The Andrews Heating Company was formerly organized to supply heating plants for isolated buildings. The great demand, however, for improvements in all lines has led to the establishment of special facilities for assisting the contractor, builder, carpenter, etc., to install not only heating plants, but plumbing, gas, light and sewerage disposals.

In the engineering department of the Andrews Heating Company are employes for the sole purpose of preparing special plants to suit each individual case brought before them. The builder who writes

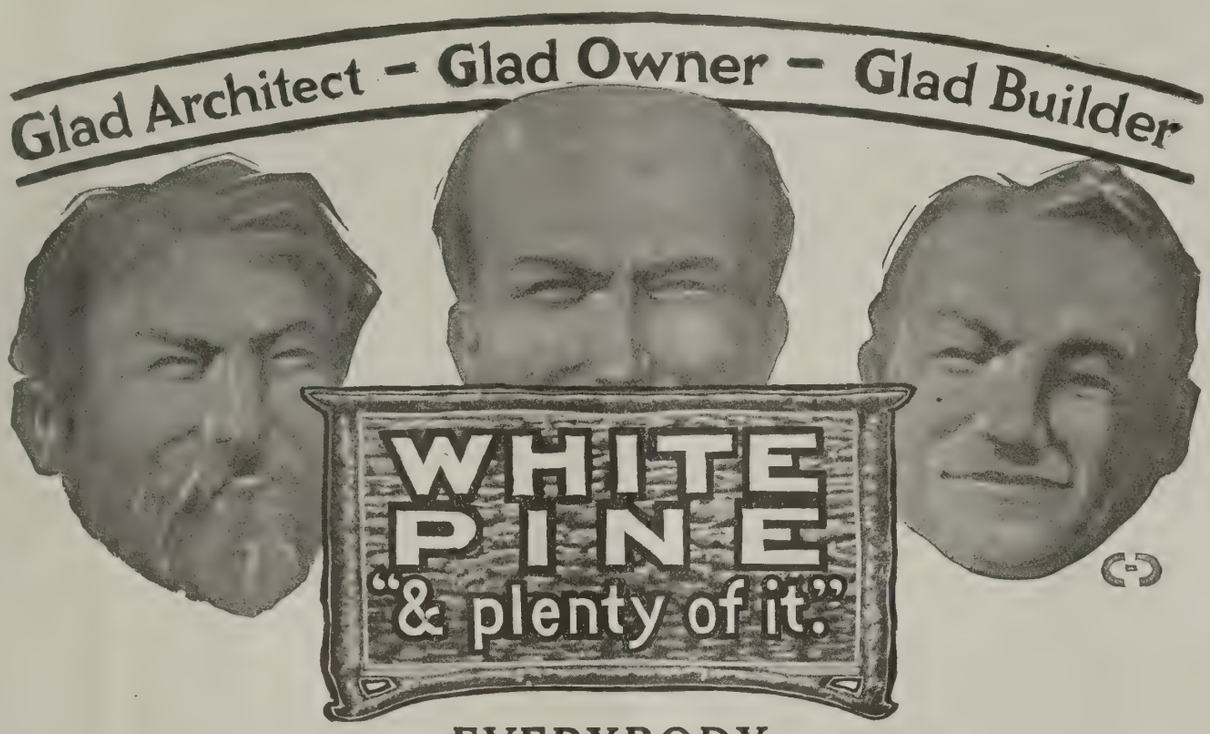


Pressure tank with hand pump.

to the Andrews Heating Company is assured of individual attention, which is the only way the problems can be satisfactorily settled. In this manner, the builder is able to install complete plants, which are sure to do the required work.

Contractors and builders who are estimating on a complete structure should secure reliable estimates and plans for this class of work, and we believe no company is better able to prepare reliable plans and estimates than the Andrews Heating Company.

A request for information on these subjects should be accompanied by detailed information regarding the exact conditions under which the plant must be operated, and it is suggested that intending builders write to the Andrews Heating Company, 1240 Heating Building Minneapolis, Minn., for information regarding the best manner of getting estimates and plans.



EVERYBODY
CONCERNED IN BUILDING

— for himself, or for others — now, or sometime later —

IS PUT IN A FINE GOOD HUMOR

by simply discovering the agreeable *and profitable FACT* that

WHITE PINE and its half-brother NORWAY PINE

("THE *BEST-NATURED* WOODS ON EARTH")

are to be had today, in any quantity — without any more trouble than you encounter in getting anything else you want *which is enough better than its substitutes* to induce some merchants to urge something else on which they may make more. It is what *you* get in the way of *value* for *your money* that chiefly interests *you*. (Is it?)

DO ALL THE INSISTING NECESSARY. WHITE PINE IS WORTH IT.

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and a very interesting and illuminating one it is. Just jot your name, address and *why you care*, on a postal —or write a regular letter (better yet)—and we shall be glad to send you "WHY-WHEN—**WHITE PINE.**"

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NORTHERN PINE Manufacturers' Association

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Residences $1000–$6000; Bungalows $500–$2500; Cottages $1000–$3000. Complete blue print drawings, working details, specifications and list of material at reasonable prices. Get this handsome Home Builders' Plan Book. Send 6c in stamps for postage and mailing.
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Best for cooking and heating water for kitchen, bath and laundry.
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No generating, no dirt, soot, fuss or muss.
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IT DOES ALL THIS
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THE VAN DORN IRON WORKS CO.
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Structural Steel and Ornamental Iron Workers
No. 1.—Steel Joist Hanger for Wood Header.
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Does away with weights and cords and VASTLY more durable.
Makes sashes work perfectly.
Permits greater window space in new work, as box frames are not necessary.
May be applied to old windows without altering sashes or frames.
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For fastening all kinds of material to Brick, Stone or Concrete
"DIAMOND N" EXPANSION BOLT
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DIAMOND EXPANSION BOLT CO.
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50 CENTS For This Clamp Fixture
IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES
Write for Catalog of Sheldon's Clamps and Vises
E. B. SHELDON & CO., 321 N. May St., CHICAGO

THE DIAMOND GROUND CLAMP

One of the most important items in installing a telephone system or a system of electrical call bells, door bells, etc., is the necessity for proper grounding the wires. The Diamond Expansion Bolt Co., 90 West St., New York, place on the market a clamp which greatly simplifies the work of forming a permanent ground. As will be seen by the accompanying illustrations, the clamp is extremely simple. The pipe is cleaned to insure a proper contact and the clamp is then placed around the pipe.



The screw driver and pliers such as a lineman always carries with him are all the tools required.

The telescoping sides of the "Diamond" Ground Clamp permit of a greater take-up than the ordinary clamp, and is limited only by the length of the screw used. As the take-up is in a direct line with the strap, a very powerful grip on the pipe is secured and the grip is easily tightened or loosened by the use of the screw driver.

The Diamond Expansion Bolt Co. also manufacture a number of other specialties for use in electrical work, and we understand that circulars will be sent upon request.

A COMPLETE PLANING MILL.

One of the most perplexing problems of the contractor—that of choosing suitable machinery—has been solved by the advent of the FAMOUS Portable Universal Woodworker, a machine which permits many different kinds of work to be done, and which can be moved around from place to place without any trouble whatever. It is mounted on a wheeled truck so that, when it is desired to move it, a horse is hitched to the truck and the whole thing carried anywhere. "A Planing Mill on Wheels" seems about the best way to describe the proposition.



This machine is a combination of a Band Saw, Jointer, Reversible Shaper, Saw Table, Borer, Tenoner and Mortiser, Knife Grinder, Emery Grinder, 10-inch Power Feed Sander, Disc Sander, Power Feed Planer, Dadoing Machine, and Panel Raising Machine. Either attachment can be operated independently of the others, and the construction permits of several men working at the same time.

The power is constituted by a three-horse-power gasoline engine, complete with batteries and belts, so that the machine is entirely self-contained and independent of outside power. To show how good and durable it is, the builders guarantee it for life.

Such a machine is a fine investment for any contractor as it enables him to get work out on time, without having to rely upon local mills, and without their high charges. There's no reason on earth why the contractor should not do his own millwork and save the profits he pays somebody else. The FAMOUS is built in various sizes and styles so that large and small requirements can be met with equal satisfaction. All of our readers who wish to cut down or eliminate planing mill bills should get full particulars of the FAMOUS Universal Woodworker from the builders, The Sidney Tool Co., Sidney, Ohio.

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Does the Paint You Use Add to Your Reputation?

"The evil men do lives after them;
The good is oft interred with their bones."
—Shakespeare.

Mr. Contractor, Carpenter or Builder—you should remember that after you've finished a job and gone, it is the quality of the paint you've used that is going to influence the final decision either for or against you.

It pays to specify and use the best.

When you use

Lowe Brothers
High Standard
Liquid Paint

the good you do lives after you, a constant advertisement of the high quality of your work; it makes the best possible reputation for you.

And for the interiors

Mellotone

is the High Standard product, producing the most beautiful and artistic effects in washable, durable and fadeless colors. You will build reputation and business through the recommendation and use of Mellotone.

Send for free catalogue, booklets and color cards of these and the other "Little Blue Flag" products. There's a Lowe Brothers Paint, Varnish, Enamel or Stain for every purpose.



The Lowe Brothers Company
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Boston New York Chicago Kansas City
Lowe Brothers, Limited, Toronto, Canada



Drawing of the Residence on Bitter Root Stock Farm, Hamilton, Montana. Owner, Mrs. Marcus Daly.

This notably fine and pure example of modern colonial architecture is built of brick, with white woodwork. The roof, the dormer windows and the triangular space over the portico are covered with

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

In a building of this kind, architectural fitness is the prime factor in the selection of a roof.

Yet no property owner will ignore the fact that an Asbestos "Century" Shingle roof costs no more than any other first-class roofing.

That it needs no repairs and no painting—no upkeep charges—that it is proof against fire—that it never "grows old."

Asbestos "Century" Shingles are the first and only practical light-weight roofing made of reinforced concrete.

You can get Asbestos "Century" Shingles in shapes to suit any architectural style—in several sizes—and in three colors: Newport Gray (silver gray), Slate (blue black), and Indian Red.

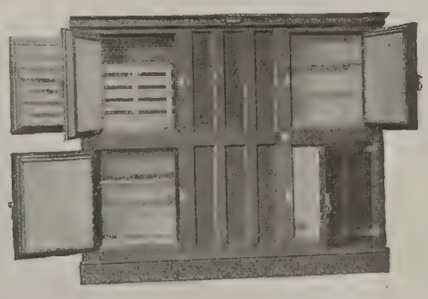
Send for quotations, and booklet "K. & M. 1912."

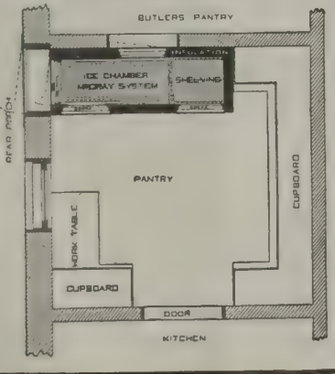
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for both built-in and stock refrigerators.

We manufacture Refrigerators and Coolers for Residences, Groceries, Markets, Florists, Hotels, Clubs, Institutions, etc., and will furnish a catalog for any of these lines on request.

McCray Refrigerator Co.
336 Lake Street
KENDALLVILLE, INDIANA
Agencies in All Large Cities



The Best "Handy Man" For Carpenter and Builder

Slow traveling eats up time—and time is money when you're busy—especially when tools, finishings or materials are needed at once. The International Auto Wagon is always ready to make a quick trip, any distance, for any purpose.

It's time you investigated the

International Auto Wagon

The large number in use by business all over the country is proof that it is the BEST all around quick delivery car for the busy man.

The International Auto Wagon has solid rubber tires (no delay due to punctures and blowouts) sufficiently high wheels to insure ample clearance. There are many other features that help to make it the most practical car for commercial purposes.

A postal will bring catalogue and full information.

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Steel Measuring Tapes



With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

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New York · Windsor



Mr. Builder:—If you are lucky enough to read this advertisement, and wise enough to write and tell us what you buy in

IRON, BRASS AND BRONZE

we will send you catalog that is attractive enough to go in any man's library. Do you want it?

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LOUISVILLE, KENTUCKY

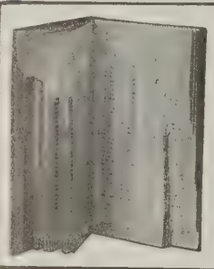
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A PRACTICAL up-to-date work on Sanitary Plumbing, comprising useful information, the wiping and soldering of lead pipe joints and the installation of hot and cold water and drainage systems into modern residences. Including the gravity tank supply and cylinder and tank system of water heating and the pressure cylinder system of water heating. Connections for bath tub. Connections for wash-bowl or lavatory. A modern bath room. Bath tubs. Lavatories. Closets. Urinals. Laundry tubs. Shower bath. Toilet room in office buildings. Sinks. Faucets. Bibb-cocks. Soil-pipe fittings. Drainage fittings. Plumber's tool kit, etc.

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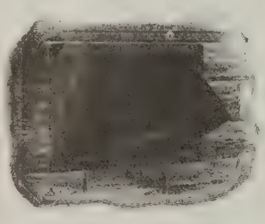
THE PERRY LUMBER RECKONER
ESTIMATING ERRORS ELIMINATED

Mistakes are impossible with the Perry Lumber Reckoner, as all the figuring is done for you.

The lumber tables give the number of board feet in any number of pieces, from one to a hundred, for all the commercial sizes of lumber. You can turn instantly to the right page. Ask your bookseller about it, or send direct.

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The Window Chute
FOR BUILDERS OF MODERN HOMES

Admits light, locks automatically, and is burglar proof. Very easy to install. Write for price and catalogue giving ten special advantages.

HOLLAND FURNACE CO.
HOLLAND, MICH.

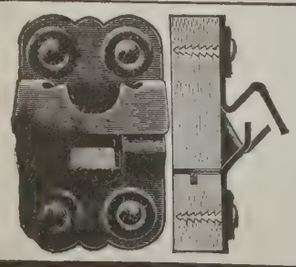
PRACTICAL GAS ENGINE HAND-BOOK
By L. ELLIOT BROOKS

Price, 16mo., Popular Edition, Cloth, $1.00. Edition de Luxe, Full Limp Leather, $1.50.

A manual of useful information on the care, maintenance and repair of gas and oil engines. This work gives full and clear instructions on all points relating to the care, maintenance and repair of stationary, portable and marine gas and oil engines, including how to start, how to stop, how to adjust, how to repair, how to test. Pocket size, 4x6½, 200 pages, with numerous rules and formulas, and over 50 illustrations, by L. Elliot Brooks, author of the "Automobile Hand-Book." This book has been written with the intention of furnishing practical information regarding gas, gasoline and kerosene engines, for the use of owners, operators and others who may be interested in their construction, operation and management.

Sent postpaid on receipt of price by

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THE WATROUS No. 18 SAFETY SASH HANGER
EASIEST AND QUICKEST TO SET

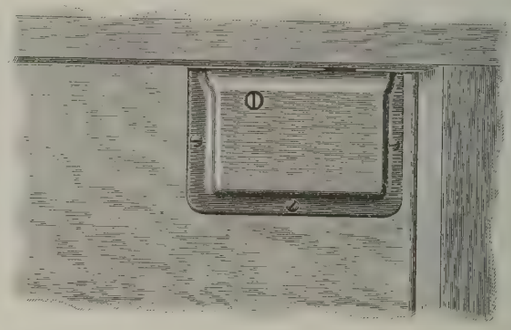
Won't blow off or be dropped off by children or careless servants. Can't be set wrong. The best of them all. Only sash hanger on the market with gauge lugs which make it impossible to set it in any way but the right way. Nine-tenths of the trouble with sash hangers comes from their being set wrong. The Watrous No. 18 is ALWAYS right. Full directions with each set.

E. L. WATROUS MFG. CO., Des Moines, Iowa

PIVOT CHECK FOR DOUBLE ACTING DOORS

How often we see a double acting door in which the oscillation is not at all pleasing? Instead of coming to a stop quickly and quietly, we see the door swing violently to and fro before it finally comes to a rest. This is especially disconcerting where the door is subjected to much use, as it frequently disturbs the next person coming through.

To obviate trouble of this character, the Standard Manufacturing Co. of Shelby, O., have designed a pivot check for double acting doors. This check is designed to be applied at the top of the door and is used in connection with the regular double acting spring floor hinge. It is claimed that with the use of this check and double acting spring floor hinge at the bottom, the same result is obtained as with a double acting check hinge. The check can be used on doors where the double acting floor hinges are already applied, and it is desired to control the swing of the door, and can be used with any make of



double acting floor hinge, as it can be set in position to bring the pivot in line with the hinge post of the bottom of the door. The various makes of floor hinges have these pivots set at slightly different distances from the floor style, so that accommodation of this kind is very necessary.

The checking principle is liquid carefully compounded so as not to be affected by extreme heat or cold. The pressure in the check is so confined to the center that there is no pressure against the joints, and, as a result, there is practically no damage or leakage.

The Standard Manufacturing Co. will be glad to supply any further details of this new pivot check, a cut of which is shown above, and we would suggest that contractors and builders be posted on this check, as there are many cases where its use is advisable and necessary.

HOUSE MOVING MACHINERY

Prosperity affects so many of our citizens that the buildings in which they reside soon becomes too small for people in their station. At such times the problem becomes, whether the old house should be remodeled at the same expense as a new one, whether they shall build a new house and sell the old one, or whether from attachment to the ground and location, they shall rebuild on the old homestead site. This means that the old house must either be torn down or moved. In the former, little or no price can be obtained for the old building; by moving it to another lot, however, its value remains practically the same, and the owner has the satisfaction of knowing that no property has been uselessly and ruthlessly destroyed.

But there are inconveniences associated with the moving of a building. In many old buildings, the timbers are more or less decayed and the transportation is over ground not well adapted for moving. It may be a hill, or the house may be required to turn completely around.

To those who are confronted with this proposition, the moving apparatus manufactured by the La Plant Tool Company is of the



greatest interest. As will be seen by the cut herewith, it consists of three trucks of eight wheels each, on which the house rests, on exactly the same principles as the best carriage or automobile construction, reducing the danger of rack and damage to a minimum.

With these trucks, house moving becomes a mechanical item, easily and quickly accomplished.

The La Plant Tool Company, 900 E. Nevada St., Marshalltown, Iowa, manufacture exclusively house moving tools. Their catalogue No. 2 shows in great detail the construction and pattern of the various trucks and other tools, as well as a great deal of information useful to house movers. Their catalogue should be in the hands of every contractor and builder who has house moving or repairing to do.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



COLOR PLANS and designs for decorating any room in any home, office, store or church with Alabastine, will be supplied by our art department free of all expense to architects, carpenters and builders having charge of such work.

Beautiful cut stencils for carrying out the decorative work now so much in vogue will be furnished by the Alabastine Co., to be used in connection with

Alabastine

THE SANITARY WALL COATING

Where the merit of Alabastine is known there it is used. Any architect, builder, decorator or property owner who comes to know the advantages of Alabastine, becomes an advocate and user of it. We want you to know about Alabastine and to feel that you are doing your customer a favor when you recommend its use.

WHAT IT IS

Alabastine is a water color, fine in texture, artistic in tint, for use on all interior surfaces, whether plaster, brick, cement, wall board or canvas.

It is a dry powder in white and many tints and colors, that may be used as manufactured, or combined and intermixed to produce any color desired.

Alabastine is ready for use by mixing with cold water. It is put up in 5-lb. packages and specially packed in bulk for large jobs where desired.

It is durable, sanitary, artistic and economical. Write us for more detailed information.

WHY IT IS BEST

Alabastine is best because it is durable, by that we mean that when once applied to a suitable surface, it can later be retinted and redecorated, putting succeeding coats of Alabastine over the old ones without the necessity of going to the expense or passing through the disagreeable experience of washing the walls.

Should you ever desire to wash Alabastine from your wall it can be done, which is not the case with paint once it commences to scale off.

An Alabastined wall can be re-coated when soiled at less expense than to wash a painted surface.

FOR NEW BUILDINGS

Alabastine is the ideal material for all new buildings because, unlike kalsomine sold under various names, when once on the wall it forms a perfect surface for any future treatment. Paper can be applied over Alabastine, a new coat of Alabastine can be put on or it may be painted. Many people desire to allow their new building to stand until it is through settling and all cracks have shown. Instead of living in a building with white, glaring walls, soft Alabastine tints may be put on and afterwards treated in any way desired without removing this Alabastine. Alabastine for an ordinary plastered surface or on wall board will not, when purchased at retail price, cost for regular tints to exceed 1½c per square yard for material. The cost of applying would be extra, but it costs no more to apply Alabastine than the cheapest kalsomine.

OVER WALL BOARD

Alabastine makes the only suitable material for use on the various wall boards. It costs much less than paint, is too superior to be compared with any kalsomine as it is durable and may be re-coated. The surfaces of these boards vary, some of them will take a coat of Alabastine with no preparation, others will work by giving them a coat of varnish or shellac size. If interested please write us.

ALABASTINE CO.
Decorative Dept.
GRAND RAPIDS, MICH.

Coupon

Alabastine Co.,
Decorative Dept.
Grand Rapids, Michigan

Gentlemen:—Please send us your special literature to contractors and builders. I am desirous of investigating further. Yours truly,

Name.....
Town.....
State.....

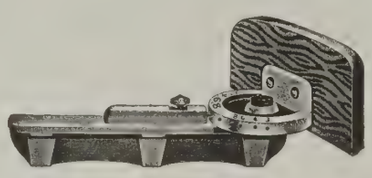
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

A POCKET MITER BOX

No amount of machinery can do away with the necessity for a great deal of hand work in the erection of buildings. This is particularly true in regard to fitting small mouldings, base, picture moulding, and various other work which requires close fitting miters. Bay windows and angles must be very carefully worked around, and this requires accurate work on the part of the carpenter.

The old-fashioned miter box, which required some time to make on the job, was cumbersome to carry around and work with. The later style patterns were excellent for work in the shop or on the bench, or where a large arount of cutting could be done at one time.

The nature of buildings, however, is such that the fitting must be done directly in place and for that reason the small portable miter tool is of the greatest value.



The Parsons Tool Manufacturing Co. of Parsons, Kan., is manufacturing a tool which is of great use to the carpenter in this class of work. As will be seen from the cut, the tool is made of aluminum and wood and is, therefore, very light and easily carried. It is small enough to fit into an ordinary pocket and so can be carried on to a scaffold or up a ladder without inconvenience. The tool is brought directly to the work and the cutting is done with any kind of saw. This makes it particularly valuable in places where a miter box cannot be carried or used, as it can be used for making joints or cutting off work already in place. The tool is adaptable to a great number of angles and accuracy is insured by the use of special machinery used in its manufacture.

The Parsons Tool Manufacturing Co. will be very glad to hear from all carpenters and builders with regard to this tool, and we would add that their circular in regard to it will interest any of our readers.

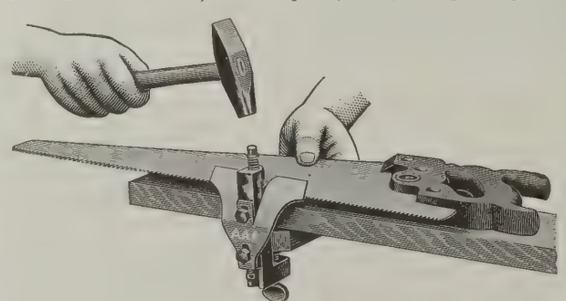
ATKINS NUMBER 5 SAW SET

The use of tools assumes that to secure the best work they must be kept in first-class condition. Various tools require different treatment to secure best results. In the use of saws, the teeth must be carefully formed and as carefully set in order to secure the best results with the least effort on the part of the workman. A large set can very easily double the labor.

E. C. Atkins & Co., famous as the "Silver Steel Saw" people, are placing on the market a new hand saw set which embodies several new principles of merit.

Through the use of a plunger, the hammer blow reaches the saw teeth at a uniform angle, insuring an accurate set. There is no danger of snapping off the teeth, and as the amount of set can be regulated, a perfect job is sure to result.

The E. C. Atkins Co., Indianapolis, Ind., are placing these sets



on sale through the local dealers, but will be glad to send further information with regard to them direct to carpenters and builders, advising them of the nearest place where they may obtain them, or selling direct where they cannot be obtained otherwise.

ORNAMENTAL IRON AND BRONZE

From the earliest times the use of wrought bronze and iron have been used in places where the highest standard of art has been required. In the forms of gates, grilles, hinges and even complete doors the craftsmen of the various ages have expended their best thought and effort. The workman of today, however, has facilities much greater than those in former times, as the use of improved machinery, furnaces, etc., gives him a degree of skill unattainable by the earlier workman.

The Dow Iron and Wire Works, Louisville, Ky., have just issued the Catalogue "F," a folio of photographs and sketches in which the idea is not so much to show the number of established designs which can be furnished as to demonstrate what has been done and is being done, and suggesting to their clients methods for producing results which are both gratifying to themselves and satisfactory from a mechanical standpoint to the manufacturers.

The intrinsic value of bronze and iron work of high grade is such that the expense of special designs is a small part of the work. At the same time, the designs have been standardized for a great many pieces, and so can be obtained without delay.

The catalogue as issued represents a great deal of time and thought in the selection of the designs shown and will be of great value to anyone contemplating work of this character. It contains a great variety of wicket designs suitable for bank and office furnishings, the use of which adds dignity as well as protection to any office. Several pages of office and balcony railings are shown, as well as doors, name plates, etc.

In many places guards are required as a protection against intrusion and injury; in many places these can best be made of wrought iron, and a simple pattern is used in places where ornamentation is neither required nor desired. The catalogue shows many designs of this character.

Country estates frequently require ornamental gates and fences similar to those made by this company. Area ways, stairways to basements, etc., should be protected by pipe and other rail.

We understand the Dow Iron & Wire Works send this catalogue to all those who are erecting work of this character on request.

"TOXEMENT"

A great many constructions are entirely waterproof and tight against the water. Under normal conditions, an ordinary basement wall may resist the dampness of the wall with which it comes in contact. The ordinary wall may shed the water which normally runs down the outside, but there are conditions under which the surface must resist water under pressure, and it is in places of this character that only the best work is satisfactory.

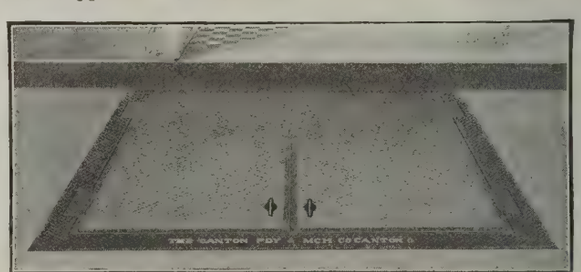
"Toxement" is a powder intended to be added to Portland cement, mortar, or concrete, under which circumstances the resulting mixture is absolutely waterproof. This material has been used with most satisfactory results for walls, cisterns, tanks, concrete blocks, stucco, etc.

"Toxement" is handled by the Garden City Sand Company, 709-711 Chamber of Commerce Building, Chicago, Ill., who will be very glad to answer questions regarding the use of "Toxement" for specification purposes where a waterproof concrete or brick surface is required.

SELF-LOCKING BURGLAR PROOF COAL CHUTES

How many architects and designers spend their chief energies on the decoration and ornamentation of the first story rooms and front, leaving the basement, which is often the working part of a building, to get along as best it may?

Few places are erected that do not necessitate taking the fuel and other supplies into the basement. This is sometimes accom-

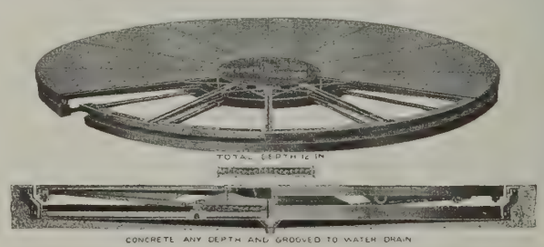


SIDEWALK DOORS.

plished laboriously by carrying the material down the stairs, and sometimes through the kitchen and first floor rooms. At times the coal is shot into the basement through a window at the risk of breaking glass, damaging the sash and scattering the coal around the yard.

The Canton Foundry & Machinery Co., Canton, O., have just issued their catalogue, "B-5," which shows a variety of coal doors and other accessories used in the well-appointed building.

We show one style of sidewalk doors which finish flush, and are provided with guards when open, to prevent accidents.



AUTOMOBILE TURNTABLE.

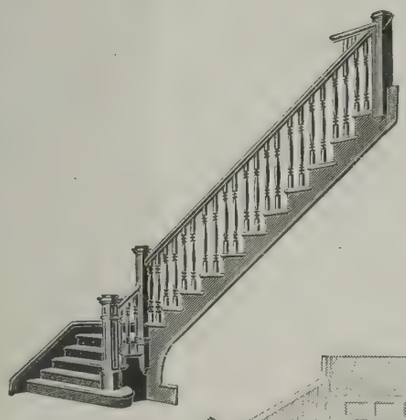
The Canton Foundry & Machinery Co. also manufacture a great variety of cast and ornamental iron work for use in buildings, stables, garages, etc. Their automobile turntables are designed upon novel lines, so that the weight is supported at a comparatively few points, making it extremely easy to turn.

Any of our readers having work of this character to install are requested to write to the Canton Foundry & Machinery Co. for booklet "B-5," and for such information as they require.

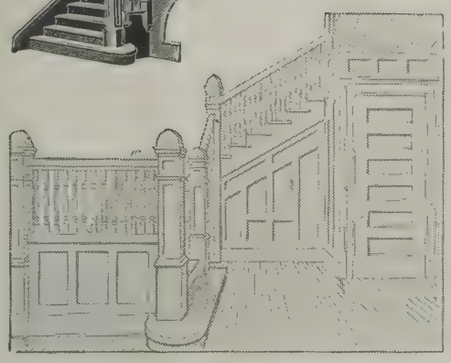
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We have *specialized* on stairs for many years. We put the best into them and still sell them from 25% to 50% cheaper than you can buy them anywhere else. ¶ Stock well seasoned and can be shipped within a week. ¶ Stair orders not machined and set up can be shipped same day we receive the order. Stairs complete and machined can be shipped within a week. Special packing by experts. Every part reaches you in apple pie order. Shipment *guaranteed* safe. A wonderful assortment can be chosen from our

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This money saving volume has added thousands upon thousands of good dollars to the bank balance of American carpenters and builders. It tells in detail—in plain English—how we save you money on all building materials. How we have saved for others by actual figures. Tells how promptly we ship, the small cost of freight to different points. It challenges comparative prices on any and *all* materials. Send for it now. Use coupon. If you wish big book of house and barn plans whose value is $5,000 reckoned by prices an architect would charge for less practical plans, send 10c to cover postage and mailing. See Coupon.

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The Fox Floor Scraping Machine

Has satisfied 8103 Carpenters and Builders and will satisfy you if you will give it a trial.

Simple in construction, durable in every detail, no parts to break, cuts into the corners right up to the baseboard, will not chatter or leave waves.

SHIPPED ON FIVE DAYS' TRIAL, freight charges prepaid. If it does the work and you are satisfied, you are to send us $25.00 If you are not satisfied, return the Scraper to us at our expense. There are 8 Knives and a full set of tools go with each Machine; weight 85 pounds; cutting edge of Knives, 3"x9".

Write us for catalog and further information.

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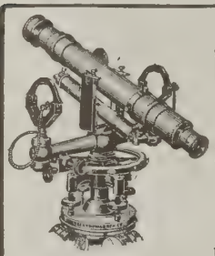
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MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

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Use "Sterling" Builders' Levels

AND SAVE BOTH

The Contractor who prides himself on the Accuracy of his work will tell you that the "STERLING" Transits and Levels are without an equal and will satisfy the most particular. There is a reason why. Write today for Illustrated Catalog.

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No lumber or nails used—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

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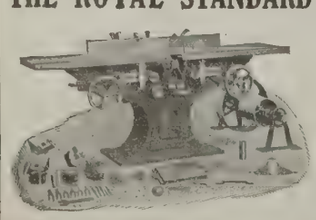
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IS THE BEST MAN ON THE JOB



for working with all kinds of saws, dadoing, grooving, rabbeting, tenoning, jointing, matching and moulding. Also has panel and other style of cutter heads.

Write for catalog showing 19 different illustrations and ways of manipulating material on this machine.

CORDESMAN-RECHTIN CO.

10 Butler St., CINCINNATI, OHIO

PORTABLE DERRICKS

The story is told of a hod carrier who told how easy his work was. He had only to carry up the brick and mortar and the bricklayer did all the work.

In modern buildings, a good part of the work consists of getting the material to the places where the mechanics can use it. This is accomplished in various ways. In small buildings, runways can be constructed so that the material is wheeled direct to the place; in



others, the use of heavy boom derricks is necessary, such as placing the stone and iron work. The hod and wheelbarrow hoists operated by power will care for a large amount of material such as brick, mortar, tile, concrete, etc., but there are many things about a building which are not easily transported by any of the above methods. For instance, window frames are usually too large to get up in the ordinary hod elevator, the lumber and flooring is in entirely too long pieces, and the placing and fitting on the elevator consumes a great deal of valuable time. It is for purposes such as these that the Taylor Portable Steel Derrick was especially designed.



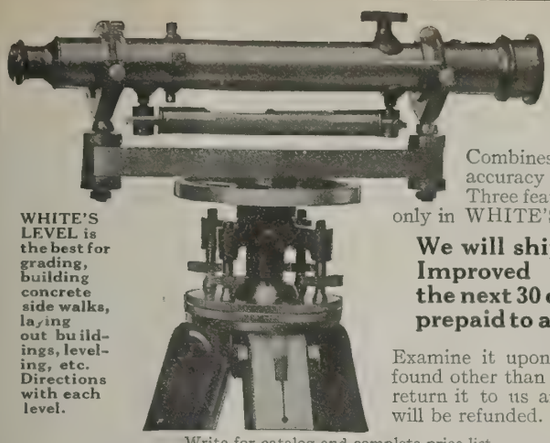
In the accompanying illustration, the first shows the derrick in the shop being tested. In these tests, a block of concrete weighing approximately a ton is lifted from the floor and swung over a complete circle. This capacity is far greater than the ordinary load which will be placed upon it in ordinary use. The second illustration shows a unique use for a derrick of this character. As will be seen, this is the New North American Building located at the corner of State and Monroe streets, Chicago, Ill., and is one of the finest type of skyscrapers. On this building two Taylor derricks were used to hoist window frames, lumber, flooring, etc. The cut shows the two Derricks, one at the 10th floor and the other on the 19th floor. The adaptability of the Taylor Derrick to work of this character makes it especially valuable as a small platform can readily be built outside the window and the material swung in through the window with little effort.

The Taylor Portable Derrick is designed to be handled by one man if necessary, and one man can carry the Derrick up a ladder to place it in position on the building.

The Taylor Derrick is also made to be fitted upon a gondola railroad car for the purpose of unloading and loading supplies and machinery. How often we see the contractor employing eight or ten men to load heavy goods where by the use of a derrick of this character the same work could be accomplished in less time by two or three men.

The uses of a derrick of this character are so many that the manufacturer, Mr. John L. Taylor, 1034 W. Lake St., Chicago, is anxious to send his new catalogue to every contractor and builder. A postal will bring it, and it is valuable in showing the great variety of work which can be accomplished.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



WHITE'S LEVEL is the best for grading, building concrete side walks, laying out buildings, leveling, etc. Directions with each level.

White's IMPROVED Level

Combines simplicity with accuracy and durability. Three features to be found only in WHITE'S LEVEL

We will ship this $45 Improved Level for the next 30 days at $40 prepaid to any address

Examine it upon receipt and if found other than we represent it, return it to us and your money will be refunded.

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Your stucco or concrete house or mill needs my coating. I've been making my coating for more than twelve years and have learned by experience the requirements of concrete, cement and stucco construction. My coating sticks where it is put and is a fire retarder.

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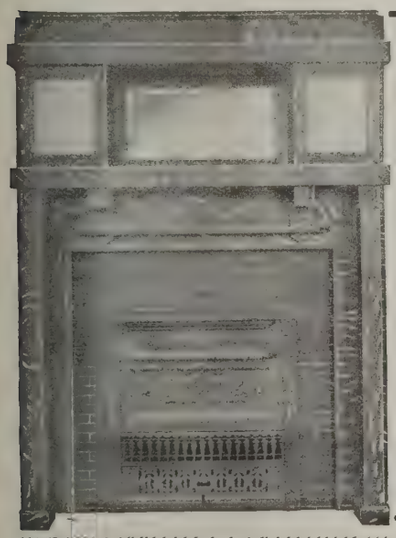


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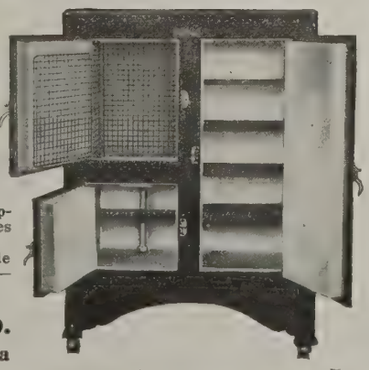
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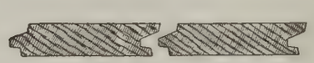
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Designers and Workers in Decorative Glass
Quality not Quantity

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Workers in Art Glass and Mosaics.
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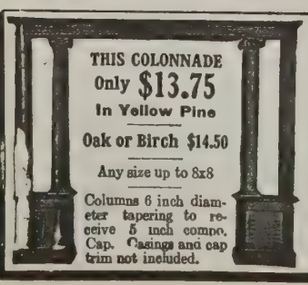


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Bertelsen Adjustable Grille Co.
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THE USE OF WATERPROOF FLAT FINISHES FOR COMPOSITION WALL BOARDS

By Frank P. Foster, Jr.

In view of the fact that composition wall boards are gaining a vogue everywhere among builders, it is of more than ordinary importance that architects, builders, contractors, interior decorators and painters should become acquainted with the best means of finishing such materials to the greatest advantage. In this connection it is interesting to note that the Glidden Varnish Company of Cleveland, Ohio, has devoted unusual attention to the development of special materials for the perfection, protection and decoration of modern structural work, including concrete and steel structures and that among the numerous products evolved as a result of their laboratory research and exhaustive practical tests are a series of special waterproof flat finishes especially adapted to composition surfaces, such as wall boards, which are rapidly becoming more and more popular. The finishes in question are made in light blue, light pink, pearl gray, cream, medium buff, golden yellow, light green, medium green, green toner, yellow toner, red toner, brown toner, and also in white, which may be tinted in any shade desired. Besides being of special value for use upon wall boards and other composition surfaces from a protective and decorative viewpoint, they are also used to great advantage in interior work on old or new plastered surfaces, whether rough, smooth or sand finished, or for metallic ceilings and wainscotings. They produce a beautiful, soft flat finish and one that is perfectly sanitary, inasmuch as it may be washed repeatedly without injury.

A sand finished surface treated to one coat of Glidden's Waterproof Flat Finish over a coat of Glidden's Alkali Proof Wall Size has been found to produce very good results. On the highest class work it is advisable to use two or three coats and to allow from two to three days between coats, according to weather and temperature conditions. These waterproof flat finishes have been found to have excellent brushing properties and covering capacity and to flow out with a full, even surface, free from brush marks. When they are applied over the alkali proof wall size on interior wall work they produce especially beautiful effects. Under ordinary conditions their covering capacity is approximately five hundred square feet to the gallon.

In applying these waterproof flat finishes they should be brushed well out over the surface so as to obtain uniform covering properties and it is essential that the surfaces over which they are applied should be dry, clean and well seasoned. Where an inexpensive yet satisfactory job is desired, it is well to use for the first coat a mix of half Alkali Proof Wall Size and half Waterproof Flat Finish in the desired color, followed by a second coat of straight waterproof flat finish. When the waterproof flat finishes are applied upon rough or sand finished plaster the material should be worked well into the pores of the surface. Upon smooth white plaster finish a priming coat composed of three parts of alkali proof wall size and one part of the color of flat finish to be used, gives good results. Where two or more coats are desired, one should use a flat finish just as it comes from the package, allowing plenty of time between coats for thorough drying.

A large, soft, black, stock brush should be used for applying the wall finishes, and the material should be well incorporated by thorough stirring before application. When applying these finishes to wood and metallic surfaces no priming coat is required. All that is necessary is to use the material as it comes from the package, after having taken proper precautions to insure the surface upon which it is to be applied being dry, clean and free from rust, grease and other foreign matter. Before applying the wall finishes to woodwork, one should see that all knots or sappy places are given a coat of pure white shellac. These flat finishes have also been used over colored wall paper with excellent results—two coats of waterproof flat finish over one coat of alkali proof wall size. Pure turpentine is used for reducing purposes.

All walls that are to be tinted should first be washed clean with soap, all cracks and crevices filled with plaster of paris. When mixing the plaster it is well to add a small amount of vinegar to the mix in order to prevent its setting too rapidly. As soon as the wall is dry, after washing, it is ready for sizing.

To prepare walls that have been painted with kalsomine or water paints of any kind they should be washed with warm water and made thoroughly clean. The most satisfactory method of accomplishing this is by means of a large paste brush or calsomining brush, for wetting the surface, and then sponging the walls after they have been thoroughly soaked. After the walls have been thoroughly cleaned, in the manner described, is the proper time to fill all cracks and crevices with plaster.

The proper treatment for walls that have been whitewashed, in order to prepare them for tinting, is to scrape off all whitewash by means of a steel brush, and, after the wall is perfectly clean, it should be well sanded and one coat of vinegar applied. After this all cracks and crevices should be filled with plaster of paris, after which the walls are ready for sizing.

New walls frequently require special treatment, as they are often very hot, having a strong absorbent tendency that practically amounts to suction. In cases of this kind, if one will see that the surface is given a strong coat of vinegar before proceeding with the sizing, no further special treatment will be required.

CORTRIGHT METAL SHINGLE ADVOCATE

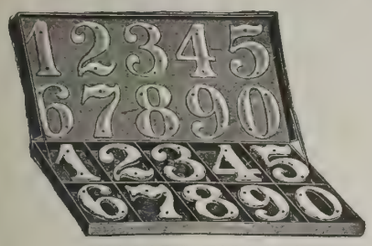
The February issue of the Cortright Metal Shingle Advocate has just arrived. This little Magazine is issued by the Cortright Metal Roofing Company, 50 N. Twenty-third street, Philadelphia, and is brim full of information for those intending to build or remodel their buildings.

It has a circulation of 35,000 each month, all sent free, the only qualification necessary for you to receive it regularly each month is to write to the Cortright Company stating that you are interested in knowing more about roofing and building problems and they will be glad to add your name to the list—do it now before you forget it.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

HARDWARE SPECIALTIES

NIAGARA METAL NUMBERS

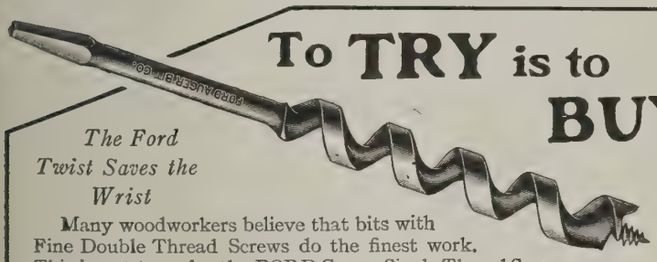


are correct in form and proportion. They are embossed round and full, in burnished Aluminum, and Brass in various finishes. Being smooth, they do not catch dust or dirt.

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Special Plates to Order in Great Variety

NIAGARA FALLS METAL STAMPING WORKS
Manufacturers of Hardware Specialties
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Niagara Sash Pulleys and Sash Fixtures, Wall and Veneer Ties, Wall Plugs, Premax Sash Chain



To TRY is to BUY

The Ford Twist Saves the Wrist

Many woodworkers believe that bits with Fine Double Thread Screws do the finest work. This is not true, for the FORD Coarse Single Thread Screw positively does finer work than a double thread ever did.

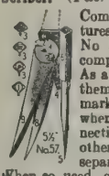
It does not crack, sliver or splinter, and bores 40% easier than any other bit. Cuts smooth and accurate in any wood from Soft Pine to Lignum Vitae.

Ask your dealer for a **genuine** FORD SINGLE LIP BIT. Try it and you'll find it the Best Bit you ever used.
Write us for FREE pocket memo book, addressing Dept. 2A.

Ford Auger Bit Company
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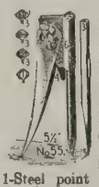
THE PEERLESS LINE
The Only Combined Compasses and Scribers that Will Hold Pencils of Any Length and of Various Shapes. Order by Mail Today!

Peerless Double Compass and Scriber. (Pat. Pending)



Combines all features of No. 30 and No 55. No other compass equals it. As a scriber, beats them all. Legs marked 8 and 9 when used in connection with each other. form entirely separate scriber. When so used, steel point No. 5 is taken out entirely. Broad point No. 9 can be swung out of the way as indicated by dotted lines. Send for circular.
Price, nickel-plated, 60 cents, postpaid. Order now.

Peerless "Stork's Beak" combined Compass and Scriber. (Pat. Pending)



Double joint and thumb screws make it most secure and rigid compass on the market.
Price, nickel-plated, 50 cents, postpaid Pencils 5 cents extra.
Explanation of figures in cuts: 1-Steel point inserted. 3-For round pencils. 4-Lever for fastening pencil. 5-Steel point. 7-7-Double locking device.

Peerless 3½ in. Scriber. Pat'd.



Broad point for plaster walls, fine woodwork, etc. Sharp point for quirks and mouldings. Adapted for extra close scribing. Steel points can be moved up or down to suit pencil
No 30. Polished steel 30c.
No. 35 Nickel-plated 35c.

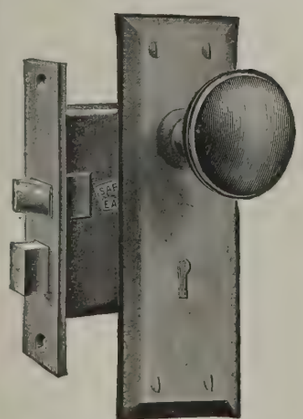
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It is a time-saver for mortise-locks.
Will not mark wood or slip upwards, nor interfere with chips. Lightest and most durable made. Gauge proper made of music wire, twenty turns to the inch.
Nickel-plated, 30c postpaid.

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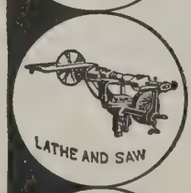
A Bigger and Easier Day's Work

Keen tools make money. When your tools are always in perfect edge you do more work, and do it easier. The way to keep tools always keen is to make it easy, quick work to sharpen them; and here's an outfit that makes the most difficult tool sharpening amazingly simple, easy and quick, as you can prove by 30 days' free trial on your own tools.

Luther Shop Tool Grinder

All steel and iron—bevel gear shaft drive in dust-proof housings—dust-proof bearings—mechanically perfected and runs easy as a sewing machine. We will send complete shop outfit consisting of grinder and 14 sharpening attachments and accessories for 30 days' free trial—no money needed, no red tape. Seventeen extra attachments, such as forge, jig and circle saws, force feed drill, lathe, etc., enable you to get full shop equipment at many times less the cost of machines to do the same work as these low-priced attachments.









Dimo-Grit Wheels Cut Steel as Emery Does Copper

Wheels of the new artificial diamond abrasive, Dimo-Grit, peel steel away in tiny shavings, instead of wearing it away like emery wheels or grindstones—no need of cooling with water, no danger of drawing temper. Twenty-five times faster than emery, 10 times more efficient than emery. Carborundum wheels also furnished. Grinding wheels make 4,000 revolutions per minute—takes but a few minutes to do grinding that would take an hour any other way. Tool rests and patent attachments give perfect bevel to twist drills, chisels, and other tools.

Write for 30 Days Free Trial Offer

Let us send you our liberal Free Trial Offer and 40-page free book telling the interesting scientific story of artificial diamond abrasives, giving points on tool sharpening, fully illustrating and describing Luther Grinders and attachments. Write today.

Luther Grinder Mfg. Co.
519 Michigan Street Milwaukee, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

REGAL BRAND SASH CORD

Regal Brand Sash Cord that has been on the market now for some time was recently submitted to the government for test, and this test of the government, which is understood to be most severe on the sash cord, was submitted to the Puritan Cordage Mills under date of January 27 with the accompanying letter:

Puritan Cordage Mills,
Louisville, Ky.

Sirs: Referring to your communication of the 11th ultimo, transmitting sample of your "REGAL Brand No. 8" sash cord, for test, I am directed by the Quartermaster General to enclose herewith copy of report of test of this material made by the Bureau of Standards.

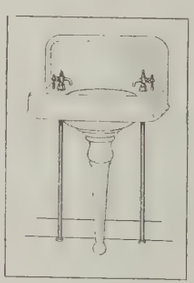
From this report of test it would appear that the sash cord in question is of good quality, and is acceptable under the specifications of this office.

Respectfully,
(Signed.) E. W. CLARK,
Captain and Quartermaster, U. S. Army.

The Puritan Cordage Mills, 1560 Story Ave., Louisville, Ky., would be glad to send a copy of this test, with a sample of the cord, to all readers of this publication. In addition to this government test, which is of course the safest guide for the consumer, this cord has been tested in many other ways, all of which tests will be as gladly sent if desired.

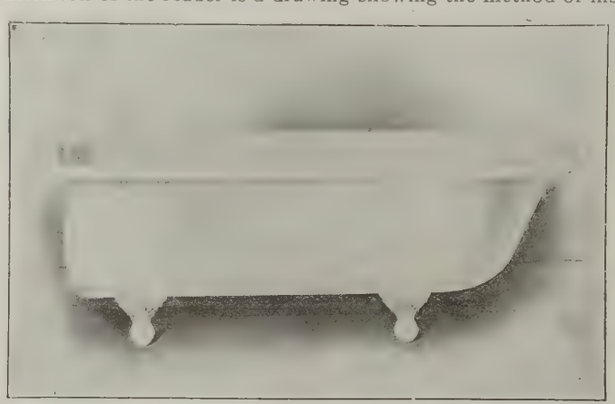
WATER AND STEAM SUPPLIES

For years past one of the most difficult things for the contractor or home owner to buy was plumbing supplies. People outside of the actual trade had not been educated to know that the installing of a bath room outfit or a complete water system could be done successfully by the average man who cared to work his brains a little. While it is true, of course, that an experienced plumber or mechanic can do better work in his own line than the average person who tackles a job for the first time, yet it is also true that there is a certain class of buildings being constructed where the owner wants all the comforts of a bath room and hot water heating. These would be entirely out of his reach if it were not for the better class of concerns which are today selling these supplies. These concerns publish catalogues which show in the plainest manner how their materials are to be installed. They are glad to give every assistance in making up sketches and lay outs for the contractor or builder who needs it. They sell goods that are just as represented, and they sell them at prices which gives the man of limited means a chance to make a better and more comfortable home for his family.



The Missouri Water & Steam Supply Company, 931 S. 6th St., St. Joseph, Mo., is one of the better class of concerns which is now selling plumbing goods, heating and lighting plants, pumps, windmills, etc., direct to the man who wants to buy.

This company issues a catalogue 12x9 inches and contains over 175 pages with over 800 illustrations. About the first thing to attract the attention of the reader is a drawing showing the method of installing supply pipes and fittings for a one-story building, using the Missouri air pressure water system. This drawing also shows the sanitary way of installing the soil pipe and fittings for the same building.



No. 23. High-Grade Roll Rim Cast Iron Enameled Iron Bath Tubs.

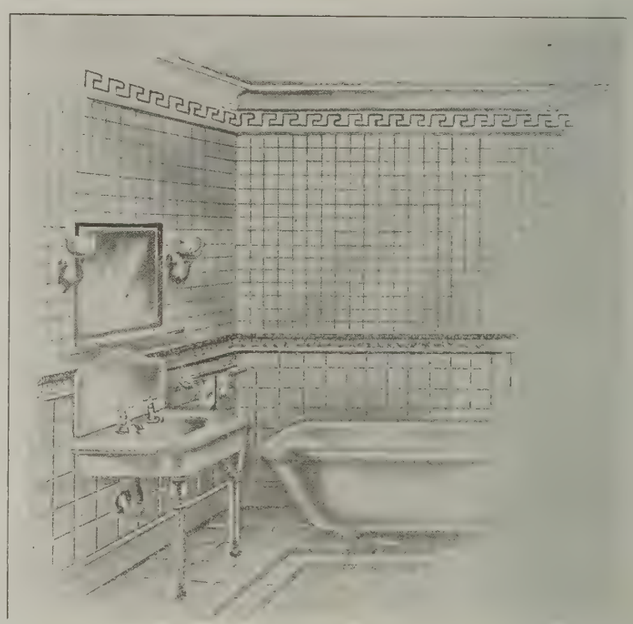
Following this is a plan along the same subject of a two-story house, and page after page of illustrations of plumbing goods, heating plants, water systems, etc. The illustrations of the bath room outfits are 7x6 inches. In fact, all through the book, the illustrations are of unusual size and clearness. Besides this large catalogue the Missouri Water & Steam Supply Company also issue a 16-page catalogue entitled "The Heating Question—What You Should Know," also catalogue No. 11 of 24 pages, entitled "Water Works for Country Homes," and a 12-page catalogue on Windmills. All of these shows prices plainly marked and at prices which will be appreciated by contractors and builders. They can be had by writing the Missouri Water & Steam Supply Company, 831 S. 6th St., St. Joseph, Mo.

ORNAMENTAL STAMPED METAL WORK

Modern machinery enables the mechanic of today to do vastly more than under the old system of handwork. A few years ago the use of stamped metal work meant making special designs by hand and stamping the work out by slow, laborious processes. On account of the cost of making dies, etc., few manufacturers had the facilities for doing the highest grade of work, and even the best were limited in the number of designs which they could supply. The builder was, therefore, confronted with the problem of either using designs not entirely adapted to the building or of paying exorbitant prices for the work.

The manufacturers, however, who persisted upon the highest grade of art metal work are meeting with success. As the result of their efforts, stamped or pressed metal ceilings of today are executed according to the highest principles of art and are made with an accuracy believed impossible a few years ago.

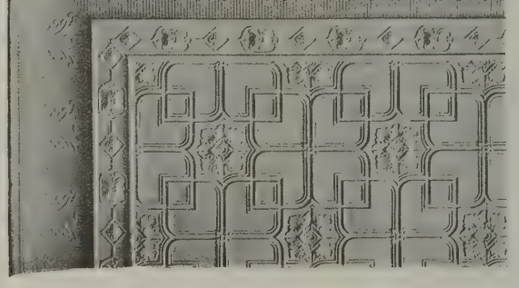
The Northrop, Coburn & Dodge Co., 30 Cherry St., New York, in their Catalogue No. 10, show a very extensive line of the highest artistic effects in stamped metal work. These goods are extensively used in hospitals, churches, schools, theaters, lodge rooms, halls, business offices, warehouses, stores and private residences. They meet the demand for a durable, incombustible surface and at the same time have a high decorative value.



The embossed surface of the metal adds greatly to the accoustic properties of the room, breaking up the echoes which are usually found in practically smooth walls and ceilings. It is hardly necessary to add the advantages of steel ceilings over wood and plaster. They eliminate the expense of repairs and the danger of annoyance of falling plaster. Their fireproof properties alone give them considerable value and the insurance rate is lowered where they are used.

One of the latest ideas as developed by this company is the use of wall decorations, as shown in the cut of the bathroom herewith. This renders the room perfectly sanitary, as it can be readily washed, cleaned and repainted.

The Northrop, Coburn & Dodge Co. have a particularly interesting catalogue, as it gives careful instructions for ordering and installing the work, as well as showing the great variety of designs. Special designs are a matter of correspondence and our readers who are interested in this work should obtain their catalogue No. 10 before placing their orders.



Amatite ROOFING

Why the Buyer of Amatite Never Complains

WHEN a man buys ordinary ready roofing he usually neglects to paint it and after three or four years he comes back to the dealer with a protest. It is human nature to neglect painting roofs.

When a man buys Amatite Roofing he lays it on his building and in three or four years it is still as good as new and does not need any paint. He forgets he has such a roof but no harm is done by that.

There is nothing to neglect in the case of Amatite. Amatite has a peculiar surface—a sort of plastic concrete made of pitch and mineral matter.

This surface is plastic enough so that the material can be rolled up into handy rolls in the usual manner and handled just like any other ready roofing. When unrolled on the roof and nailed down it presents to the weather a continuous surface of mineral matter and pitch. On this surface wind, rain, storm, heat and cold have little effect. Year after year it looks up to the sky undisturbed and unaffected. It costs nothing to maintain and relieves the owner from all responsibility.

Dealers can improve their business by selling Amatite and buyers make a good bargain when they buy it. The price of Amatite is less than that of most painted roofings of less weight and durability.

Sample and further information on request.
Address our nearest office.



Everjet Elastic Paint

A lustrous carbon black paint, very cheap, very durable—for protecting all kinds of metal and wood work.

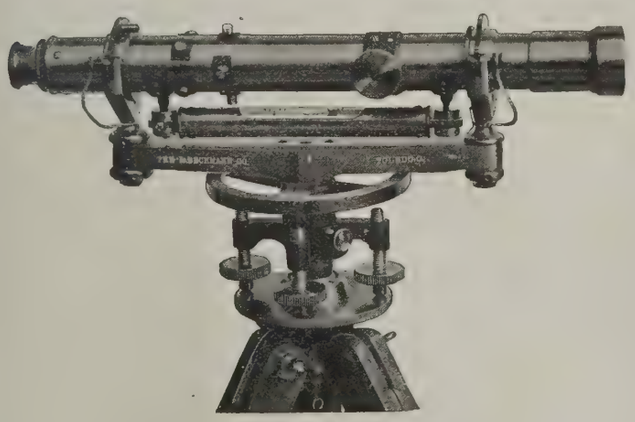
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THE BEST CONCRETE BUILDINGS

are erected with the aid of a good Level



None better than the BECKMANN Level

Our high power telescopes are especially adapted for work of this nature and will show an error of 1/8 inch in 300 feet. It will pay you to investigate our Levels.

Send for Circular W for full particulars.

The L. Beckmann Co.

Established 1874

TOLEDO OHIO

Be the Bungalow Man of Your Town



Estimated Cost $1,000. Designed by Ind Vobo.

Build With Red Cedar Shingles

"From Crest to Foundation"

Nobody knows how long they will last when properly laid. Painted or unpainted, stained or unstained, they will outlast all of us.

The pleasing beauty of shingle bungalows attracts purchasers and keeps you busy. You can secure any artistic color effect you wish by dipping them in a good stain, thus saving half the painting bill on a house. Tell your customers that Red Cedar Shingles need not be stained and should never be painted.

Our "Bungalow Book" shows 24 beautiful designs from actual photographs, with floor plans and estimated cost. Enclose 2c stamp for copy.

We have no plans or books to sell. We manufacture Washington Red Cedar Shingles, sell through local dealers only and want you to know about our product before you build.

RED CEDAR SHINGLE MANUFACTURERS' ASSOCIATION

Representing over 200 Mills
Capacity 20 Million Daily

516 White Bldg., Seattle, Wn.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

How One Builder Makes Money

¶ There lives in a little Indiana town about one hundred miles from Chicago, a builder whom we will call Jim. Jim has gained for himself a reputation for good work and honesty which gives him many a contract for a house, barn or a big roomy farm residence at a price nearly always higher than the other bids.

¶ He did not gain that reputation in a day or a week. He lost quite a lot of work at the start on account of his estimates being higher than others, but now the reputation for good workmanship, fair treatment to his customers and honesty in specifying building materials needed, are just that much capital for him. One thing that has made Jim stand out strong in his home town and locality has been his ability to tell those who are planning to build what materials to use. He has always been a close reader of the advertising in THE NATIONAL BUILDER. He has made it a point to post himself on all new materials, and to keep in touch with the better established materials as well, all of which are being specified and used extensively.

¶ Jim knows that THE NATIONAL BUILDER does its best to carry only reliable advertising. He also knows, however, that no matter what the material is, the manufacturer places in his selling arguments the best side of a subject. This is only natural. He knows also that no matter how good a material may be, it can be so placed or used that it cannot possibly live up to its specifications or claims. Therefore, he has made it a point to secure samples and catalogues of all the different things used in his trade. He has even taken the time to go through a factory or two where he has had the chance, and do a little investigating and finding out just how things were put together. All of this makes Jim able to tell the property owner what is best suited for his needs. It is such men as Jim who have made the builders' word on building subjects respected and more relied upon even than the dealer's.

¶ Thousands of dollars worth of orders for building materials, heating, lighting plants, etc., are swung from one manufacturer to another merely by the reliable up-to-date builder saying to the property owner whom he might meet on the street or be actually figuring with him on a job, "Oh, yes, I would use wall-board there instead of plaster," or "Why, yes, I suppose that 'Quick Burn' furnace you ask about might be all right, but Mr. Jones has used for years one of those 'Good Outfits' advertised in THE NATIONAL BUILDER and it has kept him warm all this cold winter—better look up the 'Good Heater' before you put in a 'Quick Burn' furnace."

¶ And so it goes, and who is there that really should know better than the man that has to put in the material, who has to know all about everything to make the best kind of a job. The builder's word is as much an authority as the architect's specifications. He should make it his business to know who are the most reliable manufacturers in everything he uses. Then there would be no mistake should the old-style dealer who never carries advertised lines try to substitute.

¶ A short time ago a property owner decided to put a new roof on his home, and having been posted up on a certain kind of roofing through the advertisements in his paper, decided on a certain kind. When he asked his dealer for it, what happened? The dealer didn't have any of that roofing, although it was an easy matter to get it. The dealer stated that the particular kind of roofing was awfully hard to find, and that he didn't know anyone who did handle it. The dealer went on to explain that even if he did carry that roofing, the buyer would not be able to tell whether it was that kind or not.

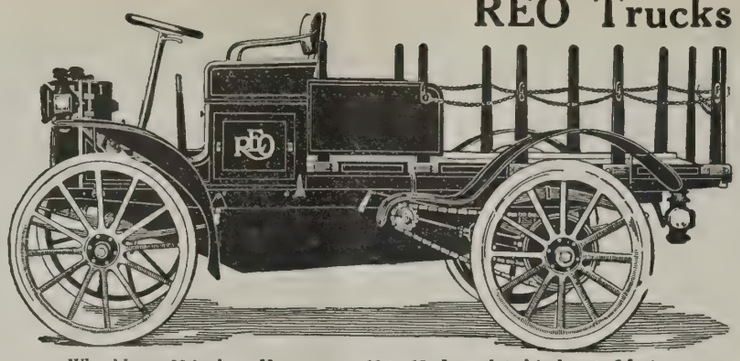
¶ All this kind of talk was handed out by the dealer simply in order to put in some other kind of roofing, which he had on hand and which the customer did not want. In this particular case, the customer decided to let his roofing job go over until the next year, thus killing an order for any kind of roofing, and also cutting some builder out of a job.

¶ So we say to our readers, Get posted on the different tools, building materials, heating plants, etc., advertised in THE NATIONAL BUILDER. When the prospective home builder asks you about the things he believes you are posted on, you will be in a position to tell him correctly.

¶ The up-to-date manufacturers are glad nowadays to educate the builders upon their materials. They realize that it is a paying investment to send out catalogues that are often really books fit to place in any man's library. Through these catalogues and the samples which are often mailed with them, every builder can be thoroughly posted. The longer that tools, materials, heating plants, etc., are advertised in THE NATIONAL BUILDER and other good papers, the more they should be specified, ordered and bought. Everyone knows that the most reliable and best things for the building trade are, with very few exceptions, those that have been and are still being advertised month after month and year after year. Advertised goods must live up to their reputation under at least ordinary conditions or disappear from the market, so get posted. Do it by starting now. Take an hour or two off and make up a neat bookcase for filing all your catalogues. Have a drawer or two for samples. Always have clean, new samples and catalogues on hand to show prospective builders. It will be easier for you to land the job. The more and better jobs you get, the better your reputation as a builder, and the more money you will make.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS,
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REO Trucks



Wheel base, 90 inches—Horsepower, 10 to 12—Length behind seat, 6 feet—
Capacity, 1,500 pounds. Front seat top, $25 extra.

Only $750

And Built by R. E. Olds

Please mark that price, and note this truck's capacity.

Most trucks which do what this truck does, cost from $1,200 up.

We are building trucks on a business basis—at a dray-wagon profit.

They are built in a separate factory, with a capacity of 5,000 trucks per year.

And they are sold through the thousand dealers established on Reo cars.

To pay more than we ask for a truck like this is rewarding inefficiency.

The Famous Designer

It goes without saying that R. E. Olds knows how to build a truck.

The dean of designers, with 25 years of experience. The builder of myriads of pleasure cars. The creator of Reo the Fifth.

Mr. Olds should be—and he doubtless is—the best qualified man in the business.

Mr. Olds' method of perfecting this truck was to put hundreds of them into use.

They were operated in city and country, on hills and plains, in all sorts of business service.

One loaded truck ran from New York to Oregon. Two carried the baggage in the Glidden Tour, from New York to Jacksonville.

These tests have now covered two years. And never has a truck of this size and capacity shown better records in service.

50 Cents a Day

This truck is built so a 12-year-old boy can drive it. There is nothing to get out of order—nothing to do but steer.

It is immensely economical. On a six months' test, covering 4,553 miles and making 3,773 stops, the cost for gasoline, oil and repairs averaged 50 cents per day.

The average of many accurate tests shows the cost of delivery by Reo truck to be 60 per cent the cost of delivery by horse.

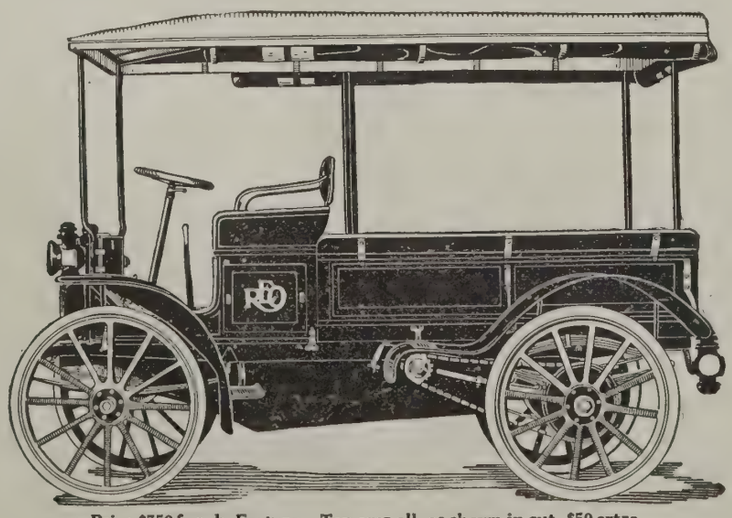
It does five times the work of a one-horse truck, and does it three times as quick.

It is always ready—never gets tired. Nothing can feaze it—heat or cold, rain or snow.

The Reo dealer—right in your town—will demonstrate the truck. He will teach your men to run it. And he is always there to take care of it.

Write us for information.

R. M. OWEN & CO., General Sales Agents for
REO MOTOR TRUCK CO., Lansing, Mich.



Price $750 f. o. b. Factory. Top over all, as shown in cut, $50 extra.

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High Lock Joint, No Possibility of a Leak. Easy to Apply.

DURABLE ORNAMENTAL FIRFPROOF

To insure prompt reply address Tile Dept. N.

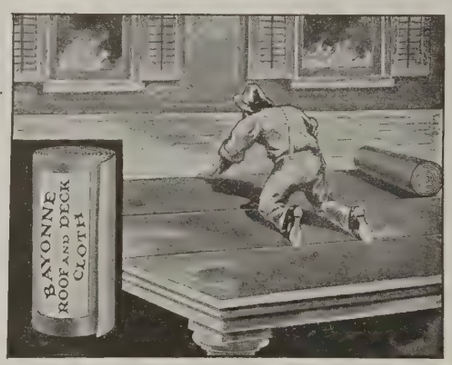
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The Kanneberg Roofing and Ceiling Co.
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Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but **one coat of paint.**
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BAYONNE or GULF STREAM
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ANOTHER CONTEST

We want every one of our readers who are interested in **Remodelling Houses** to pay particular attention to this notice.

On May first we will give a Prize of ***Ten Dollars*** to the writer of the best article on what he has done in the way of remodelling houses, barns or other buildings. Some builders make a business of making over old houses. Some do the work when they have to for a good client. What are the requirements for success in this line, and how well does it pay?

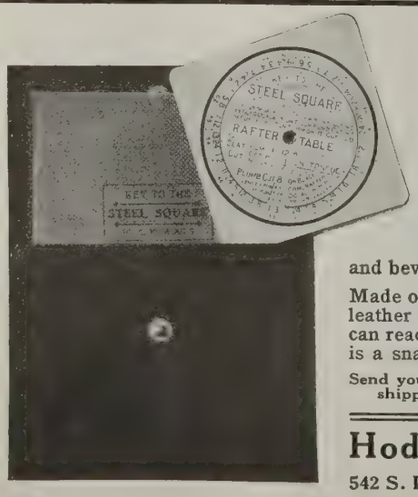
If you have photographs, before and after, or between times, send them along. Write the kind of story you like to read, and you stand a good chance for the prize. About 1000 to 1500 words will be about right for length, and as many photos or drawings as you can supply.

Only one prize will be given, but any others we can use we will pay for at our regular space rates on publication.

Get your manuscript to us by May 1st, 1912. Winner's name and article will appear in June number. **Literary Contest No. 3.**

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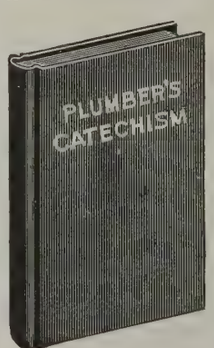
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All shapes and sizes to meet all conditions. Colors: Natural Gray, Indian Red and Slate.

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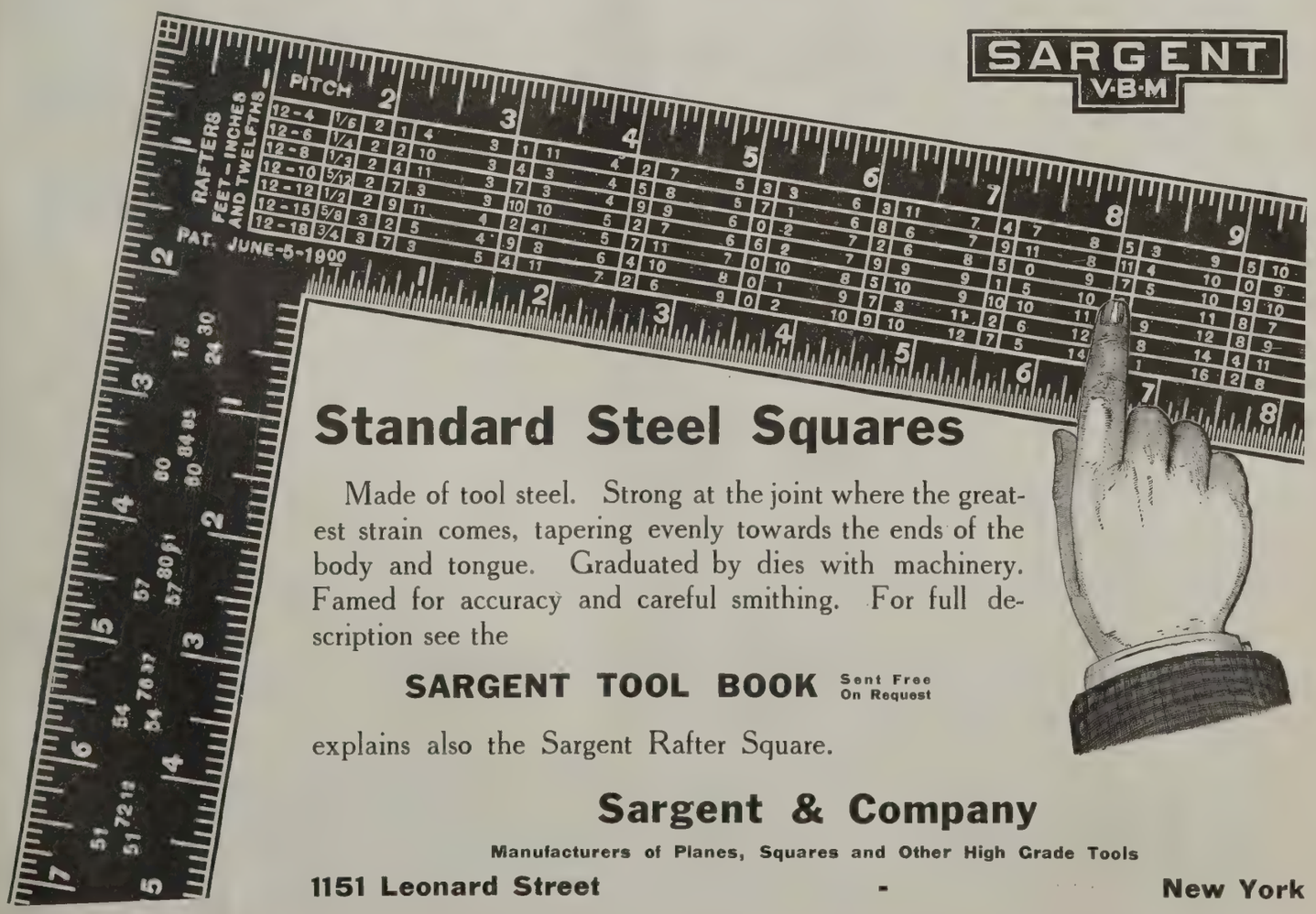
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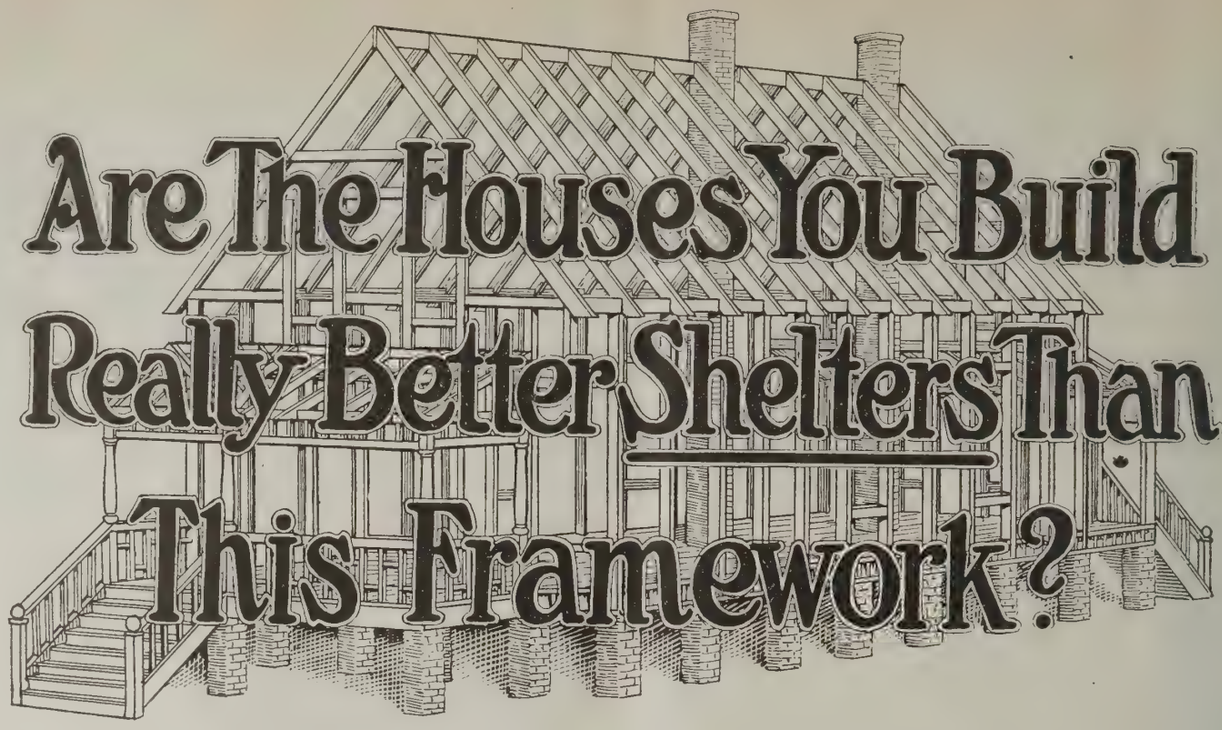
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Are The Houses You Build Really Better Shelters Than This Framework?

After all is said, isn't it true that the single word "shelter" completely covers the purpose for which any house is built? Whether you're building a detached house or an apartment, its primary requisite is that it be a **shelter**—(1) from the **public view,** (2) for the **safe-keeping** of your personal effects, (3) from the **wind, rain and snow,** and (4) from **heat** and **cold.**

(1) Curtains and blinds, (2) strong doors and locks, (3) solid walls and roofs—all do their work well. But how about **heat** and **cold?** Come, let's be frank—are your houses **really** shelters from **them?**

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the walls you build will keep cold on one side and heat on the other just as a solid black curtain keeps light and dark separate. Clapboards, sheathing, brick, hollow-tile —no matter of what material or how thick you build the walls—they **don't** insulate against heat and cold.

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There's the brief scientific fact. It shows you why Linofelt, used in walls and roof instead of building paper, will cut 40 per cent off your customer's coal bills every winter—and keep his house cool in summer as well.

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Build with Linofelt, and make your houses faithfully serve their primary purpose; make them **genuine shelters.** Write for our special booklet and complete information today. Call upon our staff of draughtsmen for any specifying you wish. There's no corner-coupon here; we want to get into **personal** touch with you. Write us fully **now.**

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For this Elegant, Massive Selected Oak or Birch, Mahogany finished Mantel.

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Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, full length or double as shown in cut.

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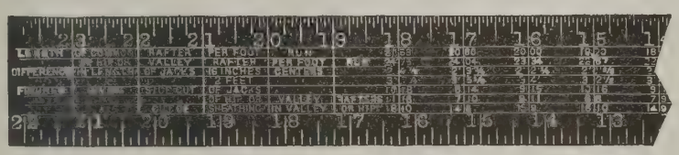
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telling how to get the lengths and cuts for Common, Hip, Valley and Jack Rafters for seventeen different pitches of roof.

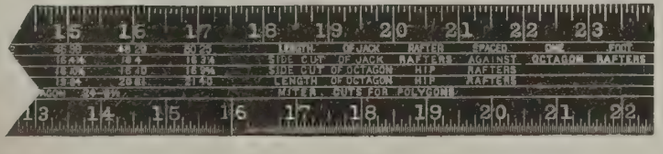
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Altogether, the "E. C. S." Carpenter Pencils are the *most satisfactory* made to-day.

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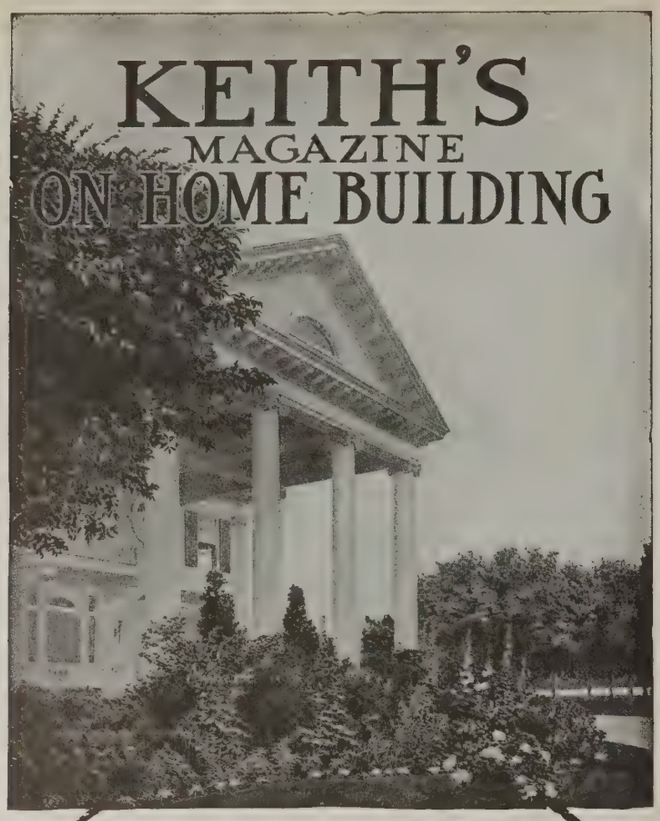
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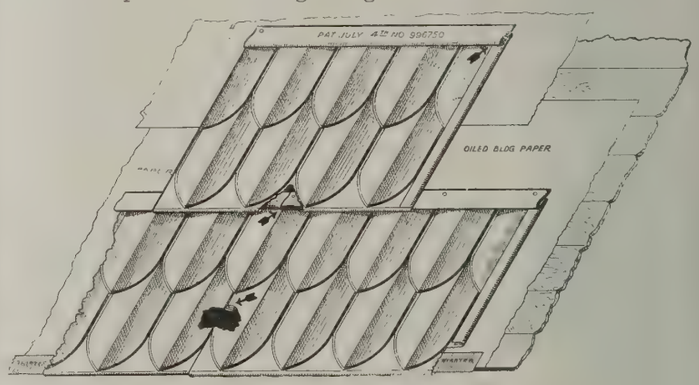
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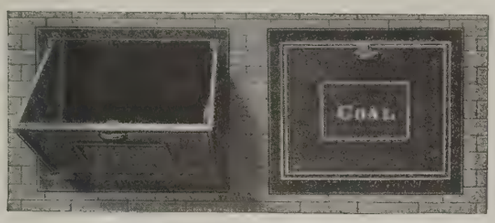
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in full or partial courses to fit your individual need. The courses cover every conceivable branch of the building trades. Conducted by a large and successful firm of Chicago architects—your lessons are supervised by them. Blue prints of buildings actually being erected in Chicago to study from. Courses are especially prepared for contractors, bricklayers, carpenters and all men in construction work. Low tuition, easy terms. No text books to buy. Send for instructive folder.

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We also teach these same courses, including architectural, mechanical and structural drafting, at our Chicago School. Day and evening classes. If interested in the resident course ask for Catalog y.



Canton Self-Locking Burglar-Proof Coal Chute

Locks automatically on being closed, and can be opened from the outside only by the key shown in the cut.

Save glass, battered sash and frames made of glass, no parts to lose. In three sizes.

Let the coal man know where to put the coal. He might dump it through the wrong window into the laundry.

Write for Booklet "B-5" containing a list of building accessories of interest to you.

THE CANTON FOUNDRY & MACHINE CO., - Canton, Ohio

THE Bessler Movable Stairway!



The Bessler Stairway in Position.

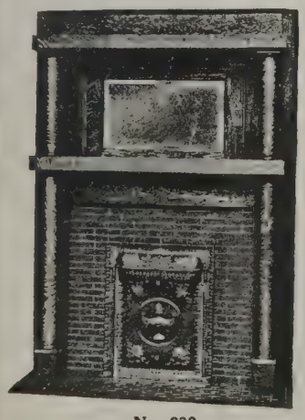
A device combining usefulness, strength and convenience.

Saves Space! Low Cost!
Strong and Durable!
Easy to Operate!
Operates Automatically!
Adds Value to House!
Reduces Fire Risks!
Secures Good Ventilation!

Write for descriptive circular and price list to

The Bessler Movable Stairway Co.
AKRON, OHIO

We Allow Contractors a Commission.



No. 239

We Offer For a Starter $24.75 Special Bargain

AT the above price we include solid oak **Mantel,** with **Tiling** and **Grate,** also **Plated Frame and Front and Ash Screen.** MANTEL CATALOGS sent free on application. Write for one.

MOORMANN & OTTEN, 611-613 Main Street CINCINNATI, OHIO



YOU Can Rise to a Position of Power

To hold a position of power you need to know more about your particular business than the men who work beside you.

The secret of power and success is to **know everything about something.**

Right along these lines the International Correspondence Schools train men for Positions of Power.

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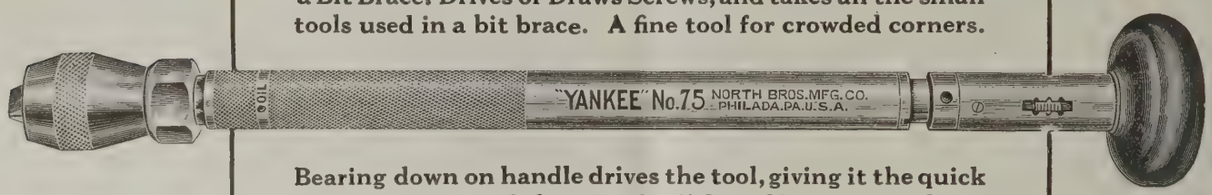
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Another New "YANKEE" PUSH BRACE No. 75

Drives Wood Augers up to 3-8 in. easier and quicker than a Bit Brace. Drives or Draws Screws, and takes all the small tools used in a bit brace. A fine tool for crowded corners.



Bearing down on handle drives the tool, giving it the quick and easy motion of the "Yankee" Spiral Drivers. Built for good service—it's a "Yankee." Let your dealer show you one

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FOR PERFECT MITRES

LANGDON ACME MITRE BOX

Langdon Mitre Boxes, when supplied with back saws fitted by ourselves, are warranted to give better service than any similar tool on the market.

Some of the advantages over older models are: In longer guides, which hold the saw steadier, and these guides are provided with elevators to hold the saw stationary, when desired, above the work.

In a graduated arc showing the various angles commonly used.

In supporting guides, to hold the work in place.

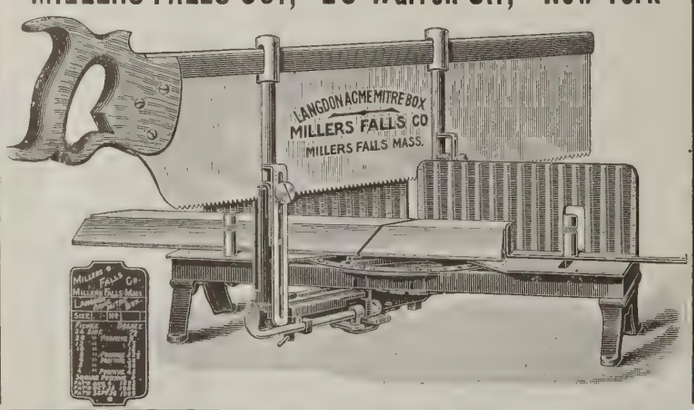
In an appliance for quicker adjustment of extension lever.

In a length gauge for duplicate lengths.

These boxes are made in three sizes and put up with varying sizes of saws, ranging from 22″x4″ to 30″x5″.

Send for the FREE book, "Tool Practice."

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Milk's Pocket Miter Box



OF ALUMINUM

Cannot break.

Guaranteed accurate.

Requires no bench.

Always with you, in the pocket. Make cut while holding moulding. No extra saw to pay for, use any fine saw you have. Ask your dealer, if you can not get it, send $1.00 for it on one weeks trial.

SATISFACTION or your money back.

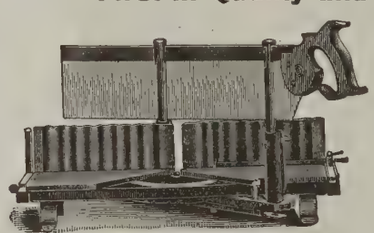
The Parsons Tool Mfg. Co., PARSONS, KAN. U. S. A.

2030 CORNING

GOODELL MITRE BOX

Made of STEEL - Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

GOODELL MFG. CO., Greenfield, Mass.

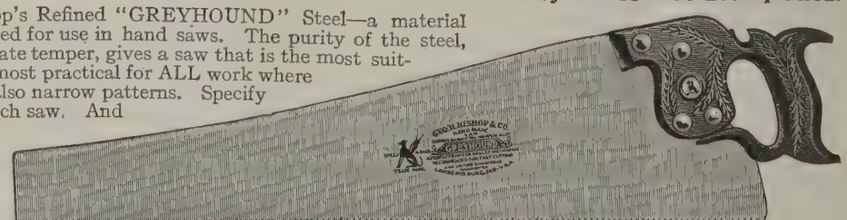
GREYHOUND HAND SAWS

SPEED & EASE

TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

Order one today and let us take all the risk. If you want literature first, write us.

GEO. H. BISHOP & CO., Makers

Lawrenceburg, Indiana

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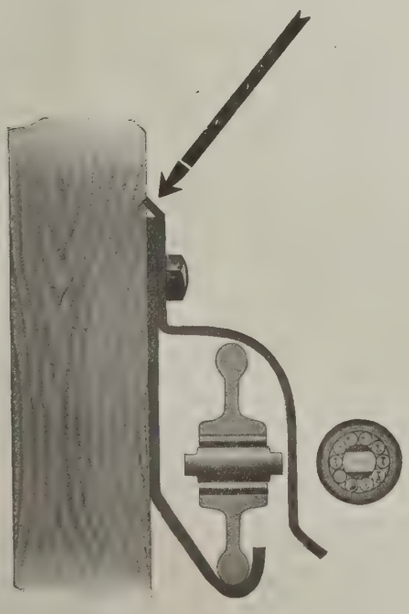
WE INITIATE—NEVER IMITATE

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No. 66 RIGID

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TITE-FIT

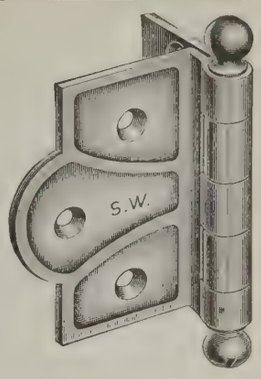


A complete description will be found in our general catalog, a copy of which will be sent on request.

National Mfg. Co.
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Saves Time and Labor and Pleases the Owner

STANLEY'S
No. 160
Ornamental Surface Butt



makes it unnecessary to mortise the door as the ornamental leaf can be screwed on the surface. The pins are reversible and the tip is slotted for the screw driver which is packed in each box, and can be afterwards fastened to your key ring.

Write for our Booklet "N" showing a few of our lines of Wrought Steel Hardware

THE STANLEY WORKS, New Britain, Conn.

Miller's Two Minute
Lever Lock Mortiser

Actual Use of Tool ½ Minute



Chisels the opening for Locks. Over 5000 Mortisers Sold Mean Something.

One builder wrote us: "I was surprised, I did not think it would do the work so quick. This is the best I ever saw."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

MILLER'S TWO MINUTE LOCK MORTISERS
GUARANTEED

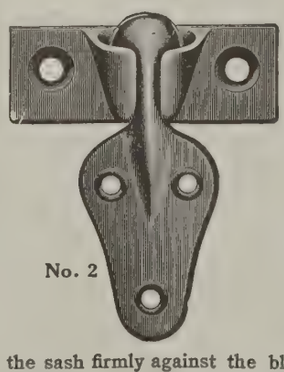
to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs, and similar work which we will send you postpaid for ***75 cents.***

A. W. MILLER MFG. CO.

Main Office and Factory
RIVERSIDE, CAL.

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No. 2

Storm Sash and Screen Hanger No. 1 and 2

The time is drawing near at hand when carpenters and builders begin putting up storm sash and it might be well to say that the best and most convenient goods are always the cheapest in the end.

We make the only Ball and Socket Hangers on the market. One trial will convince you that they are the best.



No. 1

Our No. 1 Fastener is made of the best steel wire. It holds the sash firmly against the blind stop and prevents rattling.

Manufactured by the

Diehl Novelty Company, SHEBOYGAN, WISCONSIN

Send for Catalogue

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Complete Bath Room Outfits

$38.95 — TO — $175

Modern Plumbing at ½ ordinary cost

Water Pressure Systems, from $42.00 up. Hot Water and Steam Plants. Save $100 to $250 on a Heating System. Plans free with every plant. Pipe, Valves, Fittings at Lowest Prices. All high grade, strictly guaranteed goods.

Write for Catalogue N—It will aid you in getting the best and at prices which cannot be equaled considering quality of materials

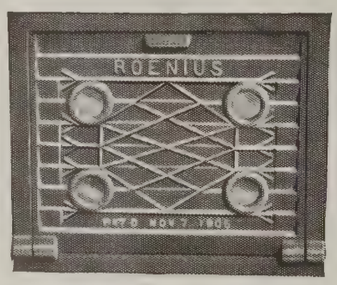
JOHN HARDIN CO.

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Doing Business for 25 Years at the Same Old Address and in the Same Square Old Way of Treating Our Customers

4541-4549 COTTAGE GROVE AVE., CHICAGO, ILL.

Roenius Wood and Coal CHUTES

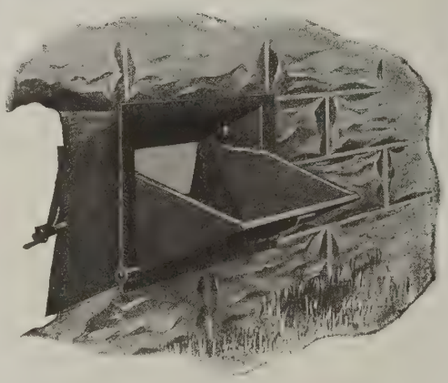


ROENIUS CHUTES

Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.

Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY

MANUFACTURERS

Grand Rapids, Wisconsin

EVER GET STUNG

with a furnace? Did the man tell you his was the only, only, **best** furnace—that it would heat you up to eighty in 40 below zero weather—on three tons a winter—and did he separate you from your dollars before you had a chance to test it; and then didn't you wish you had your money back?

We won't sting you? We don't want your money till you are satisfied with our furnace, **after a test.**

HERE ARE THE TERMS

We will ship you a furnace, with all pipes, registers, etc., made to fit your house, first submitting complete plan for your approval.

We will **Prepay Freight Charges** to your station.

When the outfit arrives, check it up and pay your local banker the purchase price. He will hold it till **January First,** subject to your test. You set up the equipment, and use it and test it till that time. If it doesn't work according to our guarantee—if you think it isn't worth our price—or more—send it back (we pay freight both ways) and the banker will return your money. We send full plan and directions for setting, also all tools, if you need them,

There's no trick about this offer. It has been in force for years and it means just a **Square, Straight Deal,** direct between maker and user,

We make a splendid furnace—welded steel—gas and dust tight, economical, simple and all that. We describe it fully in a 48 page book which we send free. Ask for one, and read it, before you buy anything in this line.

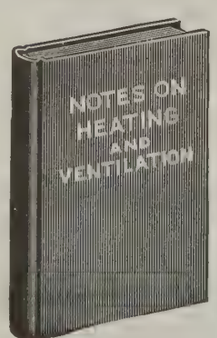
You'll buy comfort and save money.

HESS WARMING & VENTILATING CO.

1207 Tacoma Building, Chicago, Illinois

Makers of White Steel Medicine Cabinets.

Notes on Heating and Ventilation



Price, $2.00 delivered

By *John R. Allen,* M. Am. Soc. Heating and Ventilating Eng.; Junior Professor Mechanical Engineering, University of Michigan, Ann Arbor.

Second Edition; Bound in Cloth, 6¾x4¾ in.; 200 pp.

This book is a resume of lectures delivered to classes in heating and ventilation at the University of Michigan. It is written primarily for the steamfitter and designer of heating systems It presupposes a knowledge of the construction and operation of the simpler forms of heating systems. Reduced to as brief a form as possible, so that readers can readily find notes or data desired.

Contents—Theory of heat and measurement of temperature. Heat losses from buildings; rules for determining heat losses in different constructions. Different forms of heating systems; their advantages, disadvantages and relative economy. The design of a direct steam heating system. The design of an indirect heating system. Steam boilers and steam piping. Carrying pipes underground, etc.

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THE SIMPLEX Improved Mixer

1912 Model

3 Hoppers, continuous feed, rolling mix, low-down steel frame, simple, strong and accurate—





"THE MILES"

No. 5, Down Face Wet Concrete Block Machine

Makes Stone in Lengths 4, 6, 8, 10, 12, 16, 18, 20, 22, 24 inches. In Widths 4, 6, 8, 10, 12 inches. In Height 4, 6, 8 inches. ∴ ∴ ∴ ∴

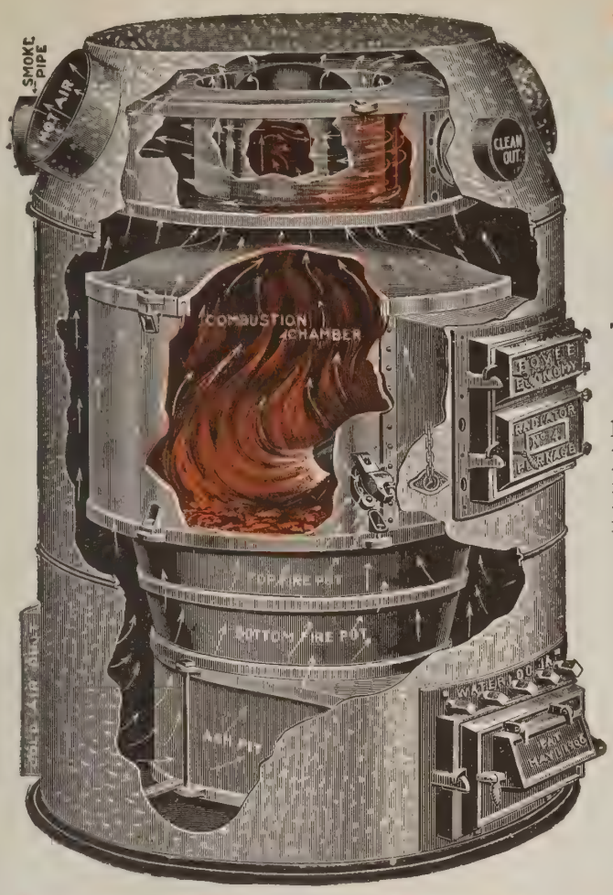
Also Angle Stone, Circle Stone, Gable Stone, Hollow or Solid Stone

THE CONTRACTOR'S FRIEND. Simple, Strong and Rapid. LOWEST IN PRICE.

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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



Bovee Furnaces

At Manufacturers' Prices

Will Save You One-Half the Price and One-Half the Fuel

The Bovee is the Only Furnace That Has a Perfect Ventilating System for Every Part of the House

Don't compare our prices with small, cheap furnaces that do not have one-half the capacity. Measure the firepot, measure the combustion chamber, measure the compound circulating radiator. Note the long travel of heat before reaching smoke pipe. See why the Bovee Furnaces **last longer, use less fuel** and **cost less** in comparison with other furnaces of equal size and capacity.

SPECIAL PRICES

Three-Run Heating Plant for Residences

Including Pipe-Registers and All Fittings

40-inch Furnace

20-inch Firepot, 28-inch Combustion Chamber. Heats 10,000 feet. Price **$65**

These furnaces will carry from 5 to 8 pipes, which can be added at small cost whan desired.

Store, Church and School Furnaces

One large run directly over furnace and two cold-air plates, including pipe-registers and fittings.

54-Inch Furnace

32-inch Firepot, 40-inch Combustion Chamber. Heats 40,000 feet. Price, **$95**

Horizontal Furnaces, with equal heating capacity, when desired. More heating pipes can be added at small cost. Prices on larger furnaces for any kind of buildings furnished on application.

Many Thousands of Bovee Economy Furnaces Sold

and not a single complaint of lack of **Heating Capacity** during all of the past severe winter. The Bovee Furnaces have the greatest heating capacity for the size of the firepot and **Fuel Consumption** of any furnace sold. **Examine Carefully** the construction as shown by the **X-Ray Cut** and see for yourself why the Bovee Furnace requires less fuel than other furnaces; see the large size of the **Combustion Chamber** and long travel of the heat into and around the large **Circulating Radiator,** which has six complete heating surfaces that conserve the utmost amount of heat from fuel consumed. We make the radiating chambers of our furnaces as large as it is possible to do in comparison to the firebox or the fuel-consuming parts.

SPECIFY AND INSTALL BOVEE FURNACES

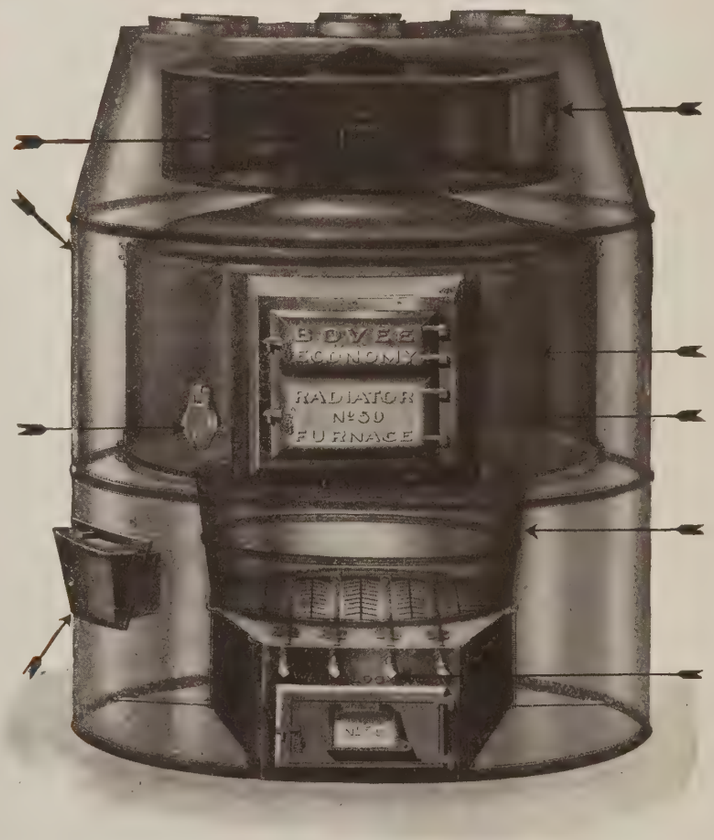
and keep the heating plant profit in your own pocket. Besides you will give the property owner a splendid heating plant at a very reasonable cost and one he will be well satisfied with.

We ship everything **Cut to Fit** and **Ready to Install,** with directions so plain that you can't go wrong.

SEND FOR FREE CATALOGUE

IT WILL BE WORTH YOUR WHILE

X-RAY VIEW OF BOVEE'S ECONOMY FURNACE



LOOK RIGHT INTO THIS FURNACE

And see why we are offering you a furnace that WILL SAVE YOU ONE-THIRD OF YOUR FUEL and last longer than any furnace you can buy.

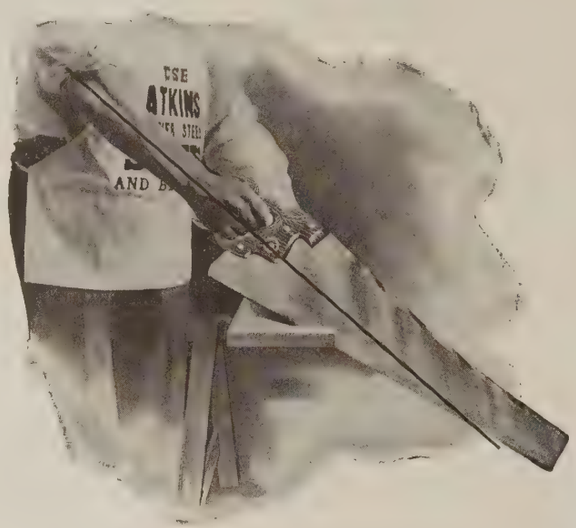
BOVEE GRINDER & FURNACE WORKS

60 Eighth Street
WATERLOO, IOWA

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Two Famous Silver Steel Saws

We want to call particular attention to the two Saws shown in the pictures below. Both blades are of SILVER STEEL—both are Taper Ground—both are genuine ATKINS SILVER STEEL SAWS—BUT the handles are constructed on entirely different principles.



No. 53. Genuine Perfection Handle



No. 51. Old Style Handle

"Pay Your Money and Take Your Choice"

ATKINS No. 53

The picture to the left shows ATKINS No. 53 SILVER STEEL SAW equipped with ATKINS Genuine Perfection Handle and illustrates plainly why this type of handle is easiest on the saw arm. While it may feel strange to the beginner—a few days use will demonstrate that the Perfection Handle is the most *scientifically* constructed and much easier on the saw arm than any other style.

Note the line running through the saw arm straight through the blade to the cutting edge. See how every ounce of power is directed to the point of contact. Observe the wrist and saw arm, how easily and naturally the blade drops into its work without pressure.

ATKINS No. 51

If you are under the impression that all ATKINS SAWS are made with the Perfection Handle, we wish to particularly call your attention to the saw shown to the right. This handle is similar to the old straight across handle that you may have been using heretofore. Note the saw arm in this case and see that the pressure back of the saw arm is *not* directed on the cutting teeth, but rather to the back of the saw. Notice this wrist and see how it is necessary to push downward in order to secure proper contact. But even with this old style handle, the No. 51 is superior to any other, because the blade is made of genuine SILVER STEEL (our own exclusive formula) and is Taper Ground, which enables it to run free and easy, even in wet lumber, with but little set.

If you do not wish to try the Perfection Handle, then try the No. 51. Either of these saws or any of our other popular numbers may be purchased through your regular dealer, who should order for you from his wholesale house in case he does not carry them in stock. If he will not order for you, let us know and we will see that you are taken care of. Be sure to see that our name, E. C. ATKINS & COMPANY, and the words, "SILVER STEEL," are on the blade. None other are genuine.

OUR FREE OFFER

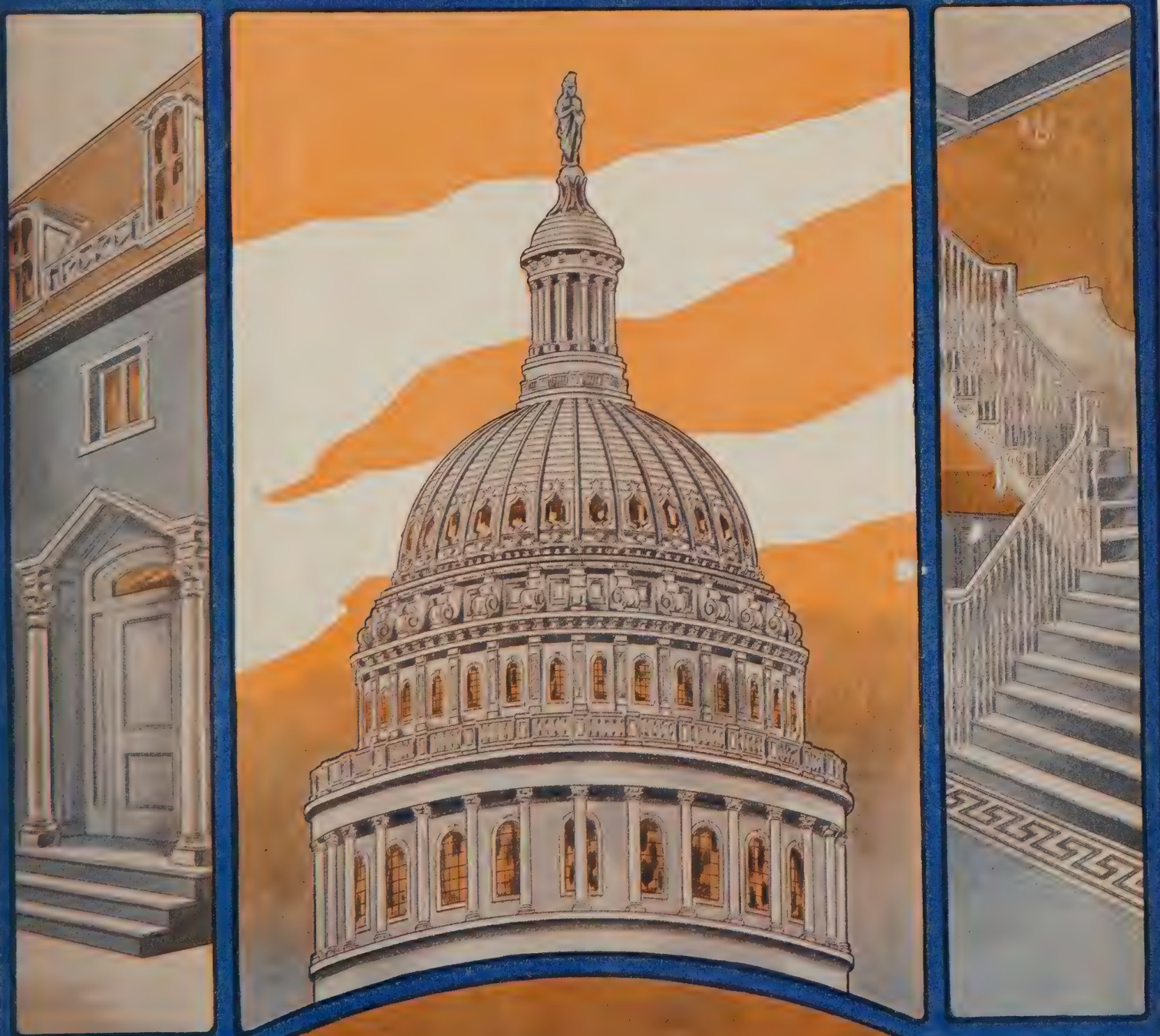
We are securing the names of high class mechanics who appreciate fine tools and if you will send us ten cents in stamps to pay postage, we will mail you one of our fine carpenter's nail aprons, Saw Sense Book, Time Book, and a great deal of useful information on the purchase and care of saws. Write today and learn "Who's Who" in the saw world.

E. C. ATKINS & CO., *Inc.*

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THE NATIONAL BUILDER



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APRIL, 1912

DISSTON TRIUMPH SAW-SET



Patented Oct. 31, 1899.

SPECIALLY ADAPTED FOR HAND SAWS, CROSS-CUT SAWS, CIRCULAR SAWS AND ALL SMALL SAWS.

THE IDEA embodied in this Saw-Set is one that will commend itself to every user of a saw-setting tool. The principal feature is the use of two plungers operated by the two levers or handles; pressure on the lower lever forcing plunger "D" against the body of the saw, thus holding it rigidly in position and preventing slipping, whilst a continuation of the pressure on the upper lever operates plunger "C" in setting the tooth.

In action it is easy and powerful, and while it will perfectly set wide and heavy saws, it is also particularly adapted for narrow blades, such as web saws, narrow band saws, etc. If the gauge "B" is properly adjusted, the result will be a uniformity of set that cannot be obtained by any other hand set.

Another important point is the head of the Set is made open, enabling the operator to quickly adjust the Saw-Set to the tooth, the work being in plain view at all times. The gauge "B," for regulating depth of set, has a wider bearing than in most saw-sets, thus doing away with the tendency to incline the tool to one side or the other, which would give an uneven set to the teeth. The anvil "E" is fitted with four bevelled surfaces, suitable for different sizes of teeth.

IN OPERATING First adjust the anvil so that the bevel most suitable for the size tooth to be set is brought into position, hang the Saw-Set on the saw so that the gauge "B" rests on the teeth; adjust this gauge for the depth of set to be given, by the use of set-screw "A." Use care not to go too deeply into the body of the tooth, as all of the set should be in the point itself. Taking too deep a hold is liable to distort the body of the blade or break out the teeth. The top of plunger "C" should be in line with the top of tooth to be set.

We claim this to be the best Hand Set ever put on the market, and a trial will convince any one of its superior merits. If the instructions as to adjustment are carried out the results will be entirely satisfactory to the operator.

The **Triumph Saw-Set** is manufactured in three sizes, the smaller size, No. 28, being suitable for Hand Saws, Back Saws, Web Saws, narrow Band Saws, etc.; the medium size, No. 18, for small Circular Saws, etc., and the large size, No. 8, for Cross-cut Saws, Circular Saws, etc.

Made only in POLISHED FINISH.

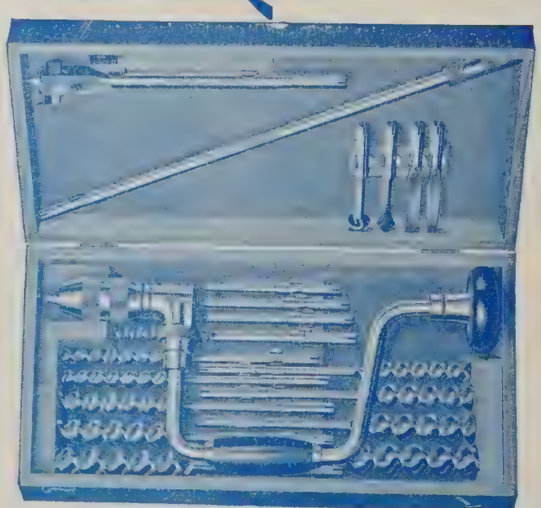
HENRY DISSTON & SONS

INCORPORATED

KEYSTONE SAW, TOOL, STEEL AND FILE WORKS PHILADELPHIA

The Best for Half a Century

A MAN IS KNOWN BY THE TOOLS HE USES



If he can take pride in his tools, his *work* is generally worth taking pride in.

The new RUSSELL JENNINGS PRECISION TOOLS, with turned shanks, are tools that any man will be proud of, and the results he can produce with them will certainly please him. These tools are the well-known Russell Jennings bits, with the correct double twist, extension lip, and screw point, and *with the new turned shank.* Other Precision tools are a new solid head expansive bit, with a cutter that can't creep, a bit extension that stays in line and can't pull out of the brace chuck, and screwdrivers, countersinks, etc.

Sold separately or in sets.



Send for Our New Bulletin

If your dealer can't show you a set let us know

RUSSELL JENNINGS MFG. CO.

Chester, Conn.

21-83

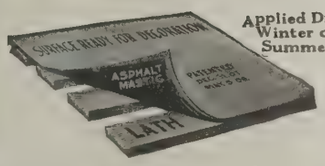
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Bishopric Wall Board Used in Finest Institutions



Beautiful and sanitary interior of hospital made with Bishopric Wall Board. Any of the handsome wall effects so popular for schools, churches, colleges, public buildings, etc., can be obtained with Bishopric Wall Board. It is especially successful in panels

Send for Big Free Sample—New Book of Home and Building Plans—Special Proposition to Contractors and Builders



Applied Dry, Winter or Summer

Shows Construction of Bishopric Wall Board.

Bishopric Wall Board is the sensation of the building world. There seems to be no limit to its uses.

It makes the finest walls in Hospitals, Schools, Churches, Public Buildings, Theatres, Hotels. As well as the finest Residences, Cottages, Bungalows, Apartments, Offices.

It is the handsomest and most durable wall for Offices, Garages, Amusement Buildings, Boat and Bath Houses, etc.

In fact the Contractor or Builder who acquaints his clients with Bishopric *develops* no end of new business.

Better Than Plaster—Costs Far Less to Apply

The old fashioned plaster wall does not excel Bishopric Wall Board in smoothness. It does not compare with Bishopric Wall Board in durability,—air proof, moisture proof, vermin proof and fire resisting quality.

Takes Any Finish—Paint, Paper, Burlap or Wall Textiles

You can finish a room in any style with Bishopric.

Any man who can drive nails can apply it in any kind of weather.

And it is *at once* ready for the decorators—no waiting for setting or drying.

It is the 20th century wall—

The Only Wall Board Stiffened by Laths

Bishopric Wall Board is made of Asphalt-Mastic (toughened asphalt), in which laths are imbedded. Surfaced with high grade, sized card board. Asphalt-Mastic does not burn. It thus makes a fire-resisting wall.

Bishopric Wall Board is the only wall board stiffened by laths. Positively cannot warp, swell or crack. Laths hold it perfectly rigid and flat, making spirit level walls and ceilings for all time. Don't have a Wall Board that has no laths to keep it from swelling, warping or drawing away from the joints.

A Score of Jobs Await Bishopric Wall Board in Your Community

Bishopric Wall Board can be used to remodel any house—make a new room anywhere—no mess—no bother to family.

Close up your attic and make a comfortable room with it. Make a new partition with Bishopric Wall Board. Finish the porch—ceil and wall the cellar with it. Make a warm, comfortable workshop in any building.

Write for Our Special Proposition

New business awaits every contractor and builder and dealer who recommends Bishopric Wall Board.

Fill out the coupon or write us at once. Let us show you how Bishopric Wall Board will fill in your dull seasons, and make your year profitable right straight through.

Our new book of Home and Building Plans shows you wall effects with Bishopric Wall Board that will astonish you. Let us send it to you. Address

The Mastic Wall Board & Roofing Mfg. Co.
320 Este Avenue **Cincinnati, Ohio, U. S. A.**

CARPENTERS AND BUILDERS COUPON

The Mastic Wall Board and Roofing Mfg. Co.
320 Este Avenue, Cincinnati, Ohio

Send me Free, sample of Bishopric Wall Board. Your New Book of Home and Building Plans and your Special Proposition to Carpenters and Builders. This places me under no obligation whatever.

Name.....

Post Office.....State.....

MAIL IT TODAY

BISHOPRIC WALL BOARD AND SHEATHING

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The "ABC" of BEAVER BOARD Construction

The fourth of a series of twelve monthly talks to carpenters about the practical use of Beaver Board, the pure-wood-fibre wall and ceiling material that is durable, economical, artistic; has none of the disadvantages of lath, plaster and wall paper; and is appropriate to any type of building, new or old.*

Beaver Board is essentially a proposition for carpenters and builders.

CHAPTER IV

Beaver Board for Attics and Cellars

Take the man with the seven-room house.

He needs more room—wishes he had it—can't get it—a new house is out of the question—so is an addition, for either his pocketbook or his lot is too small.

"See here," you say to him, "Let me build two or three new rooms *within* your house. With Beaver Board.

"I'll make you in your attic a bedroom, or two of them; a study; a billiard room, a maid's room—whatever you want.

"Down cellar I'll build you a store-room, laundry, summer kitchen, toilet—whatever you want.

"All out of Beaver Board—and attractive, warm in winter, cool in summer, dry and cheerful.

"Cost? Only a trifle."

You Can Put Up Beaver Board; Any Carpenter Can

Beaver Board's application to walls and ceilings is simply a case of hammer, nails and ordinary intelligence.

In old buildings nail it over the lath and plaster or, if the studding is exposed, directly upon it. In new buildings, of course, the studding is always exposed.

There's no trick in *Beaver Boarding;* and no perplexing list of rules to follow. We only advise a few precautions, of which these are samples:

Don't fail to work out your panel arrangement.

Don't nail *Beaver Board* closer than ⅜ of an inch from the edge of the panels.

Don't place nails at edges more than 3 inches apart.

Don't place *Beaver Board* where it will absorb moisture before using.

Don't put up *Beaver Board* until all necessary headers and furring strips have been set in between the studs and rafters.

Don't paint *Beaver Board* until it has been well sized.

We'll Help You to Avoid Mistakes

We maintain an expensive Architectural Department for your benefit. For the asking we'll plan the whole job for you and give you estimates also.

Your problem, if it is only that of *Beaver Boarding* a 10x11 corner in an attic or cellar will be given just as thorough attention as the other fellow's 12-story office building job.

When an attic is *Beaver Boarded*, it is no longer cold in winter and unbearably hot in summer.

When a cellar or basement is *Beaver Boarded*, it ceases to be a cold, damp, repellant vault.

Just glance at the photographs at the right. They best tell the story.

Beaver Board Arguments for the Carpenter

Beaver Board is economical. It suits any kind or sort of building. It retards heat, cold and sound. It doesn't crack, check or deteriorate with age.

Beaver Board, while not fire-proof, is fire-retarding.

There's no muss or litter in applying *Beaver Board.*

**These chapters began in the January number. If you have missed any of them, write us and we'll send you back chapters.*

Beaver Board's endless possibilities for all kinds of uses are fully described in our free booklet, "*Beaver Board* and Its Uses," with many pictures of different interiors. Write for it today.

The BEAVER COMPANY of BUFFALO
446 Beaver Road, Buffalo, N. Y., U. S. A.

The BEAVER COMPANY, LIMITED
386 Beaver Avenue, Ottawa, Canada
16 Eastcheap, London, E. C.



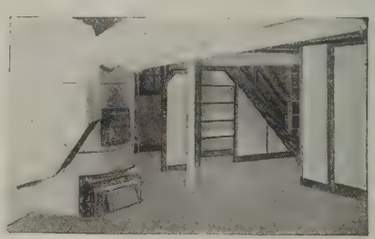
This cheery Beaver Board *attic bedroom is in the home of Mr. Harry Lewis, Beaver Falls, N. Y.*



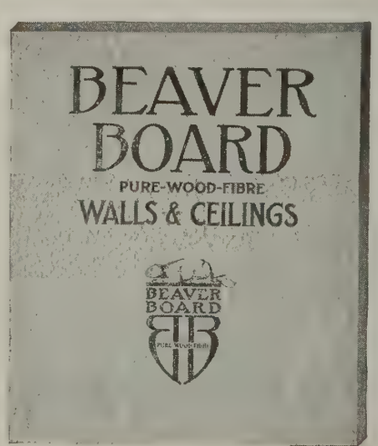
This is another bit of attic-transformation Beaver Board *was responsible for in the home of Mr. Lewis.*



This is one of many attics that have been made pleasant and livable by Beaver Board *walls and ceilings.*



In this case, the owner has used Beaver Board *in his cellar, for walls, partitions, fruit closet, and other convenient purposes.*



A sample of Beaver Board, *showing its pebbled surface, which so lends itself to painting.*

Look for this trade-mark on the back of every panel.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.







FIVE THOUSAND CARPENTERS HAVE ASKED FOR AND RECEIVED SAMPLES OF

UTILITY WALL BOARD

A large majority of them are using Utility Wall Board in the houses and other buildings that they are putting up. Every wide-awake carpenter and builder appreciates the convenience and economy of Utility Wall Board. It appeals to him because it is so easy to put on—so tough and durable—so easily adapted to every type of building—because it does away with all the muss and bother and delay of lath and plaster—because it gives universal and lasting satisfaction wherever it is used.

Utility Wall Board is moisture proof. It does not warp or crack. It is put on directly over the studding—or over old plaster. It will stay on as long as the building lasts.

If you haven't had your free sample, write for it today.
Also for the illustrated book.

THE HEPPES COMPANY

4502 FILLMORE ST.
CHICAGO, ILLINOIS



How This Contractor Got the Job at Highest Price

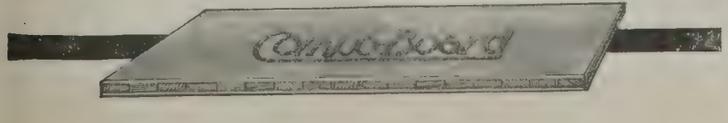
There's a money-making suggestion here for you.

"I commenced a job this morning which I got although I was the highest bidder. My bid was accepted on account of being able to complete the work fifteen days sooner than the other contractor, because I am using Compo-Board * * * Here is what happened on another job. Compo-Board delivered yesterday at 3 p. m.—put up at 11 a. m. today, papered at 2 p. m.—and the room will be occupied tonight. I have used Compo-Board on cold, damp walls and it has given entire satisfaction." John B. Walls, Philadelphia, Pa.

You can afford to specify or recommend only a wall board that will give the greatest satisfaction. You're safe in recommending Compo-Board. It's not only impervious to heat, cold, moisture, vermin, not only fire-resisting and non-warping, strong and durable, but it has several exclusive features. Can be papered, painted or kalsomined just as satisfactorily as a plastered wall, with or without panels.

Send your name on a postal card for free booklet and sample. Learn why the government and others who know prefer Compo-Board. It may be the most profitable postal card you ever wrote.

Northwestern Compo-Board Co.
5776 Lyndale Ave. No. Minneapolis, Minn.



Johnston's DULL KOTE PAINT

PAINT Wall Board

In order that it be SANITARY, BEAUTIFUL and LASTING

If every Architect, Contractor and Owner in the country knew of the REAL MERIT and ECONOMY of Wall Board and the decorative and artistic possibilities of this material when finished with

Johnston's WASHABLE Dull Kote Paint

we assure you more Wall Board would be sold and a dozen factories could not supply the demand for Dull Kote Paint.

Write for free color folder and suggestions for Interior Decoration. It will show you why you should specify and buy JOHNSTON'S Dull Kote Paints.



The R. F. Johnston Paint Co.
Pearl and Main Streets
CINCINNATI, OHIO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

UNCLE SAM SPEAKS ANOTHER GOOD WORD FOR

"THE WOOD ETERNAL" **CYPRESS** *"THE WOOD ETERNAL"*

Department of Agriculture, Forest Service, Bulletin 95, Page 44, issued June 30, 1911, says of *Cypress:*

"The properties which fit it for such wide use are the freedom of the wood from knots and other defects . . . and the *long period which the wood may be expected to last.* To this might be added handsome appearance, which frequently has much to do with popularizing a wood."



Further on CYPRESS, the same Government Report says: "The wood contains little resin and thus affords *a good surface for paint,* which it holds well . . . It is a popular wood where it is subjected to dampness and heat. It shrinks, swells or warps but little . . . For the parts of houses exposed to the weather it serves equally well."



Both quotations above are from Bulletin 95 (page 44), U. S. Dept. of Agr. (Forest Service), June 30, 1911.

"The Money You Don't Have to Spend on Repairs is ALL PROFIT."

When planning new improvements or repairs to old ones, just remember—*"With CYPRESS you BUILD BUT ONCE."*

WRITE TODAY for VOLUME ONE of the CYPRESS POCKET LIBRARY, with Full Text of OFFICIAL GOVERNMENT REPORT. *Also Full List of 31 Other Volumes.* (FREE on request.)

Let our "ALL ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1212 HIBERNIA BANK BUILDING, NEW ORLEANS, LA.

INSIST ON CYPRESS AT YOUR LOCAL DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*



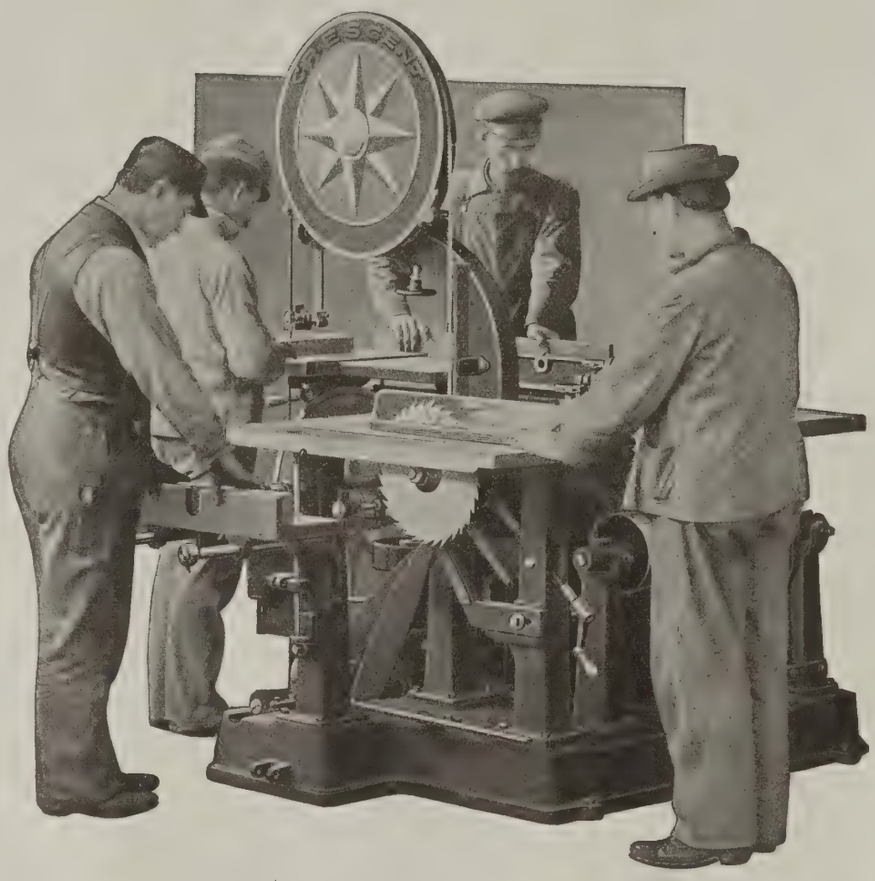
PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

See How Easily Four Men Can Work on The No. 51 Crescent Universal Wood Worker Without Interfering With Each Other

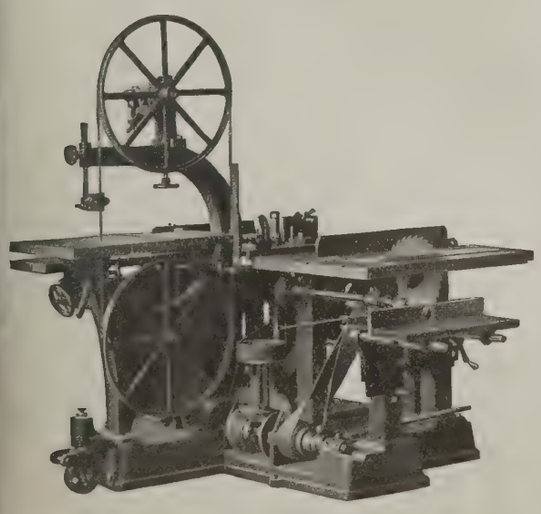
EACH man has absolute control of his own machine, independent of any other. He can start or stop it at will and he can handle his work without hindering his fellow workmen.

Your competitors are investigating the merits of this splendid machine, because they are looking for a machine that will enable them to cut down the cost of their work and increase profits. The No. 51 **CRESCENT** Universal wood worker is the machine that will accomplish this.

Keep in advance of competition and put in this tool, as it will enable you to turn out a greater variety of work than anything you have ever had offered to you. It has special features of construction that make it impossible to compare the machine with any other combination wood worker on the market.



With a machine of this kind in his shop or out on a job a contractor is sure to increase his profits. The machine is better built than any variety wood worker or any combination machine you have ever examined. Each part has its own independent adjustments. The fundamental principle of each machine is identical with larger machines of the same kind.



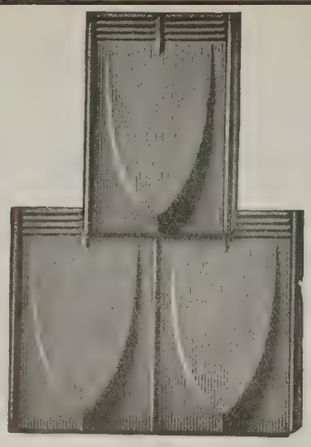
When you buy this machine you have a complete planing mill instantly at your command. If the combination machine you bought does not come up to your recommendations, look into the merits of this tool. It will please you. If for various reasons you have not investigated the merits of combination machines, send for the circular anyway. You will find something of interest in it and besides we want you to know all about the tool.

If you are interested in our general line ask for catalogue of band saw, saw tables, shapers, jointers, variety wood workers, planers swing saws, disk grinders and borers.

THE CRESCENT MACHINE COMPANY

10 Main St., LEETONIA, OHIO, U. S. A.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



STYLE B.
Showing Method of Laying

"TITELOCK" METAL SHINGLES

Fire, Water and Lightning Proof

ASK FOR SAMPLES AND CATALOG

Milwaukee Corrugating Co.

MILWAUKEE, WIS. KANSAS CITY, MO.



STYLE B. With Ridge and Hip Finish.

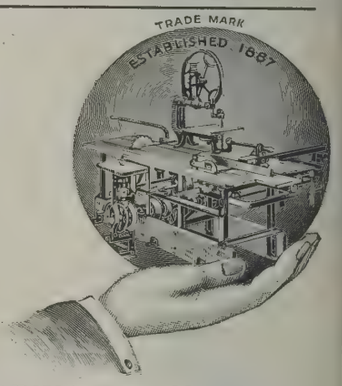


$125.00 Buys Four Machines { A Band Saw, A Saw Bench, An 8" Jointer & Planer, A Mortiser and Borer }

This solid cast iron UNIVERSAL WOODWORKER is the biggest value ever offered. We furnish the machine complete at this price including tools, belting, heavy base with wheels, one of which swivels so that a man can move the machine easily. It consists of four of the principal machines used in a mill all set up ready for instant use. Why buy a wooden or angle frame machine that must be set up each time you want to use it? Here is a guaranteed superior machine for one-third to one-half the price others ask. It is a better value in every way. We guarantee it absolutely and will refund your money if you are not perfectly satisfied. You should see our illustrated literature on this wonderful proposition before you buy a WOODWORKER. *Write To-day.*

THE TANNEWITZ WORKS
317 NORTH FRONT STREET
GRAND RAPIDS, - MICHIGAN

PARKS' WOODWORKING MACHINES



CIRCULAR SAW, JOINTER, MOULDER, BAND SAW, SHAPER, SWING CUT-OFF SAW, GROOVER and BORING MACHINE — all set ready for use.

It is Parks who for twenty-five years has been putting out the most practical combinations—convenient in operation and most effective in use—in large quantities — at a price you can afford to pay.

Ask for Catalogs and see the many designs of Foot, Hand and Belt Power—also our Portable outfit.

THE PARKS' BALL BEARING MACHINE CO.
Knowlton and Fergus Streets CINCINNATI, OHIO, U.S.A.

THE SIMPLEX Improved Mixer
1912 Model

3 Hoppers, continuous feed, rolling mix, low-down steel frame, simple, strong and accurate—





"THE MILES"
No. 5, Down Face Wet Concrete Block Machine

Makes Stone in Lengths 4, 6, 8, 10, 12, 16, 18, 20, 22, 24 inches. In Widths 4, 6, 8, 10, 12 inches. In Height 4, 6, 8 inches.

Also Angle Stone, Circle Stone, Gable Stone, Hollow or Solid Stone

THE CONTRACTOR'S FRIEND. Simple, Strong and Rapid. LOWEST IN PRICE.

Write for New 1912 Catalogue

THE MILES MFG. CO., Inc. 303 E. Franklin St. JACKSON, MICH.

To Keep Out Dampness

Paint Your Concrete and Brick Buildings with TOCH BROS.

R. I. W. PAINT

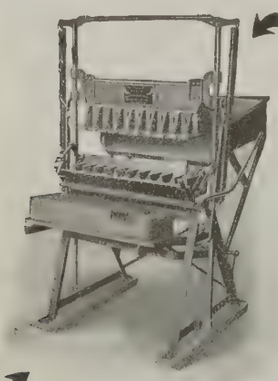
"REMEMBER IT'S WATERPROOF"

and your cement floors with TOCH BROS. CEMENT FILLER and FLOOR PAINT, Pat'd.

Proof Against Water, Acid, Fumes or Alkali

SPECIAL ELASTIC COMPOUND for EACH SPECIFIC PURPOSE

The Garden City Sand Co.
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MAKE CEMENT BRICK

Our "Crescent" Vertical Tamping Brick Machine will establish a big and profitable business for you. Cement bricks are rapidly replacing clay bricks, also cement blocks, owing to their beauty, durability and low cost of production. You get a handsome price for artistic brick.

Get our Illustrated Catalog and lowest prices. It will be an "eye-opener" to you.

It will pay you to act at once.

We also manufacture Continuous Mixers, Sewer Pipe and Tile Molds, Power Tile Machines, etc., etc.

RABER & LANG MFG. CO., 819 MILL ST. KENDALLVILLE, IND.

A FREE BOOK

On Concrete Machinery

BUILDING BLOCKS
BRICK
PORCHES
CHIMNEYS
DRAIN TILE
SEWER PIPE
SILO BLOCKS
AND OTHERS

It isn't exactly a catalogue, because it gives you the cost of making concrete Blocks, Bricks, Porches and Chimneys. It tells all about the profits in making Drain Tile for farmers. The advantage of drainage, etc.

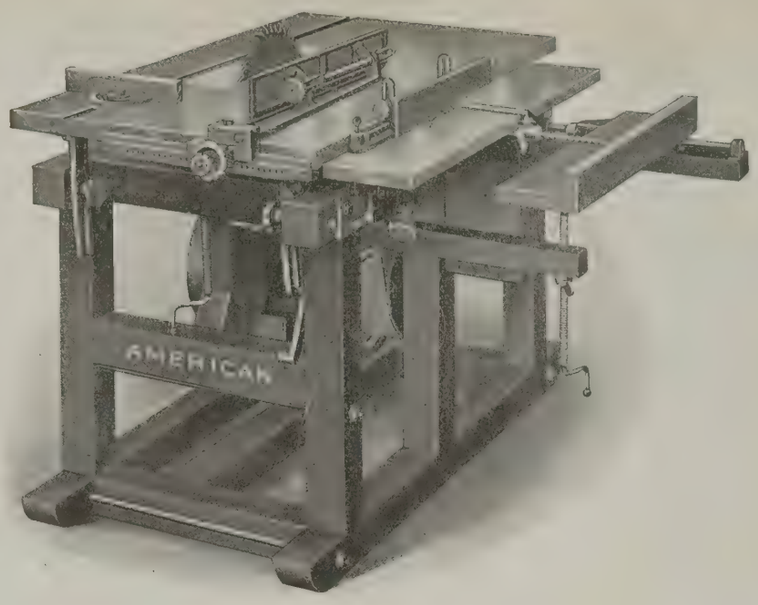
You ought to have this book if you are interested in concrete. Sixty-four pages of illustrations and interesting reading. Send at once, today, a postal will do.



W. E. DUNN MFG. CO., 4135 Fillmore St., Chicago

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

More
Better
Cheaper
} Work



Less { Cost
Time
Trouble

BIGGER PROFITS WITH AN

"AMERICAN" CONTRACTORS' PORTABLE VARIETY WOOD-WORKER

Here is the machine you have been waiting for, Mr. Contractor—a simple, sturdy, reliable little planing mill that you can take from job to job, right on the work—**at a price that brings it within the reach of every one.**

In the American Variety Wood-Worker you really get three machines—each capable of a great variety of work—each independent of the other—each so arranged that a man can work at it without interfering with the men on the other two machines.

Note that last feature particularly—the "American" is a three-man machine, with three times the capacity and usefulness of any mere saw bench.

As a matter of fact you can frame, build, trim and finish an average house with the "American" Wood-Worker and save enough on that one job to more than pay for the machine. Here are the capabilities of the "American:"

On its saw table or bench you have a rip saw, cut-off saw and mitre saw, a dado and gaining machine, a grooving machine and a rabbitter. So much for the rougher class of work.

At one side of the table is a 6-inch jointer and planer; matcher bits and moulding cutters can be inserted for all shapes. A sander drum can be substituted for the jointer head; and a disc sander can be mounted on the spindle. An emery wheel is furnished, for grinding tools.

The boring table has a 6-inch feed and a vertical adjustment of 3½ inches. For grinding or disk sanding it supports the work.

And remember that all these functions are combined in a solid, compact, self-contained, durable machine, with power built in (gasoline engine or electric motor), easily moved anywhere, ready for work at a moment's notice, right on the job.

You are after the big profits of building. You want a reputation for rapid work and good work. An "American" Variety Wood-Worker will help you to realize all this. You will find it a permanently profitable investment.

You should have the "American" Circular.

AMERICAN SAW MILL MACHINERY CO.

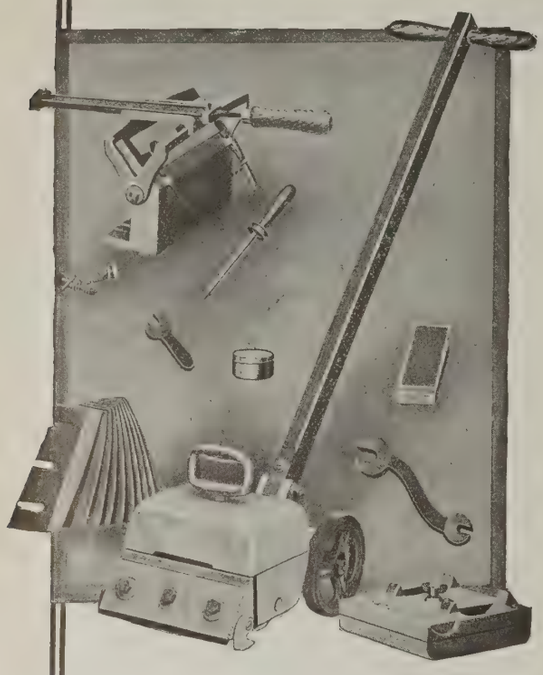
80 Laight Street, HACKETTSTOWN, N. J. **1650 Hudson Terminal, NEW YORK CITY**

BUILDERS OF

SAW MILLS AND WOOD-WORKING MACHINERY

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

OVER $100,000.00



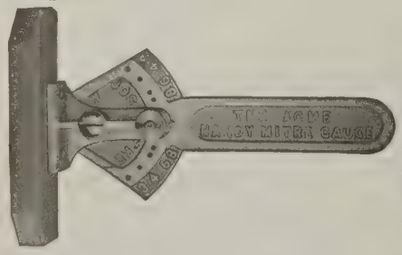
Has been SAVED by USERS of the

Acme Floor Scraping Outfit

during the past five years. Thousands of machines are now in daily operation, and every mail brings letters from users commenting upon the satisfactory work their outfits are doing and the vast amounts of labor expense they are saving.

Now, Mr. Contractor, you do not have to rely upon what I say regarding the merits of my machines, but I want you to let me send an outfit to you on **one week's free trial,** and you can then let the machines demonstrate on your own work just what they can do. If, after working with the equipment for one week, you are not convinced that the same will save you many dollars, and do your floor scraping better than it was ever done before, just pack up the machines, return them to me, and you will owe me nothing.

Write to-day for booklet and full details of my proposition.



The Acme Handy Mitre Gauge

is another labor saving tool. It is absolutely accurate, can be set at any angle and fits in the pocket where it is always ready for instant use. If your dealer does not carry them in stock, then write to me for circular describing this wonderful little tool.

JOSEPH MIOTKE

249 Lake Street : : Milwaukee, Wis.

The Standard Portable Combination Woodworker

Nine Machines in One Equipped with **6 H. P. Engine**

Send for Illustrated Catalogue

ATLANTIC ENGINE CO., Inc.

Mercer Street **Meadville, Pa.**

Canadian Office Bridgeburg, Ont.



MARSTON'S Hand and Foot Power CIRCULAR SAW

Iron frame, 36 inches high. Center part of top is made of iron accurately planed with grooves on each side of saw for gauges to slide in. Steel shafts and best babbitt metal boxes. Gears are all machine cut from solid iron. Boring table and side treadle. Two 7-inch saws and two crank handles with each machine. Weight, complete, 350 pounds.

SEND FOR CATALOG

J. M. MARSTON & CO., 193 Ruggles Street BOSTON, - MASS.

HUTHER BROS. PATENT GROOVER OR DADO HEAD

WILL SAVE COST IN THREE DAYS USE



Showing Arrangement of Cutters.

Can Be Used on Any Circular Saw Mandrel

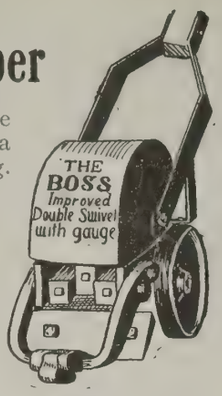
For cutting any width groove from ⅛″ to 2″ or over. Will cut a perfect groove, either with or across the grain, and leave edges smooth. Will ship to any responsible firm on ten days' approval; if not satisfactory you are at liberty to return at our expense. We also make a specialty of concave ground smooth cutting circular Mitre Saws, for either rip or cross cut; Grooving Saws for all kinds of special work; Lock Corner Cutters, Concave Saws, Etc.

HUTHER BROS. SAW MFG. CO. 500 University Ave. **Rochester, N.Y.**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

It Works Like a Plane

The Boss Floor Scraper



The Boss is the only Floor Scraper made that will plane a floor without leaving a square cut where knife first starts cutting. **Why?** Because the Boss is made with a gage on front to which is attached a pear-shaped wheel which raises when the machine is pulled and lets the knife down gradually.

The Boss can be set for any thickness of shaving, it also can be set for any shearing cut, right or left, up or down, to suit the kind of lumber.

It is guaranteed to give absolute satisfaction.

G. J. Kepplinger, MAIN OFFICE Dwight, Ill.

Manufactured also in Canada

Do You Use

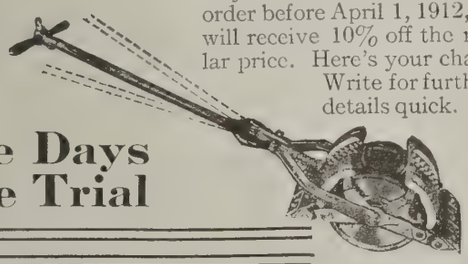
The WEBER DOUBLE ACTING Floor Scraper

No? Read This Offer

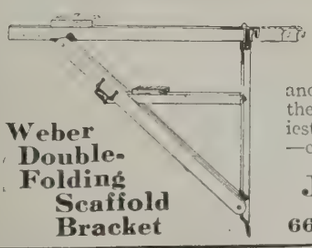
Send for a Weber Floor Scraper on five days' free trial. Give it the hardest floor scraping test you can. If it doesn't suit you, return it at our expense.

10 % Off on All Orders Received Before April 1st

If you like it and will give an order before April 1, 1912, you will receive 10% off the regular price. Here's your chance. Write for further details quick.



Five Days Free Trial



Weber Double-Folding Scaffold Bracket

Saves One-third Of Your Time

and money. Any contractor who has used them will tell you they are the best, handiest brackets made. Very light and strong—can't swing. Write for details.

JOHN F. WEBER

President Weber Mfg. Co.
661 71st Ave., West Allis, Wis.

How Would You Feel

If you paid twice as much for a floor scraper as your competitor and his machine worked just as fast and as perfectly as yours? And then because your machine had more frills on it that got out of whack, while his being of simple construction was always ready for work—wouldn't you get sore?

I Am Talking About FLOOR SCRAPERS

Most of them cost you from $45.00 to $90.00. That's too much. You are paying for the frills. **It's the knife that does the work**—and when you have a good knife in a well-balanced, smooth-running body—that's what you are looking for.

Only the Other day I Tried to Persuade

a very busy contractor to get a new scraper. He had bought one from us seven years ago. "What's the use," he said; "mine is first-class in every way and does the work." He has a Fox Scraper. I couldn't sell him another, because he's satisfied.

The Fox Floor Scraping Machine

is built of the very best material and will last a lifetime. It is so perfectly balanced that when in operation, 85% of the weight is resting on the blade. It will not chatter or leave waves. **It does the work, and the price is only $25.00.**

The Knives Are Made From the Best Quality of Steel

tempered by our own process. A set of 8 with each machine.
Shipped freight charges prepaid on a week's trial; return it if it is not satisfactory.
Order today.

F. W. CAMPION, MANAGER

FOX SUPPLY CO., MANUFACTURERS

115-123 King Street, BROOKLYN, WISCONSIN

Mechanical Requirements of a perfect Floor Surfacing Machine:

ADAPTABILITY:

a—For use on old, varnished or new floors.
b—For use in large or small rooms.
c—For use in buildings under construction and not equipped with power.
d—For both scraping and sandpapering.

ADJUSTABILITY:

a—OF THE SCRAPER HEAD—
1—For the reversible shear cut.
2—Up and down to fit every angle that a scraper edge may be turned to.
3—To scrape corners and close to baseboards.
4—To use entire edge before resharpening.
5—For simple, quick and easy resharpening, without removal of blade.
6—For sandpapering attachment.

b—OF THE OPERATING HANDLE—
1—To an easy working position according to height of the operator.
2—For use in very small rooms or halls.

c—OF THE WEIGHTS—to conform with any size of scraper edge that may be required—for light or heavy cutting—to prevent waves on all kinds of work—to do the work in the easiest practical way.

EFFICIENCY:

a—In Weight to insure a smooth wide cut.
b—In Motive Power to insure ease of operation, great capacity and A-1 quality of work.

? ? ?

Now, how would you like to own such a machine? There's only one made that really fills the bill—that is the

TRIPLE "A" SPRING-DRIVEN FLOOR SMOOTHER



THIS IS THE MACHINE that you and every other contractor in the business needs, so don't let the grass grow under your feet—send for full particulars now.

THE PRICE is right and the machine will earn its cost for you on practically every job. It will last a lifetime.

SENT ON A WEEK'S FREE TRIAL.

Triple "A" Machine Company

24 N. Clark Street, CHICAGO

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Northwestern Concrete Machinery



Cone Batch Mixing Machine

Low loading intake cuts labor costs—open drum—self-cleaning features—variable discharge—all sizes. Strongest and simplest construction known. Steam, gasoline or electric motor power.



Wood Frame Batch Mixing Machine

Low priced machine for use of the man who needs a mixer for occasional jobs. A minute batch mixer, handling wet or dry mix. Strongly constructed—give excellent service.

The Northwestern line is the largest and most complete line in existence. It includes everything from the smallest mould to the largest and most complete outfits. Everyone should have our special catalog showing these machines, tools and forms.

Northwestern machines embody the best and most simplified construction, are speedy and durable—guaranteed absolutely with returnable privilege if not entirely satisfactory. This large factory enables you to secure the most modern machinery at wholesale prices.

It means money saving to get in touch with the Northwestern line. Send for catalogs today advising what machines or moulds you are interested in and they will be mailed to you promptly with full and complete information.

WHOLESALE PRICES

Block Machines, $10 to $250; Brick Machines, $22 to $75; Mixers, $24 to $1000; Porch Column and Baluster Outfits, $15 to $75; Cap and Sill Moulds, $12 to $35; Lawn Vases, $15 to $25; Ball Moulds, $2 to $17; Grave Stone Moulds, $7 to $69; Well Curbing Moulds, $4 to $7; Drain and Sewer Tile Moulds, $6 to $83; Block Cars, $11 to $17; Fence Post Moulds, $7 to $12; Silo Moulds, $14 to $150; Coping Moulds, $18; Hitching Post Moulds, $20; Baluster Moulds, $6 to $18; Jardinieres, $12; Special Gate Post Moulds, $10 to $30; Newel Post Moulds, $14; Grave Markers, $7; Burial Vaults, $90.

Special contractors' equipment, including culvert forms, drain and tile moulds, rock crushers, cinder crushers, elevators, sand screens, all tools needed for concrete work, block machines of every description, special forms, wheelbarrows, gasoline engines, ornamental moulds of all kinds, waterproofing, etc.

Write for particulars. Tell us what you are interested in so we can send full information and the proper catalog.

Northwestern Steel & Iron Works, 1055 Spring St., Eau Claire, Wis.



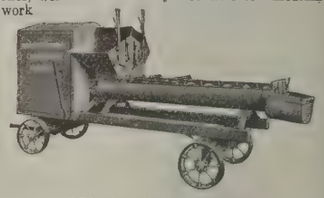
Triangular Convertible Hand Batch Mixer

For either hand or power mixing. Equipped with either one or two cranks or supplied with power attachment for engine. Fine for block plants, tile works, etc. Uses wet or dry mix, has good capacity, and mixes quick.



TRIANGULAR SIDEWALK MIXER

A compact portable machine for sidewalks and foundations. A very low price speedy machine easily moved—can be fastened to wagon and moved from job to job. Exceptional mixing qualities, well made and very desirable for medium work



CONTINUOUS MIXER

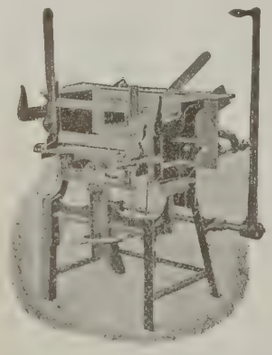
Splendid machine for block plants, tile works, sidewalks and general work. Adapted also for mortar mixing. Very compact and portable. Double screw action. Variable speed enables regulation for big or small crew. The only variable speed continuous mixer on the market.

"The Standard"
Low Charging Concrete Mixer



Don't think, when buying "The Standard" Low Charging Concrete Mixer, that you will not be better pleased with the outfit than you would if you paid two or three times as much for other complicated machines with side loading hoppers and mechanism.

Many contractors using "The Standard" Low Charging Concrete Mixer say that they would not exchange it for any other machine at any price.



In addition to our low charging mixers, we also have special designs for peculiar requirements, such as:

"The Standard" Low Charging Mixer with Folding platform.
"The Standard" Low Charging Mixer with belt drive.
"The Standard" Low Charging Mixer with cart charging arrangement.
"The Standard" Low Charging Mixer with discharging trough for street work.
"The Standard" Low Charging Mixer with hoist for mixed material.
The Eclipse Stone or Block Machine.
The Perfect Brick Machine.
"The Standard" Hoist and Elevators.
Gas and Gasoline Engines.
Steam Engines and Boilers.

Ask for catalogue No. 32. The information in this catalogue will be of value to you.

The Standard Scale & Supply Co.

CHICAGO 1345-47 Wabash Av. PITTSBURGH 243-5 Water St. PHILADELPHIA 35 So. Fourth St. NEW YORK 136 W. Broadway

M ASHLAND M

Accuracy, Convenience and Economy are the Features Secured by Using

U. S. Standard Concrete Mixers

I I



X X

The measuring and proportioning of the cement, sand, gravel or crushed stone is done automatically, positively without variation, regardless of whether materials are fine or coarse, wet or dry. A high-grade mixer at minimum cost. Our business has been built up on repeat orders. Correspondence invited.

E E

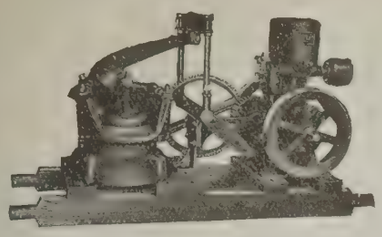
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THE ASHLAND STEEL RANGE & MFG. CO.

ASHLAND, O.

R ASHLAND R

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Novo Contractor's Trench Pump Outfit

"The engine for every purpose"

NOVO ENGINE

AND

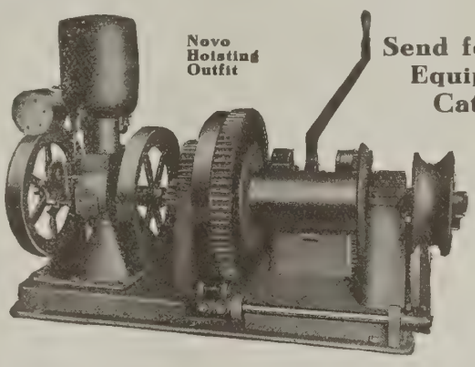
Hoisting and Pumping Outfits

NO TANK
NO FAN
NO FREEZING TROUBLE

The Novo Engine is simple, easy to start and run, guaranteed free from freezing troubles. It is the lightest engine for power developed—making it readily portable and especially valuable for contractors. Made in 1 to 10 H. P.

will do your power work—hoisting, water pumping, cement and mortar mixing, rock crushing, etc.—better and more economically than either steam or electricity.

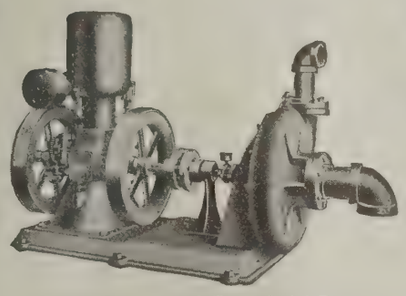
Novo Hoisting and other outfits are built for hard service. The gears are large and strong, bearings are wide—everything is made in the way that long experience has proved to be the best.



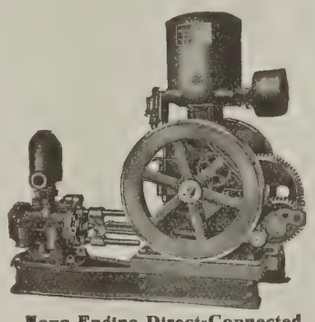
Novo Hoisting Outfit

Send for Novo Equipment Catalog

and give us the opportunity of convincing you. It will be to your benefit as well as ours. At least do your business the favor of looking into this proposition.



Novo Engine and Centrifugal Pump Direct-Connected



Novo Engine Direct-Connected to Pump

NOVO ENGINE CO.

CLARENCE E. BEMENT, Sec'y and Gen'l Mgr.

228 Willow St. LANSING, MICH.

We can offer an attractive contract to dealers in new territory. Write us for details.

The handiest machine in the shop—30 days free trial

The new Luther Tool Grinder is a workshop in itself. Extra attachments convert it into 17 different machines, such as turning lathe, force feed drill, jig and circle saws, forge, etc. The low price of these attachments enable you to get a full work-shop equipment at a tremendous saving of what it would cost you to buy separate machines to do the same work.

Dimo-Grit wheels cut steel as emery does copper

Wheels of the new artificial diamond abrasive, Dimo-Grit, peel steel away in tiny shavings instead of wearing it away like emery wheels or grindstones. No need of cooling with water, no danger of drawing temper. Carborundum wheels are also furnished. Grinding wheels make 4000 revolutions per minute—takes but a few minutes to do grinding that would take an hour any other way. Tool rests and patent attachments give perfect bevel to twist drills, chisels and other tools.

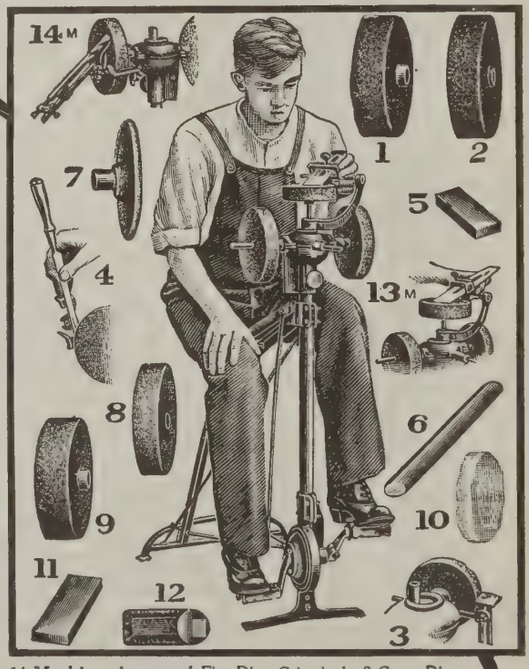
Luther Shop Tool Grinder

foot and engine power

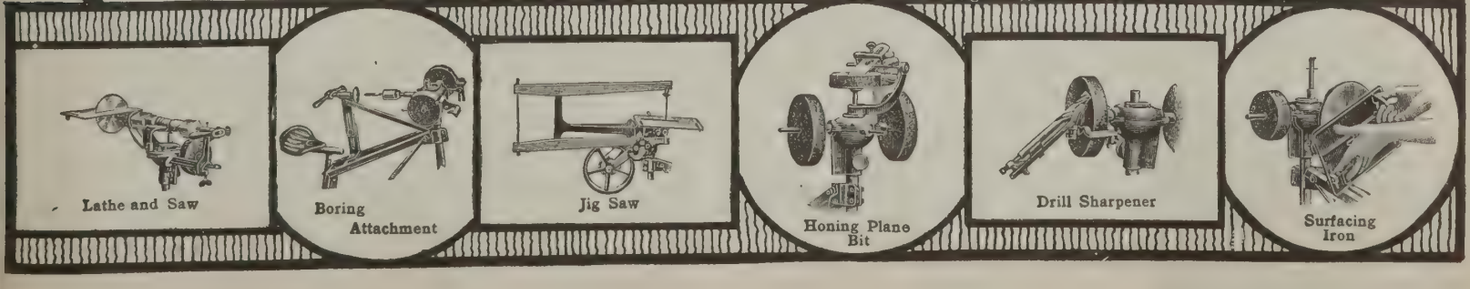
All steel and iron—bevel gear shaft drive in dust-proof housings—dust-proof bearings—mechanically perfected and runs easy as a sewing machine. We will send complete shop outfit consisting of grinder and 14 sharpening attachments and accessories, for 30 days free trial—no money needed, no red tape. Write today.

Write for 30 Days Free Trial Offer

Luther Grinder Mfg. Co., 619 Michigan St., Milwaukee, Wis.



14 Machines in one—1-Fine Dimo-Grit wheel. 2-Coarse Dimo-Grit wheel. 3-Universal tool rest. 4-Chisel and plane bit guide. 5-Dimo-Grit razor hone. 6-Dimo-Grit scythe stone. 7-Dimo-Grit saw gummer. 8-Felt polishing wheel. 9-Medium Dimo-Grit wheel. 10-Cloth buffing wheel. 11-Dimo-Grit oilstone. 12-Dimo-Grit pocket hone. 13-M-Plane bit honing attachment. 14-M-Twist drill sharpening attachment.



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THE NATIONAL BUILDER

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Charles A. Miller, Jr. } Associate Editors
Wm. C. A. Stevenson }

Porter-Hodgson Co., Publishers, 542-550 South Dearborn St., Chicago

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FRED. D. PORTER, Secretary and Treasurer.

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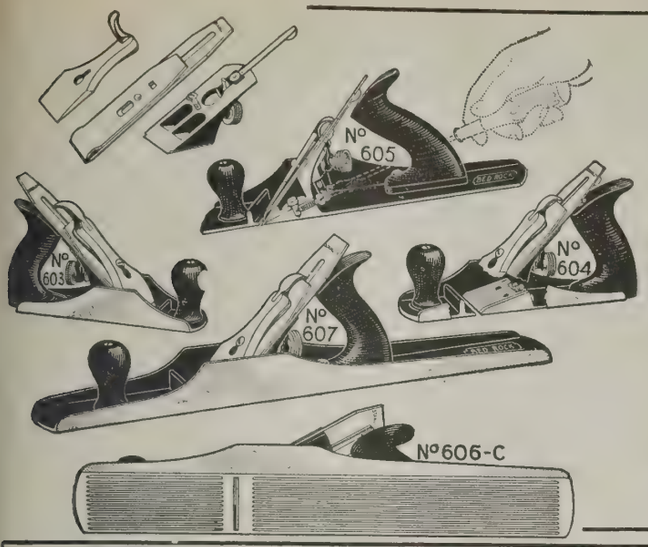
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Woodwell, Jos., Co.	66



Stanley Tools

In the well known "BED ROCK" Plane as now constructed, we offer the user of high-grade tools a Plane that is the strongest and most perfect in adjustment of any Plane ever manufactured.

The design of the sides, which is a new and distinctive feature, adds greatly to the strength and attractiveness of the Plane, as will readily be seen from the illustration.

The new method of fastening the frog to the seat permits of the frog being adjusted either forward or backward without moving the lever or the cutter.

The shape of the knob has been changed, the new shape permitting a much firmer and easier grip than before.

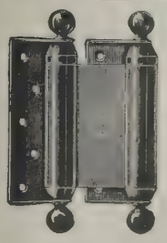
The high grade of material used and the great care taken in their manufacture, enables us to guarantee these Planes in every respect.

STANDARD THE WORLD OVER

Stanley Rule & Level Co.
NEW BRITAIN, CONN. U.S.A.

EVERY TOOL GUARANTEED

BOMMER SPRING HINGES
ARE QUALITY GOODS



This Trade Mark on Every — THE BOMMER SPRING HINGE — Genuine Bommer Hinge



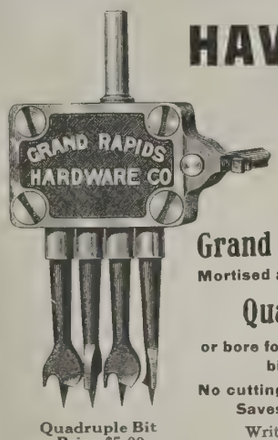
REJECT SUBSTITUTES

The Springs Never Go Lame

Spring Hinges lead the strenuous life in Builders's Hardware; no other article in their line endures such wear and tear; therefore don't err in judgment, use BOMMER SPRING HINGES; they stand up to their work.

FOR SALE BY ALL HARDWARE MERCHANTS

HAVE YOU POWER BORING MACHINES?



Quadruple Bit Price $5.00
Can not be used in a hand brace

IF SO, No Sash Pulley Can be Classed with the

Grand Rapids No. 12
Mortised at one Punch with the
Quadruple Bit
or bore four holes with a single bit and it's done
No cutting, fitting nor trimming
Saves time and money
Write for Free Samples



Grand Rapids Hardware Co., 118 Pearl St. Grand Rapids Mich.

ELEVATORS FOR INVALIDS

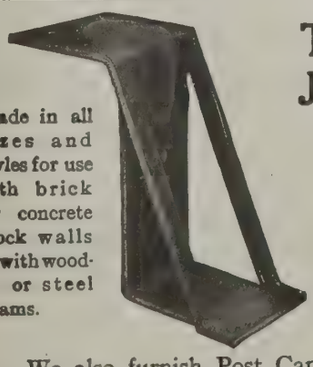
"The Sedgwick Machine Works,
130 Liberty St., New York.

Gentlemen:

In my house we had no elevator and my daughter had to depend on our man to carry her up and down stairs. If she wished to let the man have an evening off, she had to go upstairs right after supper and stay there. Now the man could be dismissed so far as carrying her in the house is concerned. She is entirely independent, goes up and down by herself, can run the elevator with one hand, and she goes up and down as often as she wishes and when she wants to. The elevator is a great comfort to us and we shall be glad to have anyone needing such a thing come and see it, or write us about it. There are many invalid ladies and men who toil laboriously upstairs who, if they knew of the Sedgwick Hand Power Elevators, would not be without one."

The above unsolicited letter was written to the Sedgwick Machine Works by a well known New England Judge who has had a Sedgwick Hand Power Invalid Elevator in his house now for nearly five years. The Sedgwick Machine Works, 130 Liberty Street, New York, will furnish his name and address upon request, or will send catalog and full information as to their Hand Power Elevators and Dumb Waiters free on request. Judge B——purchased his elevator through his local carpenter.

Sedgwick Machine Works
130 Liberty St. :: :: :: :: New York



Made in all sizes and styles for use with brick or concrete block walls or with wooden or steel beams.

TRUS-CON JOIST HANGERS

Avoid cutting away and weakening of timbers and walls—save labor, time and money.

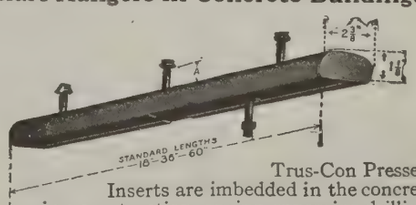
Trus-Con Joist Hangers are made from open hearth steel plates, and are proven by actual test to be the strongest on the market. Note the bulb-shaped reinforcement at upper angle.

We also furnish Post Caps, Post Bases, Wall Plates and Base Plates made in rolled steel, malleable iron, or cast iron.

Write for catalog and prices.

SHAFT HANGER SUPPORTS *for* CONCRETE BUILDINGS

Trus-Con Pressed Steel Inserts for Supporting Shaft Hangers in Concrete Buildings.



Trus-Con Pressed Steel Inserts are imbedded in the concrete during construction, saving expensive drilling after completion of the work. The long slots allow a wide variation in position. Special washers prevent bolts turning in the slots. Write for details and prices.

TRUSSED CONCRETE STEEL CO., 384 Trussed Concrete Bldg., DETROIT, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



ASK YOUR DEALER, or send $1.50 and we will prepay charges.

GET THE DOUBLE CLAW HAMMER

It Saves Cost Continually

¶ The labor and material to produce it is threefold. But it is well worth while. ¶ It starts a nail *high* over your head and draws the nail *up* instead of rolling it out. No danger of smashing your fingers. It is a pleasure to work with it.

SAVE TIME, LABOR AND MONEY. Your main thought in fulfilling a contract is to get it done in the quickest possible time, in the best possible manner and at the lowest possible cost.

THE DOUBLE CLAW HAMMER with its better ideas, material and workmanship helps you do all these things. It does more and does it more easily. ¶ The price, $1.50, is justified because of its superior service and the fact that it costs three times as much to make this hammer. The difference in price is insignificant—you lose many times more than this difference in time and labor, lost by working with the old style hammer. The price is nothing compared to its earning power.

REMEMBER it is the user who makes the continual profit. Get the DOUBLE CLAW HAMMER.

16 OZ. HEAD } WHICH?
21 OZ. HEAD }

DOUBLE CLAW HAMMER COMPANY
453 Broadway - Brooklyn, N. Y.

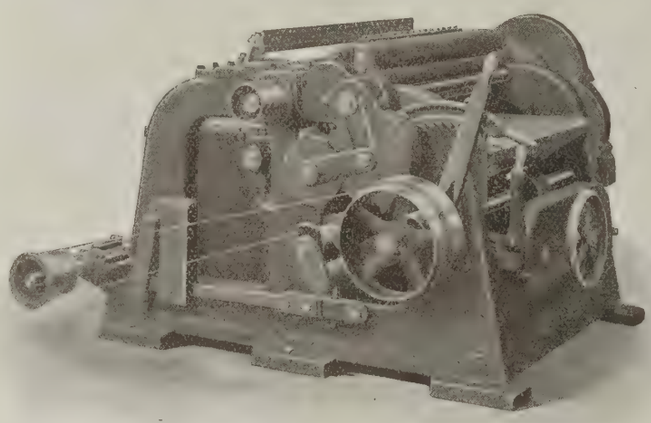


BOTH MEN ARE STARTING TO DRIVE A NAIL

The Double Claw has all the good features of the old hammer, and a lot more besides.

SMITH OF SMITHVILLE

Woodworking Machinery



THIS CUT represents a Heavy Cabinet Planer which is adapted for Hardwood Mills and for making Interior Finish. It is fitted with a 4-knife Round Head, and provision is made for jointing and grinding the knives without removing the knives or head from machine.

For further particulars address

H. B. Smith Machine Co.
Smithville, N. J., U. S. A.

Branches: New York Chicago Atlanta San Francisco

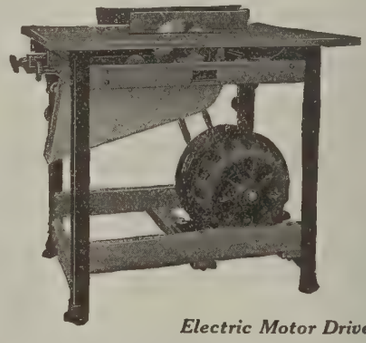
GRIMM TRADE MARK

Woodworking Machines

will complete any Planing Mill operation such as ripping, cutting off, sizing, jointing, planing, plowing, jig-sawing, boring, moulding, shaping, rabbeting, mitering, mortising, tennoning, sanding and emery wheels.

It will pay you to own a

"Grimm"



Electric Motor Drive

Built to operate with Electric Motor or Belt Drive; also with Gasoline Engine for portable use.

No more delays in going outside for your woodworking. The Grimm will do them all.

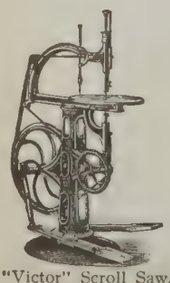
What a saving you will make both in time and money with a "Grimm."

Catalog and prices on application.

Grimm Manufacturing Company
42 Erie Street, Buffalo, New York

FOOT, HAND AND LIGHT POWER

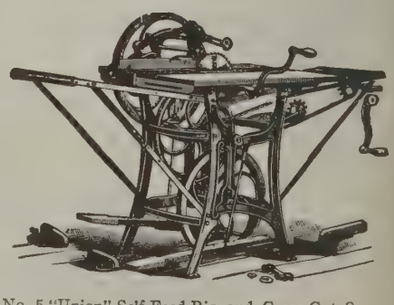
WOOD-WORKING MACHINES


"Victor" Scroll Saw.


"Diamond" Mortiser

Carpenters, Builders, Cabinet-Makers and other wood-workers can successfully compete with large shops by using our labor-saving machinery. Save for yourself some of the profits you have been paying to the mills. With our machines one man will do as much work as four to six men using hand tools; will do it easier; will do it better.

Send for catalog "A" describing our complete line

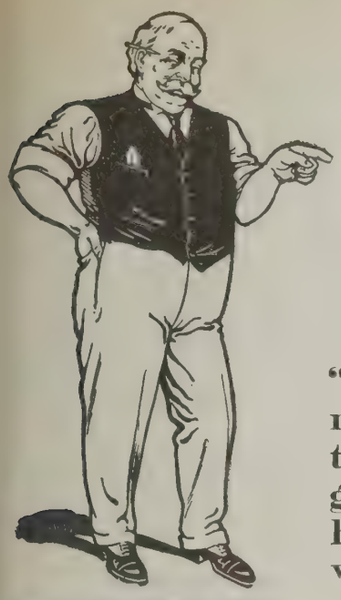

No. 5 "Union" Self Feed Rip and Cross-Cut Saw

THE SENECA FALLS MFG. CO.

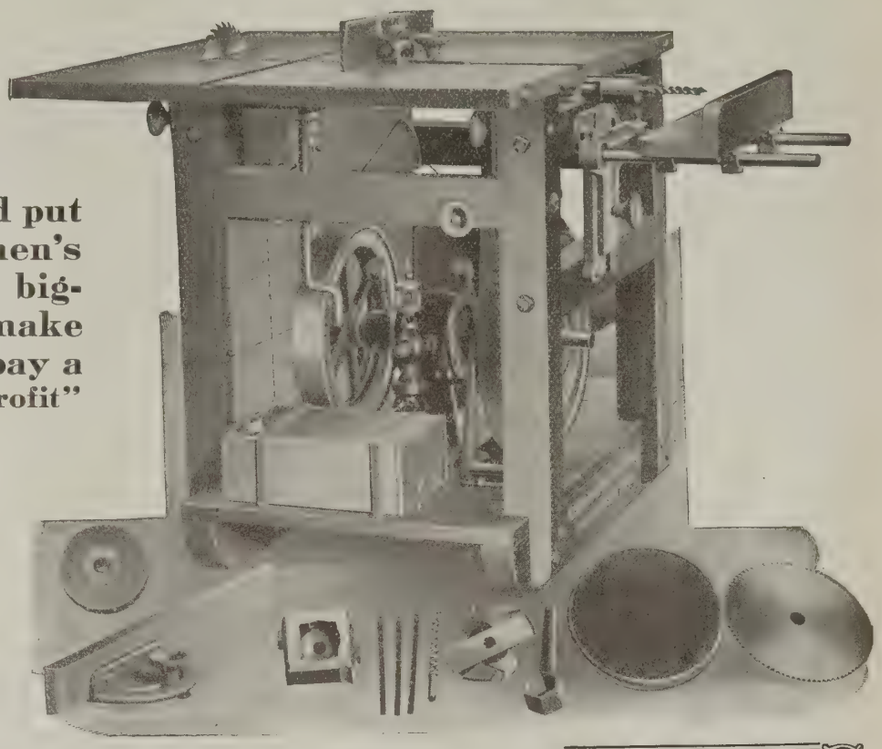
629 Water Street SENECA FALLS, N. Y., U. S. A. (249)

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

"Every contractor certainly ought to own a rig like that!"



"Then he could put more of his men's time in on the bigger work, and make his contracts pay a whole lot better profit"



"RIPPING hard pine and oak stuff by hand takes a lot of time. So do boring in hardwood—sanding—dadoing—and many other things that come up on every job a contractor takes. Get an 'Eveready' saw rig and you can save a big share of this lost time. It rips, cross-cuts, miters, jig-saws, sands, dados, joints, grinds tools, etc.—nice clean-cut work—in just about *one twenty-fifth* of the time your best man can do it by hand. And all it costs to do this is *2 cents* an hour. Can you beat it? The

TRADE MARK OSHKOSH

'Guaranteed for Life.' **Eveready** *'Guaranteed for Life.'*

SAW RIG

can be loaded into a cart by two men and taken right out on the job. There you can swap it around from cellar to garret—anywhere the work is.

"Its frame and skids are of best air and kiln-dried maple. They'll never warp a particle. The engine's a beauty—a 4 h. p. of the latest design out. And it's mighty easy to run. Give her a spin and she's off—for ten minutes or all day. Any bright boy can operate it.

"You wouldn't be without the Eveready a day if you had the least idea of the time, money and back-breaking labor it saved!

"Why—you'd mighty soon gain enough in extra profits to make up the little you paid for the rig.

"Contractors—and even the smallest carpenters—are making the Eveready a part of their regular outfit. It's a whole planing mill in itself and they find it just as necessary—yes, a great deal more so—than any machine they own."

All These Attachments Free

JOINTER HEAD—Works on exactly the same principle as an up-to-date planer. Produces a smooth, even job with no deep cut as the material leaves the jointer head. 2½ inches in size.

BORING ATTACHMENT—Guaranteed absolutely accurate. Extra long boxes insure easy, long-running qualities on the guides. Bits, standard size.

JIG SAW—Not a cheap one, but the best 13 inch jig we can make. All joints reinforced with steel, equipped with brass bushings.

SANDER—The best one yet. A great time and money saver over old methods in change and economy of paper. Our method of holding paper will not blister. 10 inches in diameter.

SAW GAUGE AND MITRE DEVICE—Saw Gauge of best gray iron, 18 inches long, adjustable to any bevel. Mitre Device adjustable to angle and can be used as a cross-cut gauge.

DADO HEAD—Our own special design. Does smooth, even work with or across the grain.

EMERY WHEEL—A 6-inch wheel for grinding tools also furnished with this rig.

Try One Six Days Free

Then—if you can get along without it—return it at our expense.

You'll never get a fairer, squarer chance than this. And if you keep it, it is actually **guaranteed for life.**

Spring is just the time when everybody is getting ready to build. Get in shape to bid lower than anybody else—on good, profit paying work. The Eveready will help you do it by cutting down your men's time.

A few strokes of the pen and a few drops of ink bring the whole proposition before you. Why not write today for full details?

OSHKOSH MFG. CO., 414 So. Main St., Oshkosh, Wis.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

MORE
C.H.&E.
PORTABLE SAW RIGS
NOW IN USE THAN
ALL of our IMITATORS
COMBINED



WE ARE THE PIONEERS IN THE
MANUFACTURE OF
PORTABLE SAW RIGS
WE MANUFACTURE THEM IN FOUR SIZES

Write for our descriptive catalogue

C. H. & E. Manufacturing Co., Inc.
319 Mineral St., MILWAUKEE, WIS.

IF
IT IS
Wood Working
Machinery

CONSULT
US

UNITED MACHINERY
88-89 Centre St. COMPANY NEW YORK

The STANDARD CIRCLE SWING with geared winch. Capacity 2500 lbs. Equipped with 150 ft 5-16" cable, block, fasteners, load and boom brakes, Price, $45.00

The LIGHT WEIGHT CHAMPION. Capacity 1000 to 1500 lbs. Equipped with 110 ft. cable, block, boom and load brakes. Price.....$36.00



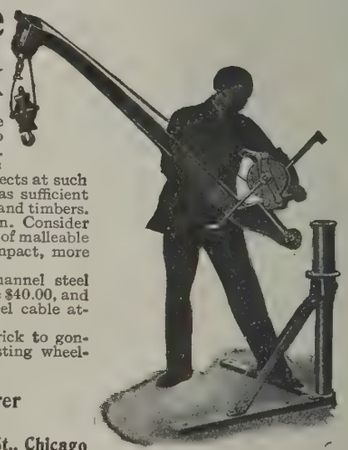
OUR MOTTO:
SATISFACTION
OR
NO SALE
Prompt Shipment Guaranteed

We also manufacture
STIFF LEG, GUY LINE, BOOM, "A" FRAME
TRIPOD, POLE AND SETTER DERRICKS

Write for Circular "N"

SASGEN BROS. 2053 Racine Ave. CHICAGO - ILL.
NEW YORK OFFICE: 103 Park Avenue

Taylor Portable
Steel Derrick



Tested at factory, hoisted and swung complete circle 1900 lbs. Shipped ready to operate. No wrench or tools required to set derrick on job. Made in two sections. Beam section connects post by tipping in a vertical position and projects at such an angle to clear side wall of building and has sufficient height to hoist wheel-barrows, window frames and timbers. One man can climb a ladder with either section. Consider the durability of a derrick constructed entirely of malleable Iron and Steel and that of Wood, more compact, more powerful.

Derrick complete with three way block, channel steel brackets, bolts for attaching to building, price $40.00, and four and one-half cents per ft. for crucible steel cable attached. Drum capacity 300 ft.
Special platform and chains for attaching derrick to gondola railroad cars, price $15. Chains for hoisting wheelbarrows, price $2.00.

JOHN L. TAYLOR, Manufacturer
Taylor Portable Steel Derricks
Telephone Monroe 3066 1034 W. Lake St., Chicago

Carpenters! Builders!



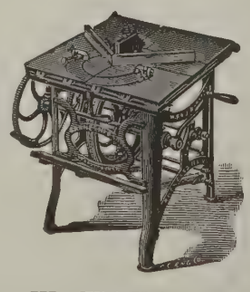
I. For Ripping.

Our new foot and hand power Circular Saw No. 4, the strongest, most powerful and in every way the best machine of its kind. For ripping, cross-cutting, boring, grooving, dadoing, etc.

Solid Iron Table Planed Perfectly True.

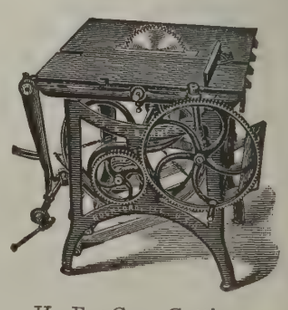
COUNTERSHAFT IF DESIRED.

Send for Our New Catalogue.



III. With Universal Mitre Gauge.

Foot and Hand Power Machinery, Lathes, Scroll Saws, Formers, Mortisers, Tenoners, etc.



II. For Cross Cutting.

W. F. & JOHN BARNES CO.
436 Ruby Street, ROCKFORD, ILL.

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
IT WILL HELP.

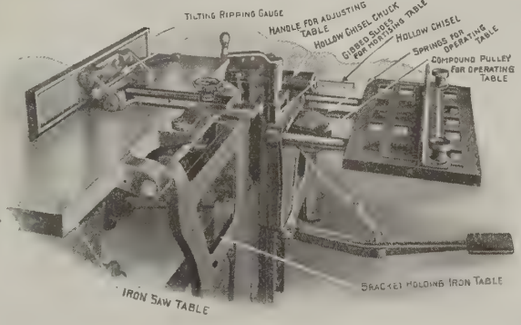
the Saw-Table on the FAMOUS Universal Wood-worker is Made of IRON!

—so is the ripping gauge. This substitution of iron for wood furnishes another example of *Famous* durability, and our determination to **maintain** the prestige of the *Famous* Universal Woodworker as the **unquestioned leader.**

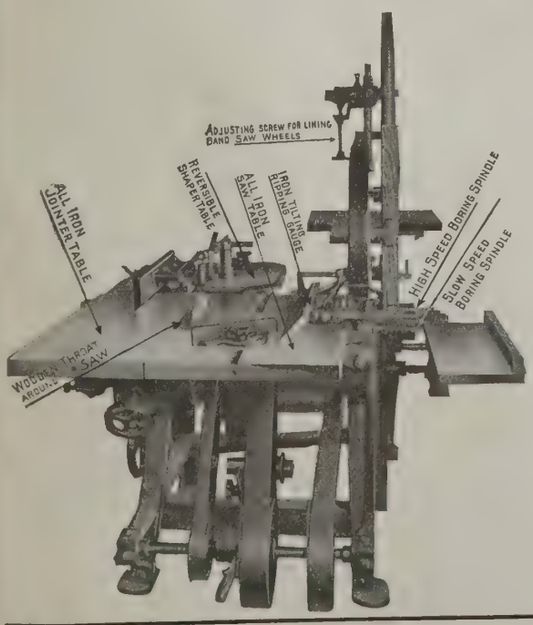


Over eleven hundred (1100) FAMOUS Universal Woodworkers are in use today. You are not experimenting—or taking risks—when eleven hundred carpenters and contractors have proved that, as an investment, the FAMOUS has no equal in woodworking machinery. Eleven hundred machines of one type is **proof positive** of efficiency and satisfaction.

Look at this woodworker proposition from any angle—Strength, Durability, Adaptability, Working Conditions, Simplicity of Operation, Price—the FAMOUS has **no competitor.** Study the strength—the FAMOUS is all iron and steel; others are not. Consider the durability—the FAMOUS lasts a lifetime because we unreservedly guarantee it; you cannot get that kind of service from others. Look at the adaptability



—the FAMOUS does **sixteen** different kinds of work; far more than the next best could ever hope to. Think of the working conditions—the FAMOUS permits four men to work at one time; can any other machine excel that? The simplicity of operation means that any machine hand can operate the FAMOUS without any previous experience. The prices are so low, and so easy to pay, that every contractor or carpenter can easily afford one.



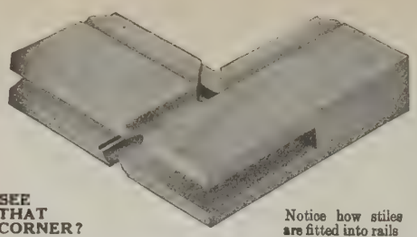
The FAMOUS Universal Woodworker consists of: 27 inch Band Saw; 12 inch Jointer; Saw Table (with raising or lowering arbor); Single Spindle Shaper, Borer, Pony Planer, Tongue and Pole Rounder, Hollow Chisel Mortiser, Single End Tenoner, Drum Sander, Disc Sander, Knife Grinder, Emery Grinder, Band Re-Saw, Spoke Tenoner, Rim Borer and Wheel Equalizer, Adjustable Felloe Rounder—a total of sixteen.

Notice, by the accompanying illustrations, how practical they are arranged and how easy they are to operate. Then write for catalog and full particulars.

The Sidney Tool Co.

Sidney **Ohio**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



MADE TO ORDER FLY SCREENS and SCREEN DOORS

WE use the best grades of wire, black enamel, galvanized, pearl and copper bronze, fastened by the improved **Standard Shoulder Strip Method,** which makes the wire drum tight and firm, can not sag or pull away.

Dealers, Carpenters, Contractors and Builders, write for a free copy of our 1912 illustrated catalog

STANDARD SCREEN CO., 1848-50 W. 14th St., Chicago, Ill.

Our screens are all mortised, tenoned, joined with waterproof glue and pinned with steel pins, will last a lifetime

Our High Grade Millwork
Is Right in Quality and Price

We have the largest factory capacity in Chicago. We carry a big stock of kiln dried factory lumber in Pine, Cypress, Yellow Pine and hardwood. Our work is acknowledged to be the best. Twenty-five years experience in handling millwork contracts enables us to give you prompt and satisfactory service.

Send In Your Lists or Plans

We will mail you an estimate at once and do our best to get and hold your business. ***Catalogue sent on request.***

Harty Bros. & Harty Company

21st Place and Loomis St. - - - - Chicago, Ill.

OAK FLOORING

Increases the Renting and Selling Values and Attracts a Better Class of Tenants



Builders and *owners* will find it a clinching argument to say "It's floored with OAK FLOORING." It is the biggest single feature to look for in any house or apartment building. It imparts an air of *refinement* and *elegance. It is the modern flooring.*

OAK FLOORING ⅜" thickness by 1½" or 2" faces can be laid *over old floors* in old homes or over cheap sub-floors in new homes *at a very low cost.* It is *cheaper than carpets* or *pine flooring.* When laid it has all the appearance of heavy flooring.

There is a *solid satisfaction* and *lasting pleasure* in the *substantial* and *dignified appearance* of OAK FLOORING. Contractors and carpenters find it very *profitable* to lay ⅜" stock over old floors in old homes during the winter season.

A little *canvassing* is all that is necessary to *secure jobs.* A carpenter or handy man can lay OAK FLOORING successfully.

For *durability* OAK is the best. OAK FLOORING laid thirty years ago, after very hard use, is still in good condition.

Write us for catalog.

THE OAK FLOORING BUREAU, 872 Hammond Bldg., Detroit, Mich.

CUSTOM MADE FLY SCREENS



Our work is far superior to the usual output of local mills and has a style and finish not obtainable from those who do not make a specialty of FINE SCREENS

Our screens are made from kiln dried lumber and have waterproof coped joints and the frames are weather-proofed before the finishing coats are applied.

Best grades of Wire Cloth, Enameled, Galvanized, Genuine Bronze, fastened by most approved methods.

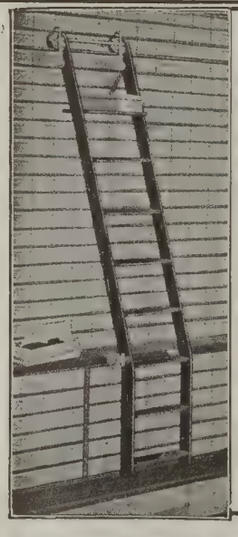
Our new "Ironwood" Screen is the cheapest good Custom Made Screen yet produced.

Intending purchasers may have free by mail sample of woods, finishes, wire cloth and a copy of catalog. Agencies in nearly all large cities. Agents wanted in smaller cities.

Special Terms to Contractors and Builders. Delivered prices will be quoted. Goods laid down at your railway station

A. J. PHILLIPS & CO., Le Roy Street, Fenton, Mich.

28 Years Experience. 3½ Acres of Floors



Mr. Carpenter and Builder

Why Not Make Some Extra Money

by inducing your local merchants to modernize their stores? By doing so you will not only make money on selling them the **rolling ladders** that they may require, but also on the shelving that it may be necessary for them to extend to ceiling or rearrange.

It is only necessary to send us the measurements and we will do the rest. Ship you the ladders complete and ready for use and guarantee them in every respect to be satisfactory.

Write for Catalogue

MILBRADT MANUFACTURING COMPANY

1442 N. Eighth St., ST. LOUIS, MO.

KOLL'S PATENT LOCK-JOINT COLUMNS



HOT OFF THE PRESS!

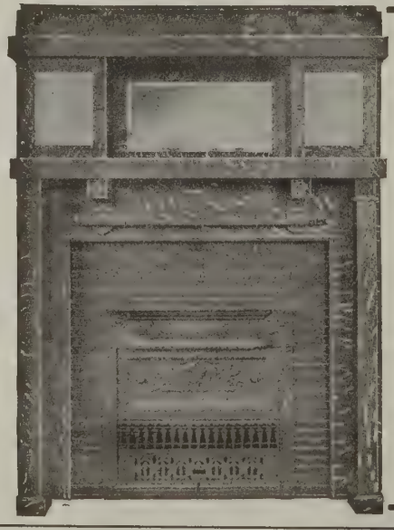
Our trade bulletin No. 1 containing valuable information for the Architect, Woodworker and Builder. All the information you need regarding wood columns. This is free for the asking.

THEY CANNOT COME APART

HARTMANN-SANDERS COMPANY

MAIN OFFICE AND FACTORY, 2155 ELSTON AVENUE, CHICAGO

EASTERN OFFICE, 1123 BROADWAY, NEW YORK CITY



Quartered Oak Mission Mantel

$42.00 Complete

With Coppered Art Glass, Beveled Mirror, Enameled Tile all Colors, and Grate.

Our 68 page catalogue shows complete line of more and less expensive mantels.

Sent free upon request.

EDW. F. SONNTAG MANTEL CO.

316 Sixth Street - EVANSVILLE, IND.

SEND US TWO OR MORE NAMES of persons who are interested in or want to buy Hot Water Heating Plants and we will send you this scale. Back inches are divided into 6, 10, 12, 16, 20 and 40 parts. Also free catalog on request. Name this paper when writing.



ANDREWS HEATING CO.

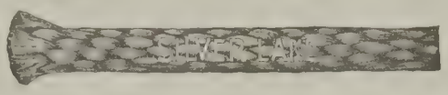
1287 Heating Building

MINNEAPOLIS, MINN.

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WHEN YOU GET TO **SASH CORD** USE **SILVER LAKE**

And insist upon getting it from your dealer. To insure you against substitution, we stamp our name on every foot of our cord. Carried by all dealers.

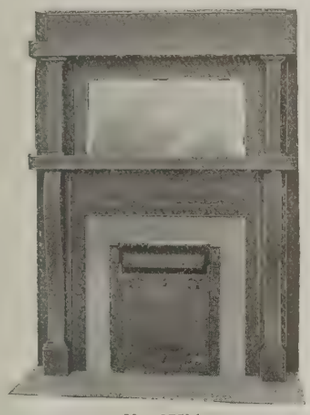


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was originated by us, and for forty years has been recognized as—

THE STANDARD

Established 1869



No. 875½

$28.60

For this Elegant, Massive Selected Oak or Birch, Mahogany Finished Mantel, beveled mirror, 18x36 inches.

"FROM FACTORY TO YOU"

Price includes our "Queen" Coal Grate with best quality enameled tile for facing and hearth. Gas Grate $2.50 extra. Mantel is 82 inches high, 5 feet wide. Furnished with round or square columns, as shown in cut.

Dealers' price not less than $40.00.

"REPUTATION AND QUALITY COUNT"

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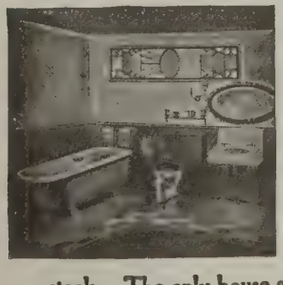
are distinctive in workmanship, finish and style. Twenty-five years' experience enables us to know and satisfy the needs of those who want Mantels of quality, different from the rest. We build all styles, Colonial to Mission.

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Complete bath room outfits—tubs, closets, lavatories, kitchen sinks, etc. Prompt shipment from a complete stock. The only house selling up-to-date, guaranteed goods at wholesale direct. Write for illustrated catalogue and prices.

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Read What Contractors Think of Our Machines.

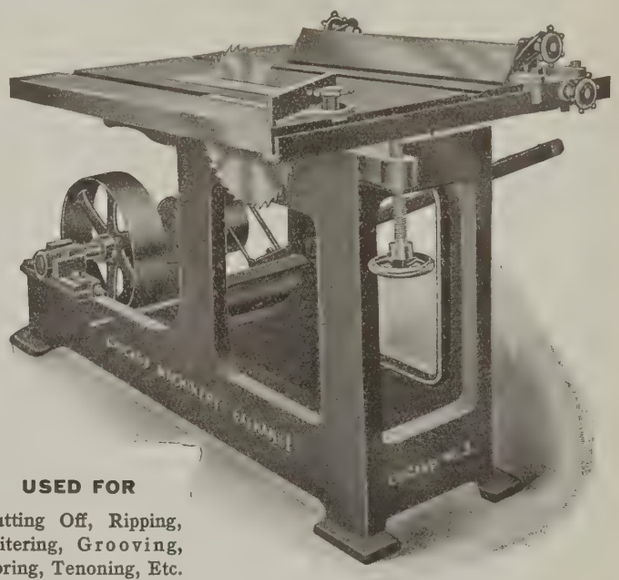
Charleston, Ill., July 13, 1911.

Chicago Machinery Exchange, Chicago.

Dear Sirs:

Your saw table which I bought of you last fall is a complete success, the best I ever saw for the money, and I worked in a good mill for ten years. You can refer anybody to me in regard to your saw table No. 5. Yours,

CLARENCE B. MUCHMORE.

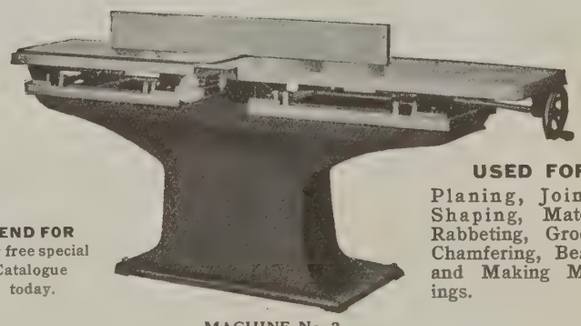


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These two machines are always ready for work without any changing. They are a big bargain at $170.00. This price includes belt for saw arbor, countershafts, one 12 in. rip saw, one 12 in. cut-off saw, five boring bits—¼ in., 5-16 in., ⅜ in., ½ in., ¾ in.—and 1 pair of jointer knives. Ask for price on one if you cannot use both.



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These Plants Produce TWO-THIRDS of A



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OUR SPECIALTY

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METAL CEILINGS AND SIDE WALLS
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The Kanneberg Roofing and Ceiling Co.
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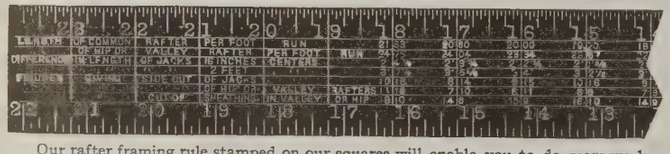
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In a Subject that in time would net you HUNDREDS OF DOLLARS

If so—

invest one cent in a postal card. Send it to us asking for one of our little books telling you how to get the lengths and cuts of Common, Hip, Valley and Jack Rafters for seventeen different pitches of roof.

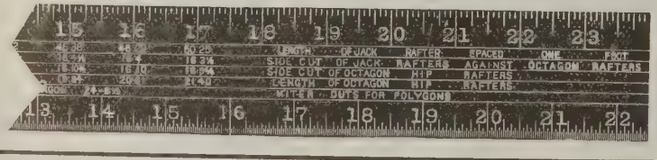


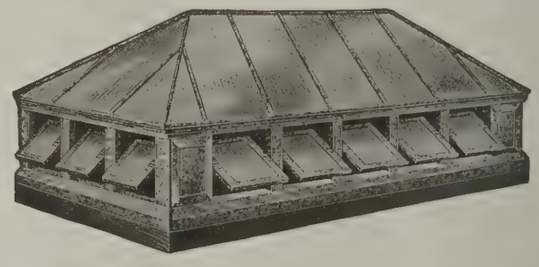
Our rafter framing rule stamped on our squares will enable you to do more work—faster work—better work—and more accurate work, therefore, obtain better wages.
It's a big step toward being the contractor instead of the laborer.



We manufacture the only practical **Take-Down Square,** guaranteed to remain true. **Don't be a jack-knife carpenter.** Send today for this little book.

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From Factory to Builder
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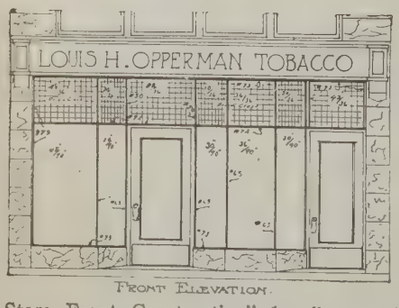
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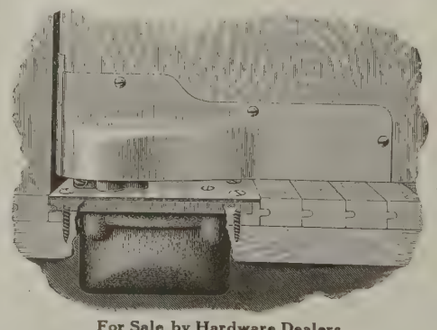
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Petz Bars have style, strength and safety, with no danger of breaking glass. Petz Bars are easy to install, and cost no more than inferior bars.

Our booklet on "Modern Store Front Construction" describes our bars in detail, and gives the experience of prominent users. Write for a copy today.

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For Sale by Hardware Dealers

A Checking hinge for double-acting doors between dining room to pantry or kitchen, etc.

It is a door check and hinge combined.
It automatically closes the door without a slam.
It prevents children from being knocked down.
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It renders the action of door absolutely noiseless.
It will outwear three of the spring hinges now in common use.

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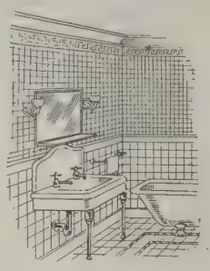
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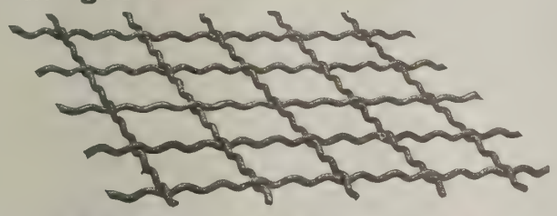
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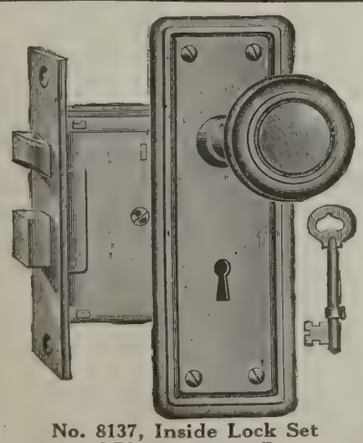
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Gentlemen: * * * The roofing which I did last year with your Cortright Shingles is all O.K. I am highly pleased with them. They are absolutely *stormproof*, and I can't praise them too highly. Yours respectfully,

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overlap and inter-lock with each other. They're just as easy to lay as wood shingles. They'll give your customer more satisfaction, and you more profit and less trouble, for it's hard to get wood shingles now-a-days. The solution is ***Cortright Metal Shingles.***

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Shingles, Slate and Tile become loose and blow off—

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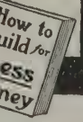
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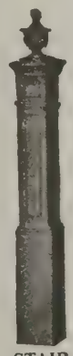
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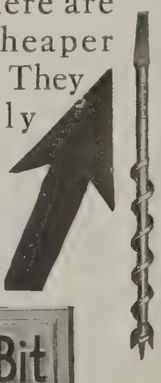
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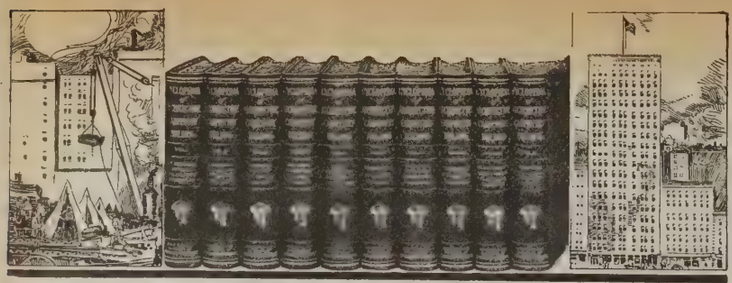
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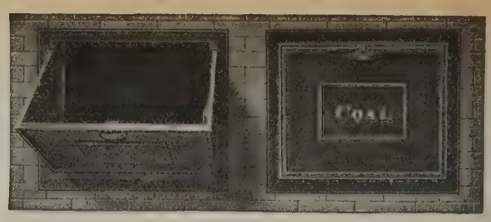
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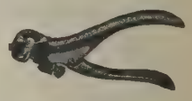


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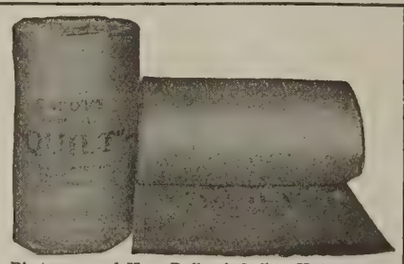
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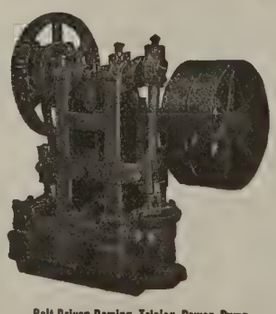
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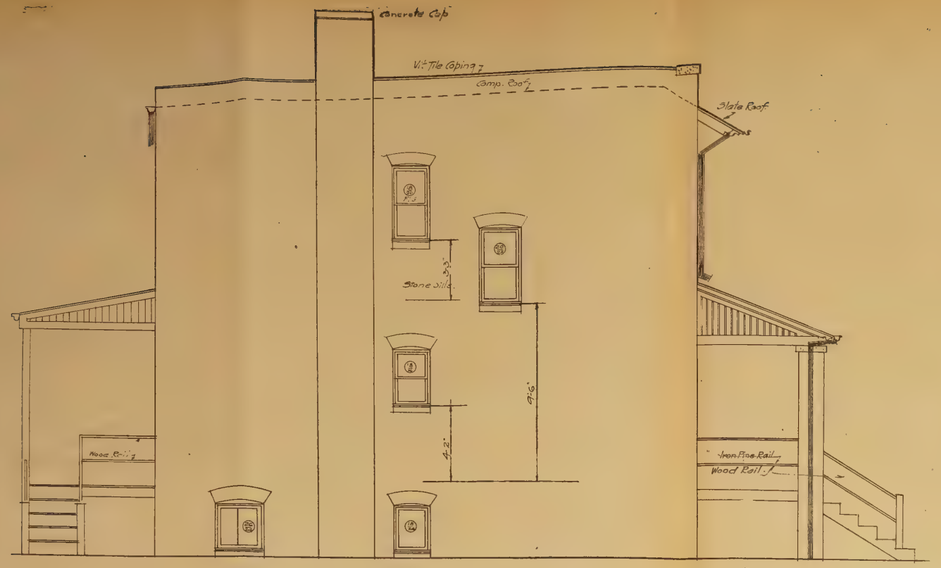
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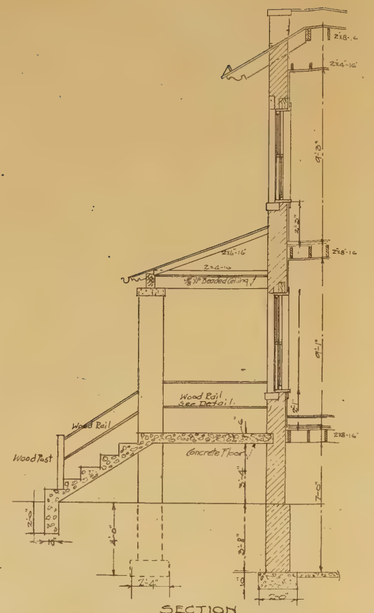


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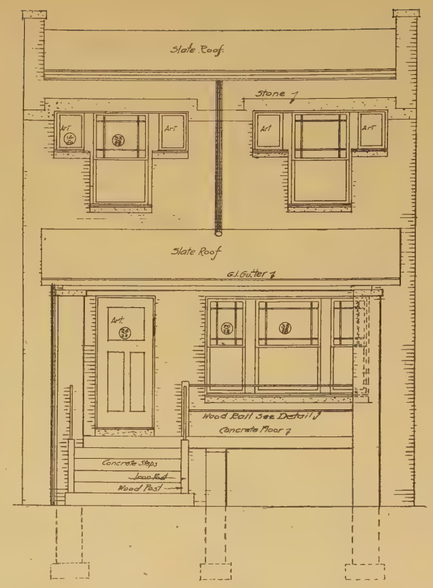
UNIVERSITY OF ILLINOIS



SIDE ELEVATION



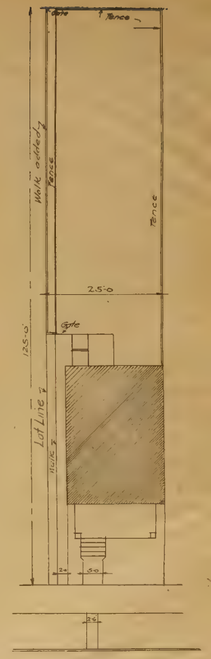
SECTION



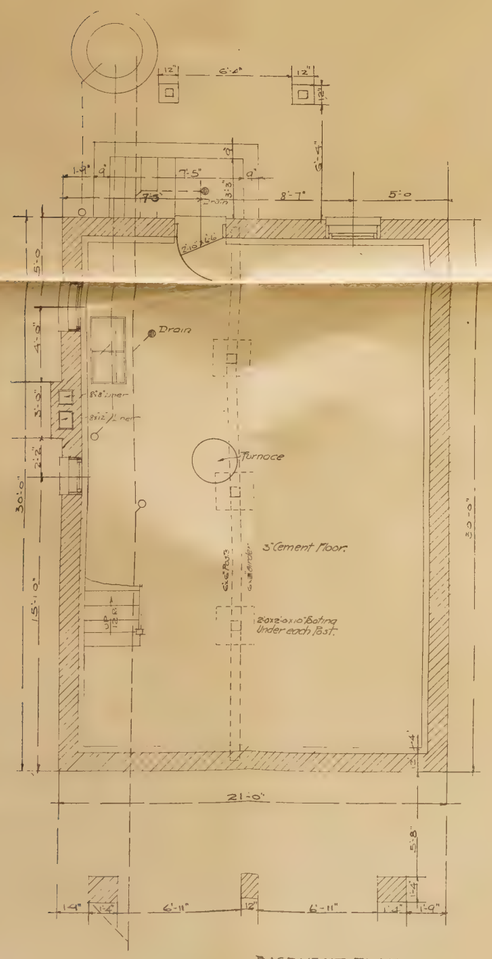
FRONT ELEVATION.



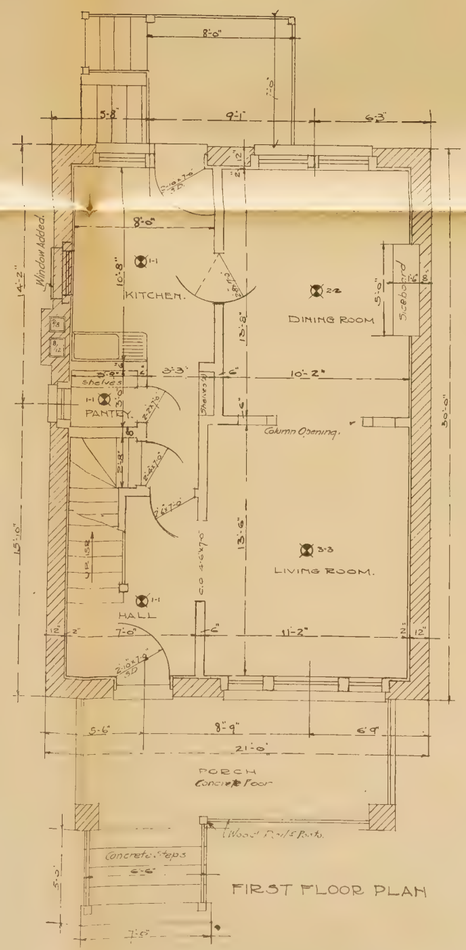
REAR ELEVATION.



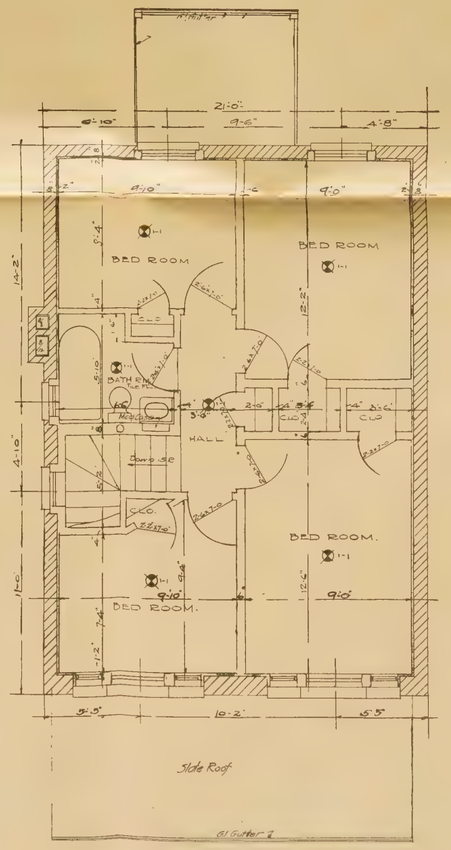
PLAT PLAN.
SCALE 1/16=1'0"



BASEMENT PLAN.



FIRST FLOOR PLAN

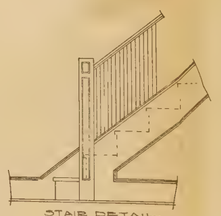


SECOND FLOOR PLAN.

SUPPLEMENT TO
THE NATIONAL BUILDER
APRIL, 1912
NATIONAL BUILDER DESIGN No. 362, THE MONROE RESIDENCE
Scale for Floor Plans, Elevations and Sections, 1 inch equals 4 feet. Details, 1 inch equals 2 feet.

FOR ESTIMATE SEE PAGE 29

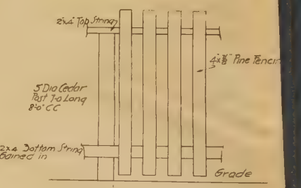
DETAIL OF PORCH RAIL



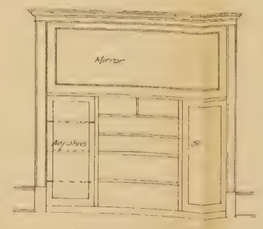
STAIR DETAIL



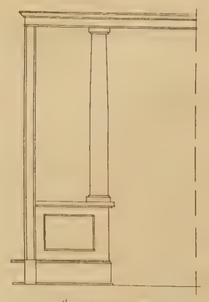
MEDICINE CASE



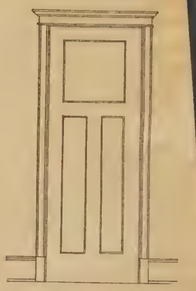
DETAIL OF FENCE.



SIDEBOARD



½ OF COLUMN OPENING



TYPICAL DOOR.

THE NATIONAL BUILDER

Vol. 53 CHICAGO, APRIL, 1912 No. 4



THE MONROE RESIDENCE, built at Chicago, Ill.

NATIONAL BUILDER DESIGN No. 352

Lewis E. Russell, Architect, Chicago, Ill.

For Floor Plans and Elevations, see Supplement of this Number. Estimated Cost, Architect's Fees Not Included, $2,932.55

THE MONROE RESIDENCE

DESIGNING a house for a narrow city lot has its disadvantages, not alone from the constructive problem, but from the requirements to bring it within the limits of the city building and health rules. In this house, however, the architect has provided the comforts of the city, while the owner has the entire house to himself, and in a measure the isolation of a suburban home. The compact design indicates economy in housekeeping, compatible with the low cost of the finished building.

Estimate of Monroe Residence*

By I. P. HICKS

EXCAVATING AND MASONRY.

104 yards excavating, 35c	$ 36.40
200 cubic ft. concrete footings, 25c	50.00
60 yards cement floor in cellar,, 60c	36.00
30 lineal ft. 8x12 flue lining, 20c	6.00

*Materials are figured at Omaha prices. Carpenter labor figured at 40 cents an hour.

30 lineal ft, 8x8 flue lining, 15c	4.50
60 lineal feet wall coping, 20c	12.00
4 stone caps, 17x17x4, $1	4.00
2 stone door sills, 5x14 in. x 3 ft. 0 in., $2	4.00
1 stone door sill, 5x14 in. x 3 ft. 4 in	2.25
4 stone window sills, 5x8 in. x 3 ft. 6 in., $1.50	6.00
3 stone window sills, 5x8 ft. x 2 ft. 6 in., $1.25	3.75
1 stone window sill, 5x8 in. x 4 ft. 0 in	1.75
7 stone window sills, 5x8 ft. x 2 ft. 0 in., $1.00	7.00
4 stone window sills, 5x8 in. x 3 ft. 0 in., $1.40	5.60
1 stone window sill, 5x8 in. x 6 ft. 6 in	2.90
1 chimney cap, 18x36x4 in	2.00
55,000 brick, laid in walls, $12	660.00
3,700 pressed brick in front, $22	81.40
Total excavating and masonry	$925.55

LUMBER BILL.

	Feet.
2 6x8x16 ft. girders	42
3 6x6x8 ft. posts	72
72 2x8x20 ft. joists	1,944
24 2x4x20 ft. ceiling	352
4 1x4x12 ft. ceiling	16
72 2x4x18 ft. studding	864
9 2x6x18 ft. studding	162
12 2x4x16 ft. plates	132
12 2x4x12 ft. plates	96
2 2x6x12 ft. plates	24
100 1x2x18 ft. furring	300
2 2x10x18 ft. porch	60
2 2x10x14 ft. porch	46
8 2x4x14 ft. porch	72
8 2x6x16 ft. porch	128
3 2x8x16 ft. rear porch	63
1 2x8x14 ft. rear porch	19
4 2x4x16 ft. rear porch	44
4 2x4x18 ft. rear porch	48
2 4x4x16 ft. rear porch	42
14 2x6x14 ft. lintels	196
Total feet framing	4,722

4,722 ft. framing lumber at $26	$122.77
2,260 ft. 8-inch, No. 2 Y. P. lap, rough floors and roof, $26	58.76
1.550 ft. 7/8x2¼ face flg., $45	69.75
120 ft. 1x4x8 ft. flg., rear porch, $45	5.40
350 ft. 5/8x4x14 ft. ceiling, $32	11.20
160 lineal ft. 1x4 cypress finish, $50	1.65
64 lineal ft. 1x10 cypress finish, $50	2.50
80 lineal ft. 1x8 cypress finish, $50	2.70
24 lineal ft. 1⅛x12 cypress finish, $55	1.65
Total lumber bill	$276.38

MILL WORK.

1 cellar window frame, 13x24, 2 lt	$ 1.75
1 cellar window frame, 18x24, 1 lt	1.50
1 cellar window frame, 15x24, 2 lt	1.75
1 cellar door frame, 2 ft. 10 in. x 6 ft. 6 in	2.25
1 cellar sash, 13x24, 2 lt	1.25
1 cellar sash, 15x24, 2 lt	1.50
1 cellar sash, 18x24, 1 lt	1.10
1 cellar door, 2 ft. 10 in. x 6 ft. 6 in. x 1¾	4.00
2 o. s. door frames, 2 ft. 10 in. x 7 ft. 0 in., $2.50	5.00
1 triple frame, 2 wds., 20x28, 1 window 36x28, top sash divided	8.00
2 triple frames, front, 1 window 38x22, div., 2 sash, 12x20	7.50
1 window frame, 18x18, 2 lights	2.25
1 window frame, 20x22, 2 lights	2.25
1 window frame, 18x20, 2 lights	2.25
2 window frames, 32x28, 2 lights, $2.50	5.00
1 window frame, 30x28, 2 lights	2.50
1 twin frame, 30x28, 2 lights	5.00
2 windows, 20x28, top sash divided, $2.50	5.00
1 window, 36x28, top sash divided, $1.50	3.00
1 window, 38x22, top sash divided, $1.50	3.00
2 sash, 12x20, art, $2.25	4.50
1 window, 18x18, 2 light	1.80
1 window, 20x22, 2 light	1.95
1 window, 18x20, 2 light	1.90
2 windows, 32x28, 2 light, $2.40	4.80
3 windows, 30x28, 2 light, $2.30	6.90
Jamb linings for 14 windows, 50c	7.00
1 front door, 2 ft. 10 in. x 7 ft. 0 in. x 1¾	16.00
1 rear door, 2 ft. 10 in. x 7 ft. 0 in. x 1¾	10.00
1 door, 2 ft. 6 in. x 7 ft. 0 in. x 1⅜	2.75
1 door, 2 ft. 8 in. x 7 ft. 0 in. x 1⅜	3.00
1 door, 2 ft. 4 in. x 7 ft. 0 in. x 1⅜	2.65
1 door, 2 ft. 2 in. x 7 ft. 0 in. x 1⅜	2.50

Second Story Doors.

4 doors, 2 ft. 6 in. x 7 ft. 0 in. x 1⅜ in., $2.75	11.00
5 doors, 2 ft. 2 in. x 7 ft. 0 in. x 1⅜ in., $2.50	12.50
1 door, 2 ft. 4 in. x 7 ft. 0 in., 1⅜ in	2.65
5 set door jambs, 2 ft. 6 in. x 7 ft. 0 in., 80c	4.00
1 set door jambs, 2 ft. 8 in. x 7 ft. 0 in	.80
2 set door jambs, 2 ft. 4 in. x 7 ft. 0 in., 75c	1.50
6 set door jambs, 2 ft. 2 in. x 7 ft. 0 in., 70c	4.20
1 set jambs, cased ope., 3 ft. 3 in. x 7 ft. 0 in	.90
1 set jambs, cased ope., 4 ft. 6 in. x 7 ft. 0 in	1.00
68 plinth blocks, cypress, 6c	4.08
1 collonade opening, cypress	35.00
476 ft. side casings, 7 ft. 6 in., 2½c., cypress	11.90
168 ft. side casings, 5 ft. 4 in., 2½c, cypress	4.20
280 ft. head casings, 12 ft, 2½c, cypress	7.00
280 ft. cypress cap mold, 2½c	7.00
280 ft. cypress fillet, ½c	1.40
64 ft. cypress window stool, 2½c	1.60
64 ft. cypress apron, 2c	1.28
236 ft. cypress window stops, 14 ft. 1c	2.36
252 ft. cypress door stops, 16 ft. 1½c	3.78
415 ft. cypress base, 3½c	14.52
415 ft. cypress floor mold, ½c	2.08
300 ft. cypress picture mold, 1½c	4.50
Front stairs	48.00
Medicine case	6.00
Side board	38.00
2 rear porch columns	3.00
2 rear porch newels	1.40
3 front porch newels	3.20
50 ft. porch rail, bottom, 6c	3.00
50 ft. porch rail, top, 6c	3.00
200 porch balusters, 1⅛x1⅛x2 ft. 4 in., 4c	8.00
Total mill work	$384.45

CARPENTER LABOR.

4,722 ft. framing lumber, $10	$ 47.22
2,260 ft. 8 in. sheathing, $10	22.60
1,550 ft. 2¼ face flooring, $1.50	23.25
120 ft. fir flg., $1.50	1.80
350 ft. fir ceiling, $1.50	5.25
12 squares smoothing floors, $1.50	18.00
Setting basement frames	1.50
Setting main window frames	4.50
Setting outside door frames	1.00
40% cost of mill work for finishing	153.78
Finishing closets, pantry, etc	20.00
Incidentals, 10%	29.90
Total carpenter labor	$328.79

RECAPITULATION.

Excavating and masonry	$ 925.55
Lumber bill	276.38
Mill work	384.45
Carpenter labor	328.79
Hardware	48.00
Tin work	15.00
262 ft. slate roof, 12c	29.04
6 squares compo. roof, $4.50	27.00
Plastering, 610 yds., 27c	164.70
Plumbing	290.00
Electric wiring	46.00
Painting	120.00
Furnace heating plant	138.00
Incidentals, 5%	137.39
Total estimate	$2,932.55

EDITORIAL NOTES AND COMMENTS

There is no economy in having your workshop cold. Men always work better and more satisfactorily when they are comfortably warm.

* * * * *

The loss of five or ten minutes by each workman, warming up, if there are many employed, would mean a considerable loss in a week's time, more, by a large percentage, than would cover the cost of extra fuel.

* * * * *

There seems to be a steadily growing demand for the use of French, or casement windows. We hardly approve of this departure from the old and long tried system of the English hung sliding sash window. The casement sashes may answer very well in the milder climates of the South, and middle states.

* * * * *

The hinged sash, has, of course, some advantages, but not many, and where there is an advantage, it should be embraced by the architect or the builder. They can be used often in basement windows or for cellars, as they can be made to open inwardly or outwardly, and may sometimes be used as glass door openings on to a balcony, or on to a stoop or veranda where there is not head room enough to admit of a lower hanging sash to raise sufficiently high to admit of persons passing from the room to the outside without being obliged to stoop. Some of the objections to these windows have been overcome by a number of patent devices where metal has been introduced to prevent wear of the parts that are likely to cause openings. These French casements should never be less than 1¾ inches thick when finished. The meeting stiles should be double rebated or hook jointed, the hanging stiles tongued into the jambs, and the top and bottom edges throated. Double tenons should be used at the meeting stiles, and the front edge of the threshold tongued into the stone or concrete sill. When water-bars are used they should be sunk into the jambs at their ends. We show, in another column, a correct method of making these casements "wind and water" proof.

* * * * *

A subscriber living in Minneapolis desires to learn something of faience, tiles, and other glazed materials used in the building trades. The term faience is now used to represent all architectural glazed ware, other glazed bricks and sanitary goods, which of recent years has come into extended use. Glazed surfaces are of course, hygienic and reflect light. In towns glazed ware is most suitable; it reflects the much needed light, and keeps clean, what little dirt that does collect being easily washed off. Furthermore it affords means for adding the much needed relief of gorgeous color to the streets. For interior work, of course, colored tiles have been used from time immemorial. Glazed terra cotta and wall tilings are now frequently combined, with very beautiful and effective results. They possess the great advantage over all other decorative methods in that the only cleaning they ever require is wiping over with a damp cloth. Under fair conditions, both are practically imperishable, except by effects of fire.

* * * * *

Faience is manufactured of the same materials as ordinary glazed tiles, but it must otherwise be treated exactly the same as terra cotta. Shrinkage must be allowed for in working details. The glory of a tile is its color, and the pattern is comparatively unimportant, except as a peg to hang the color on. The pattern should therefore be conventional. The design of colors can only roughly be suggested in a drawing, for the conditions of manufacture so vary that it is almost impossible to get the exact same tint. Dead flat colors should be avoided as they look too machine made. It is natural for one glaze to run slightly into another on a flat surface in firing, and this gradation of color forms a distinctive and most beautiful feature. If desired to keep colors apart, the forming of cloisonnes seems the most appropriate method.

* * * * *

Why should the walls of public schools, hospitals, homes and other institutions be bare and cold? Why should not such walls be decorated, relieved of their gloom by appropriate paintings? Of course the answer is—expense. In England, however, a committee of artists, art patrons, critics and philanthropists has been formed for the purpose of promoting mural painting in schools, churches, hospitals and other institutions. Young artists and students are to be invited to submit designs and to decorate such wall space as may be offered, for very small pay or without any pay at all, in order to get useful experience. The idea is to submit all designs to intelligent criticism and accept only truly artistic work. Contributions are solicited, but much free work is expected.

* * * * *

Is not this plan excellent from every point of view? Would it not promote art as well as public appreciation of mural painting? Why should not American artists and lovers of beauty start a similar movement in this country? The Hull House Theater offers a good example of appropriate mural decoration, and thousands have admired the painting as well as the subjects. Why not follow this example? We know of instances in Canada, where one or two public buildings have had walls decorated with mural paintings by local artists, with subjects of early Canadian history, and they have proved quite effective from an artistic and historical point of view, and in a measure are instructive and elevating.

* * * * *

The contractor and builder, especially in the smaller cities and towns, has a most important relation to the growth of the town. By the exercise of his knowledge of materials, construction, and even design, he is able to advise the prospective home owner regarding the style house he should build, as well as to keep the cost within the necessary limits.

The average householder builds a home but once. No amount of spare time study can fit him to design, specify, superintend or construct the erection of his home. His experience has not been along those lines and his ignorance puts him at the mercy of an unscrupulous contractor, even as his false ideas embarrasses an honest one.

But the aggressive contractor is not alone concerned in the actual erection of the building. His work should begin before the owner's idea of beginning. He should know those who are able to own their own homes, and show them the economy of being a home owner, as well as the pleasure of possession.

Many a young man would build a modest cottage if he were urged, and frequently by joining with several others, a little colony can be established in which each would have a relatively important part in keeping up the good appearance of yards and streets.

There is a class of people who would never build a house anyway. But the up-to-date contractor can frequently build the house in the desired neighborhood, and behold, he has a buyer. A home is acquired without the annoyances of building, and the contractor has built a house in record time, partly because there was no owner to consult, change and delay the progress. By knowing his man, the contractor can really build him a house without his knowing it.

The American banking system comes in for a good deal of abuse, for which it is not always to blame. The contractor knows how to arrange the loans, and can take a load of care off the shoulders of the clerk, mechanic or laborer who is not familiar with banking customs. By arranging all this for the prospective client, the way is smoothed out, and the usual objections disappear. The contractor to do this work must have an unquestioned reputation with the bank, as well as with the material dealers.

It frequently happens that one house built leads to a number more. The hearty house-party at the opening of a new home, the first enthusiasm and a convenient vacant lot nearby makes the opportune presence of the contractor seem like an act of Providence. The house suits everyone. Of course he will build another, and yet another, at the same price.

When the contractor reaches this stage it is sometimes advisable to own a tract of land or parcel of lots, to better control the class of houses which go on it. When every land owner has the right to build the style house he pleases, the contractor is wise to sell the lots, with the houses on it, making thereby a profit on both lot and house.

THE LIVING ROOM, WITH ITS APPROPRIATE TILE FIREPLACE.

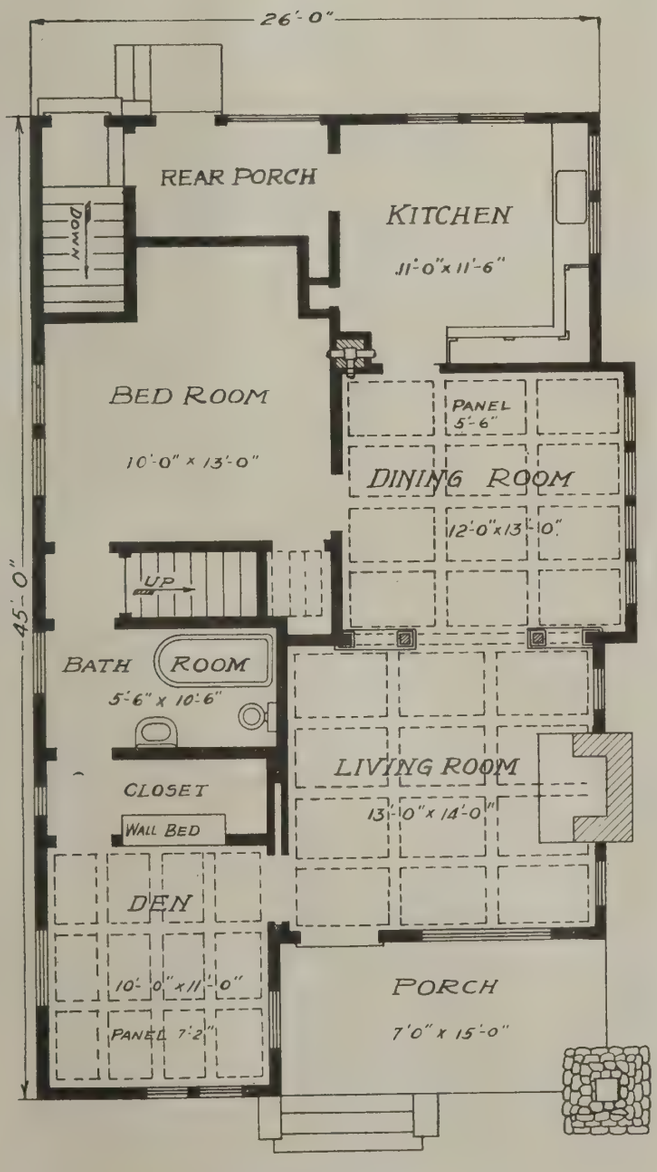
THE DEN, PANELLED WALLS AND BEAMED CEILINGS.

THE FRONT: UNIQUE EFFECT WITH FIELD AND COBBLE STONES.

THE DINING ROOM. THROUGH TO LIVING ROOM.



THE REAR. NOTE THE SLEEPING PORCH.



FLOOR PLAN

A MODEL BUNGALOW

By JUD YOHO

A BUNGALOW bargain is found in this commodious and attractive home, costing less than $2,000. There are five rooms on the ground floor, in addition to front and rear porches, and bath room. There is a small staircase to the attic, which is fitted for children's sleeping rooms with a small sleeping porch overlooking the rear entrance. A full concrete basement contains other rooms, including a servant's room, completing a compact little residence capable of accommodating as many as a seven- or eight-room house.

The house was built this summer in Seattle by Architect Jud Yoho of that city. The exterior is of heavy siding covered with cedar shakes, laid 12 inches to the weather and stained a silver gray. The trimmings are white, with green window sashes, dark brown latticework and braces. A single timber supporting the front arch over the porch, rests on a pyramid column of cobblestones. The fire-place chimney is of pressed brick, light gray in color, and interspersed with cobblestones.

The interior includes a living room off the porch, containing, among other attractive features, a tile mantel with opening for a three-foot log. On either side of the mantel are small, mission-framed windows of art glass. The woodwork of this room is of slash grain fir, stained a delicate brown. The beamed ceilings are of the same material in eight by eight-inch beams. The walls are tinted a gray tinge, corresponding with the exterior stain.

From the living room into the dining room is an opening about six feet wide. The demi-partition is panelled on the living room side with rotary-cut, three-ply, veneer panel fir, and on the dining room side is used for a china closet. It supports two massive looking columns of the same wood on either side, extending to one of the ceiling beams which are carried into the dining room. This room is panelled as high as the plate rail on all sides not taken with the leaded glass closets for china and glassware. Mission fixtures for lighting are in use throughout. The floors are all of oak, with a wax finish. This room is slightly smaller than the living room, with the kitchen a bit smaller than the dining room. Back of the kitchen is a good-sized lattice porch which can be used in the summer as a breakfast room.

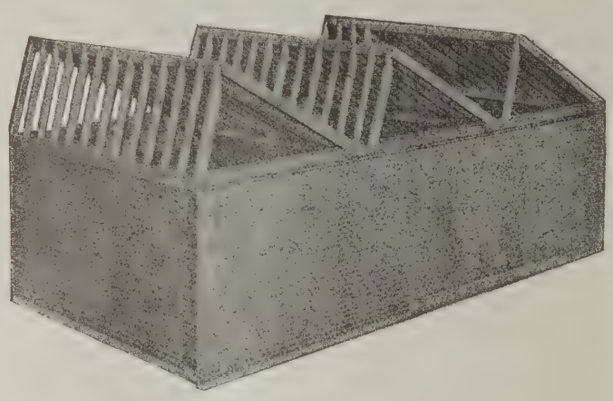
This bungalow has a frontage of twenty-six feet and a depth of forty-five feet, including porch, and has been built complete, including plumbing, heating, electric lighting and painting, for $1,938.

ROOFING WITH THE STEEL SQUARE

A SAW TOOTH ROOF

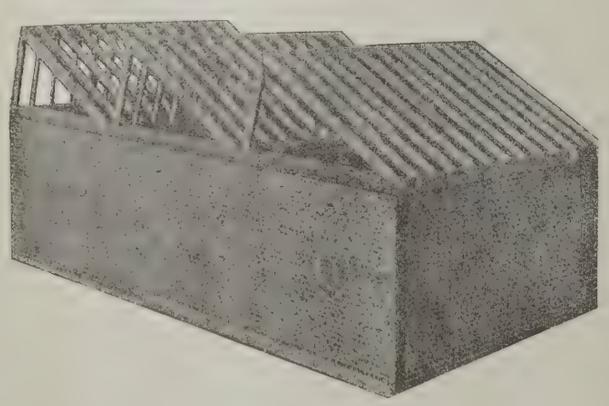
A SAW-TOOTH roof is one in many districts is quite unknown, while in others it is very common. It is constructed, as a rule, for covering weaving sheds, engineering shops, and similar buildings, when it is very useful, as owing to the size of these it is necessary to take the light from the roof, and the upright sides of this kind of roof form a ready means of doing this without the risk and expense of skylights. In some cases the whole of the upright parts of the roof are formed of rough plate-glass, but in others certain portions only are so formed, the glass being inserted in lights hinge at the top, thus forming a very efficient means of ventilation.

In the ordinary methods of roofing, the ridge runs parallel with the longer way of the building, but with the saw-tooth roof



this is not so, the series of roofs running across the width of the building, as in the plan, Fig. 100, so that the intermediate plates will have a comparatively short bearing. However, if the building is a large one, these would be supported by a series of columns. The intermediate plates take the form of gutters, as shown in the plan (Fig. 100), the section (Fig. 101), and the sectional detail (Fig. 102), and if the building is a large one, the necessary columns may well take the form of iron pipes to carry away the water from the roof. If this is done, the plates may be fixed level, the pipes being sufficient to drain them, but if not, a certain amount of fall must be arranged for, so that the gutters will empty themselves in the usual way.

Fig. 100 is the plan of a saw-tooth roof consisting of three spans, and covering a building 36 ft. long by 18 ft. wide. The outside eaves are finished level, so that the outside and inside



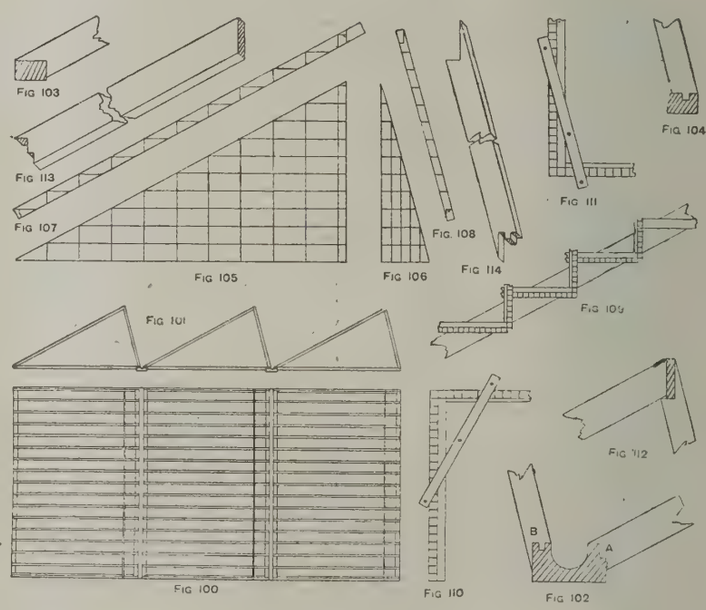
rafters come practically alike as regards finish, but they will require varying slightly for the sake of strength; thus, while the outside rafters on the left of Fig. 100 will fix to the plate as Fig. 103, the corresponding rafters on the other two spans will fix to the gutter plates as Fig. 102 (A). The upright rafters on the right of Fig. 100 will fit to the plate as Fig. 104; those in the other two spans will fit as Fig. 102 (B). These are simply details, and do not affect the length of the angles of the rafters in the least.

To obtain the pitches shown in the roofs, a going of 10 ft. 3 in. is found on the left, and of 1 ft. 6 in. on the right, the height being 5 ft. 6 in., which gives practically a rise of 5⅜ in. in each foot of going for the long rafters, and a going of 3 in. full to each foot of rise for the short rafters. These latter being practically upright, it is more convenient to work them this way than the other.

The section of the roof as set out in squares is as Figs. 105 and 106, the going in the latter being marked in alternate squares only. The scantlings, with length and angles of the two rafters marked on, also the successive stages of the squares, are given in Figs. 107 and 108, and the successive positions of the square on the longer rafter are shown in Fig. 109. This latter shows the square in use without gauges, but it is best to use the gauges mentioned previously, especially in the upright short rafters, and these are shown fixed on the square in the correct position for both long and short rafters, in Fig. 110 and 111 respectively.

The bottom ends of the intermediate long rafters should be cut into the plates, as at A (Fig. 102), the latter either being notched to take them, or rebated throughout the length. If this precaution is not taken, the roof will be very weak at this point, and the rafters will be liable to split at the throat.

The short rafters should be tenoned into the plates, both outside and intermediate, as shown in Figs. 102 and 104, this



adding greatly to the strength. If, however, this is not done, they should be fixed by nailing through the lip into the edge of the intermediate plates, the outer ones, of course, being nailed at the top.

The long rafters will be cut with a plain bevel at the upper end, but the short ones should be cut with a bird's mouth to fit under the ridge, as in Fig. 112; thus, the long and the short rafters when cut will be as Figs. 113 and 114 respectively.

The various lips and tenons at the ends of the rafters are all parallel with, or at right angles to, the main cuts, so that they can all be obtained without difficulty with the square, and as the rafters will not vary in length from point to point, no confusion need be caused by the different form of feet.

The two outer spans of a saw-tooth roof should be provided with ties, preferably iron rods, at the usual intervals, but the intermediate spans should not need these, the thrust from either side preventing any tendency to spread after the complete roof is on. Temporary ties during erection may be needed; in fact, they should be used for the sake of safety to the works.—Building World.

MAKING YOUR SHOP HELP OUT

By J. CROW TAYLOR

"THE FIRST THING I am going to do," said a carpenter and contractor, who has a shop, but up to this time had never installed any power-driven machinery, "is put in a foot-power mortiser and make up a lot of my old sash and odd frames.

"I find that it is often more trouble and expense to get odd frames and old sash now and then than it would be to make them. They not only cost extra at the planing mill, but there is delay in the time involved in running after them and I have concluded this is a good way to make my own workshop help out.

"I can do quite a lot of the work myself on rainy days and dull days, and when busy season comes on I believe I will have enough of these odd jobs to keep some old fellow, who is a good all-round workman, but is not very lively at climbing around on buildings, busy in the shop.

"I am going to start with a foot-power mortiser, so that I can get sash stuff, which I will have run through the sticker at the mill in any length the lumber comes in and then can cut up myself, make into cellar sash, transoms and attic sash, and other odd sash that I have a call for now and then and that sometimes are missed in the regular order. Some of them are overlooked, but more of them really come from changes and alterations when work is in progress, These call for special sash here and there that I can make up easier than I can get made at the mill.

"Not only that, but there is the cellar frames, for example. They are the first thing I want and generally it is hard to get them on the job from the planing mill until the regular list of frames comes, and these are generally plain, box frames that we can often get material for out of our left-over stock.

"Then there is screening, the making of door and window screens, which I can have for a sort of knitting job in the shop. The main thing I need to help out and make the thing practical is a mortising machine, and I think I will start with a foot-power mortiser and make my own shop help out a lot in convenience and save me enough money to more than pay for one man at work there."

This is the man's idea for the beginning, but the chances are it will be only a start and as soon as he makes this start he will find it worth while to add some power-driven machinery, either a rip-saw or combination woodworker of some kind, including a band saw or a jig saw.

There is no question but what the man with a little machinery equipment can make his own shop help out considerably. It is not so much a matter of taking the place of planing mill work proper. The standard planing mill work can generally be bought cheaper than it can be made. At least until a man has a pretty thoroughly equipped machine shop of his own.

But one can make a little machinery in his shop help out a whole lot. He has generally quite a lot of left over stock from every job, odds and ends that will become worthless ordinarily and be piled up and used for scrap.

Yet, lots of this stock can be worked into frames, odd sash, and now and then some short length trim worked out of it for special purposes, and by taking care of it and using a little ingenuity one may make his own shop help out enough to turn the balance decidedly in his favor during the busy season.

It is an excellent plan to start modestly, as this man was figuring on, and not get wild and buy too much equipment at once, because it is hard to tell in advance just how much equipment you will need or what will work in best. It is by getting one thing at a time and gradually developing this work of making the shop help out that you are best able to determine the right machines for your own particular work. Once you get at it, though, you will find the game interesting and that one thing will suggest another and the whole business will grow up gradually and almost unconsciously and it will aid you materially in not only doing your regular work, but it will put you in the way of developing a lot of special work that heretofore you have not thought worth bothering about or have not been in position to supply.

PAINT FOR WET OR DAMP PLACES

By A. ASHMUN KELLY

THE main difficulty with paint used in damp locations consists in the poor adhesion of the paint to the surface to which it is applied. It is not so much a question of paint as of adhesion. If the material to which the paint is to be applied is not perfectly dry there is bound to be trouble, the paint either will not stick, or it will soon deteriorate. If possible, therefore, get such parts dry. It often occurs that the dampness comes from the season in which the painting is done. In this case it is far better to wait until the dry season sets in. Very little damage will be done to a building by standing without paint for a few weeks. Perhaps none, while at the same time great good will be accomplished in withholding the paint, which would certainly go wrong.

The paint for a naturally damp situation, as in the vicinity of a body of water, a river, lake, etc., can be made by using a harder body than for other places, where the air is dry and mild. I would particularly recommend a composition paint, such as most paint makers now prepare, and in which enter some sinc oxide, white lead, earth pigment, and some inert substance, like floated silica or barytes. Then I would advise some spirits of turpentine with the oil, as tending to produce a harder paint than oil alone will give. Also not too much driers, notwithstanding that the paint is to meet damp conditions.

In the foregoing I have had in mind the painting of wood only. Paint for metal in damp places will call for little different from that demanded by wood, only the first coat and the preparation of the raw surface will be different, as metal, meaning here iron or steel, is likely to rust under paint unless carefully prepared beforehand. First, the surface must be made perfectly clean, with wire brushes, after which a priming coat or red lead paint may be given. For priming iron this is the best paint known. Upon this priming coat may be placed the usual paints, or about what has been indicated for wood in damp situations.

For walls, brick, stone or concrete, in damp place, there will be necessary the water-proofing of the surface, and, if possible, the prevention of the drawing up of moisture from the earth. This is not easy to do. Some use coal tar to coat the surface for a distance above the earth, but no paint will do well on tar. If a foundation could be built upon loose stone, instead of mortared stone-work, the drawing of dampness by the wall would be next to none at all.

There are what is known as damp-resisting paints, but such would be out of the question with ordinary painting of buildings. A carefully prepared ordinary house paint is about the best we can get for damp or dry places. There is no paint that can be recommended as proof against dampness. Sooner or later the paint will yield to the silent but powerful influence of H_2O, but as stated, with care a paint may be given that will last the maximum of time, provided that the work and conditions are right.

Another trouble with paints subject to dampness is mildew, which is caused by a fungous growth, the result showing in blotches of greyish-black, greatly disfiguring the surface, and in time causing the paint to fail. There is no preventative, and the only cure is washing it off, only to see it reappear in time. Mildew occurs not only in damp situations, but wherever the sun does not get at the paint, as on the north side of a building, and under porches. It occurs in its most aggravated form where certain pigments are used, ochre being particularly liable to mildew, and in fact most of the earth pigments will. There might be a paint devised that would resist this disease, if I may call it such, but there is none that I am aware of.

The paint for damp situations would do better if mixed carefully, strained carefully, and applied evenly and thin, brushing it out well. Allow each coat to dry perfectly before giving the next coat. Four coats would be better than three, and three much better than two. The linseed oil should be raw and of the very best quality. As previously stated, a certain proportion of turpentine, depending upon the amount of dampness present, should be used. A hard, non-porous paint is what is required for the painting of surfaces subject to dampness.

BUILDING CONTRACTS

By W. J. STANTON

PRELIMINARY to the execution of contracts for buildings or other works, an estimate is frequently made of the amount of materials to be furnished, to be submitted to prospective bidders for the work. The contract does not, when entered into, usually refer to such bill, but requires the work to be completed as a whole according to certain plans and specifications. Though such bill is used by the bidders in estimating the amount of their bid, there is no implied agreement on the part of the builder that the bill of quantities is correct, and in case such bill is incorrect, the contractor is not entitled to compensation, as for extras, for additional work and materials necessary for the completion of the work.

Whether a working contract is entire or divisible depends, of course, upon the intention of the parties and the terms and subject matter of the contract. If the contract is for the construction of an entire work or structure for a fixed compensation, it is considered as entire and not divisible, especially where it is stipulated that the compensation is not to be paid until the work or structure is completed. So, though the contract calls for the performance of several items, if the compensation is not apportioned among the several items, but provides for a fixed sum for the work as a whole, the contract is regarded as entire. If the contract is for a work as a whole, it will not be rendered divisible by the fact that the compensation is payable in installments as the work progresses, as where payments are made periodically on an estimate of the amount of work done, or as the work reaches certain stages of completion. As a general rule where a working contract requires the performance of several separate and distinct items, the price for which is apportioned to each item, or where the price is clearly and distinctly apportioned to the different parts of but one item, it will be regarded as severable.

In the absence of any provision, therefore, in the contract the builder has the right to demand that the contractor shall permit modifications and alterations of the agreement. Working contracts, however, frequently expressly provide that the builder shall have power to make alterations and modifications and require the contractor to assent to such alterations and modifications. The contractor and builder may, of course, by subsequent agreement modify the original contract and authorize or require deviations and alterations therefrom. The architect or engineer under whose supervision the work is being performed has no implied authority to modify the contract and authorize deviation therefrom by the contractor; but the builder may confer on his architect or engineer the power to agree to modifications of the contract.

Where the deviations and alterations are made by agreement of the parties, the builder is liable for any increased cost resulting, the provisions of the special contract governing as far as possible, and it is sometimes provided that where the deviations lessen the cost of the work, the contractors charges shall be decreased proportionately; but if the alterations are made at the request of the builder and without any agreement for a reduction from the agreed compensation, the contractor is not obliged to allow a deduction, although the deduction lessened the cost of the work. Slight modifications and alterations made in a working contract with the consent of the parties do not abrogate the entire contract and the rights and obligations of the parties thereto, but the original contract continues in force, except as altered by such modifications. If, however, the original contract is deviated from in material respects so that the work cannot be reasonably recognized as that originally contracted for, the original contract should be treated as abandoned.

As in case of other contracts, a building contract may be rescinded and terminated by mutual agreement of the parties, but to show a rescission by mutual consent of the parties the intention to rescind must be apparent or clearly shown by implication. The fact that the builder, upon the wrongful refusal of the contractor to complete the work, has the work done under his own supervision does not show a rescission or termination of the contract by mutual consent. If the builder wrongfully prohibits or prevents the continuance of the work, he is liable in damages to the contractor for breach of the contract. Fraudulent representation on the part of the builder will, as in other cases of fraud, authorize a rescission by the contractor. The builder may by his acts waive his right to rescind the contract for failure of the contractor to properly perform his contract. Thus, where the builder accepts the work in an incomplete condition and makes use of it, he waives his right to rescind the contract for failure entirely to complete the work.

The law recognizes as valid provisions in working contracts that the builder may, at his option or on certain contingencies, stop further performance of the work without incurring any liability to the contractor for damages, or that the builder may rescind and annul the contract upon the failure of the contractor duly and properly to perform the work, or allowing the builder to annul the contract if the contractor is not doing the work to his satisfaction. So provisions that upon the failure of the contractor, in the opinion of the architect in charge of the work, to proceed with the work with proper speed and in a proper manner the builder may rescind and annul the contract are valid, and in the absence of fraud or bad faith on the part of the architect his decision upon such question is, as a general rule, conclusive upon the contractor. His decisions may, however, be impeached for fraud or bad faith. In order to authorize the builder to rescind and annul the contract under provisions therefore in the contract he must comply with the requirements of the contract as to the exercise of such right. Thus, the builder must procure the required certificate of the architect and must give the required notice of his intention to terminate the contract.

The builder may, of course, waive his reserved right to rescind and annul the contract, and if, after the cause for termination, he fails to declare a termination of the contract, and acquiesces in the continuance of the work, he waives his right to terminate the contract for such cause. Thus, where the right to annul and rescind is dependent upon the failure of the contractor to proceed with the speed required to complete the work within the required time, the builder, by acquiescing in the continuance of the work after the specified time waives his right of rescission.

Building contracts providing for payments in installments frequently provide for a retention by the builder of a certain percentage of the value of the work done until the full completion of the contract, and for a forfeiture of such percentage in case of an annulment of the contract for failure of the contractor duly and properly to perform. While such provision are upheld and enforced, the right to retain such percentage must be clearly brought within the provisions of the contract.

(To be Continued.)

THE MISSION OF THE MOTOR TRUCK

PUTTING the automobile to work has been the result of investigations carried on by manufacturers of automboiles and the users of them. The good results obtained by men such as architects, engineers, salesmen, manufacturers, etc., who have to cover a large field in the course of a day, has resulted in the adaptation of the automobile in the form of motor trucks for various lines of industries to follow up these men with the delivery of supplies.

Only a few years ago motor trucks were an experiment. Today the large manufacturers and dealers have resorted to their use to cut down delivery costs and widen the field for the delivery of the output of the factory. A circular issued recently by one company showed that they had supplied motor trucks to at least eighty-three different lines of manufacturing. This shows the rapid growth of the motor truck business and the quickness with which manufacturers are beginning to grasp the opportunities that allow them to operate their factories more economically. An investigation of the motor truck by factory managers who have hitherto held aloof, would doubtless result in great economy in the delivery of the factory output or the prompt securing of certain supplies, etc., required for the plant.—Pacific Builder and Engineer.

THE MITER BOX

By J. E. TRUITT

'TIS an old saying that "the best workmen use the simplest tools." However this may be, the mastery of a few fundamental facts and basic principles would render useless a lot of hard-to-remember and senseless rules. And so we come to the consideration of the uses—the wide range and possibilities of the miter box—not the ordinary wooden affair made of three pieces of board in the shop or on the job, seldom accurate, limited ordinarily to two cuts, one forty-five or square miter and one square cut, quickly worn out and useless—but the modern, up-to-date, strongly modelled, accurate, durable, and above all, scientifically constructed box. I say "scientifically constructed" because such is really the case. It is taken for granted that every mechanic knows that a square is an angle of ninety degrees, or the fourth part of a circle. In the full circle, there are, of course, 360 degrees. On this basic fact, hence scientific, is constructed and arranged the miter box of this article.

Huxley says that an unverified theoretic conception is but a figment of the imagination, but Mr. Huxley does not say there are no verifiable theoretic conceptions, and any bright boy is capable, with a good miter box and saw, of verifying with an accuracy equal to the best geometrician many and various theories and problems. In fact, it will give invaluable "first aid" in the solution of a vast number of cases, often puzzling to even experienced workmen, and nothing in the whole list of carpenter's tools conduces more to neat and accurate work than a good miter box. The figures herewith show that while it is thought to be helpfully suggestive, it is little more than just a hint. However, "a hint to the wise is sufficient."

Figure 1 shows the general arrangement of the bottom of the box (the back is not shown). The "Saw Line" simply shows the position of saw to cut the triangle, shown at A in Figs. 1, 2, 3 and 4. It will be noticed that triangle A in Fig. 1 and triangles in Fig. 2 are exactly the same slope and are perfect equilateral triangles, and are horizontal plane figures with no bevel.

The triangles shown in Figs. 3 and 4, it will be noticed are longer and sharper, owing to the "Pattern Board" being elevated on upper side in miter box by being placed on blocks cut at the desired angle. In Fig. 3 (marked B), it is shown as 30 degrees, while in Fig. 4, it is shown as 45 degrees. It will require two of these little blocks upon which to rest the "Pattern Board" while being sawn. Of course, if one side of the "Pattern Board" is elevated and sawn through (no matter at what angle except right angle) we will have a beveled edge. Some would call this a compound miter, but the writer prefers the term, "Beveled Miter." Figure 7 shows the bevel for triangle in Fig. 3. Fig. 8 shows bevel for Fig. 4. Figures 5 and 6 are simply suggestions.

In conclusion will say, get the boys a good miter box and let them experiment and demonstrate.

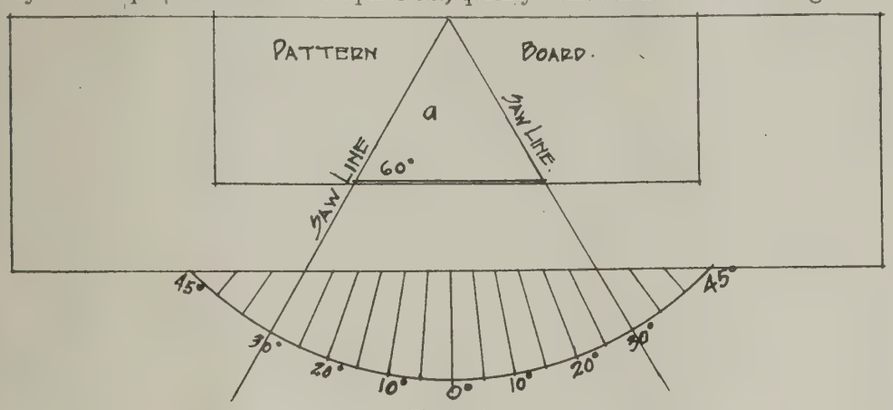


FIG. 1.

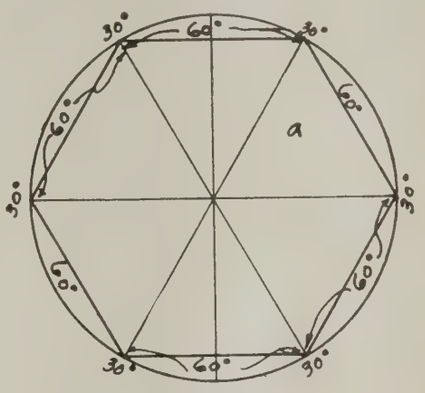


FIG. 2.

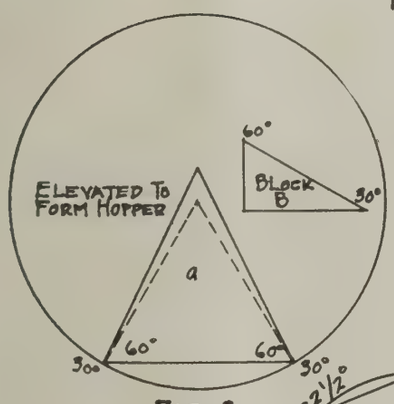


FIG. 3.

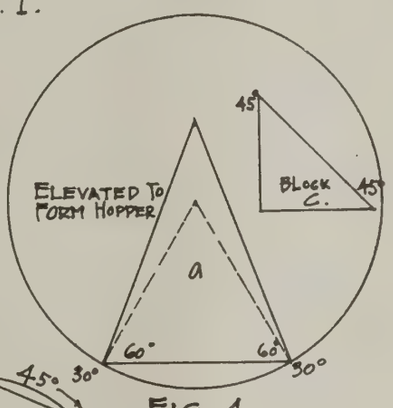


FIG. 4.

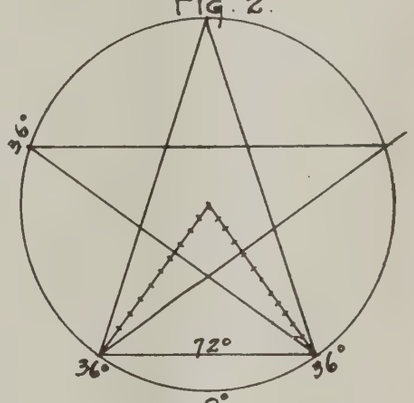


FIG. 4.

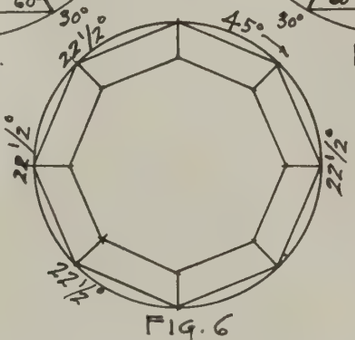


FIG. 6



FIG. 7. FIG. 8.

Don't let me miss this month's issue as I am anxious to get it. It is the best builder's paper I ever saw on the subject of carpentry and building.

LOUIS H. STAGNER,
420 Bighill Avenue, Richmond, Ky.

DICKINSON, N. D., November 16, 1911.

I am a builder here and could not get along without your paper now, after having kept it for one year.

OTTO HONSEY,
Seventh Avenue West, Dickinson, N. Dak.

WHAT IS FIREPROOF

By H. B. McMASTER

AGITATION of the subject of saving our created resources is not complete without directing effort to the determination of the properties of buliding materials by some medium through which can be formed an absolutely impartial judgment.

When the committee or commission that may be formulating the building code of a city or state is pursuing its work, they are throughout their deliberations besieged and besought by salesmen and representatives of the various manufacturers of building materials, each with his evidence all built up to convince one that his material should be given preference, or at least a recognition, and this a competitor may later dispute.

This competitor will apparently have a case as strong as his rival—and so the "merry war" goes on, but the men who are building the code are confused and often with all integrity back of their conclusions, will take action that is the result of good "salesmanship" rather than of a presentation of facts.

Much that is offered as evidence of the fire-resisting quality of materials is not based on scientific data and, in fact, it is doubtful if absolutely unbiased conclusions in these investigations will be found except they come from tests or experiments conducted by a Bureau of the Government. Many of the problems now confronting insurance engineers, constructing engineers, architects, city and state governments and others would be solved were investigations to ascertain definitely and scientifically the properties of building materials, particularly as to their fire-resisting qualities, to be pursued by the Bureau of Standards. This bureau, with a limited appropriation at its disposal, has begun work of this sort but as yet has not been given facilities to demonstrate the relative fire-resisting values of the different materials that go into buildings.

With delay in having this important research made by this bureau, which is the one best equipped for that work, there will be continued waste of effort and futile endeavor on the part of states and cities to fix standards.

The prime thing in favor of having the Bureau of Standards carry on this research is that it would undertake to learn just what various materials will do under all conditions that might be created in a conflagration, and their findings would be free from prejudice as between the manufacturers of competing materials.

This matter is deserving of agitation that a sentiment shall be created which may result in this very important work being taken up by the Bureau of Standards and through that medium have settled for all time what materials can best be depended on to retard a fire.

This data is very much needed by those who say what shall be used in buildings and a manufacturer of building material who would object to the development of facts along the lines proposed might be suspected of a want of confidence in his material, or a lack of integrity.

If this project could have the support of the several trade journals whose columns are devoted to all that will promote engineering, architecture and building construction generally, it would soon crystalize into a definite movement which should result in legislation and appropriations commensurate with the importance of this work.

CUTTING ROOF HOLES

An old, but perhaps not the best, method for laying off a hole for an upright round pipe in a slanting roof is to stand the pipe upright on the roof as shown in Fig. 1, and then by means of a steel square, or even a straight strip of wood, mark a number of points in the outline of the hole. It is evident that the heel of the square will rest upon that point of the roof through which the part of the pipe against which the straight-edge is placed would pass, and by marking a sufficient number of these points and drawing a line through them we can mark out the shape of the hole with great accuracy. By using a ruler, with a pencil

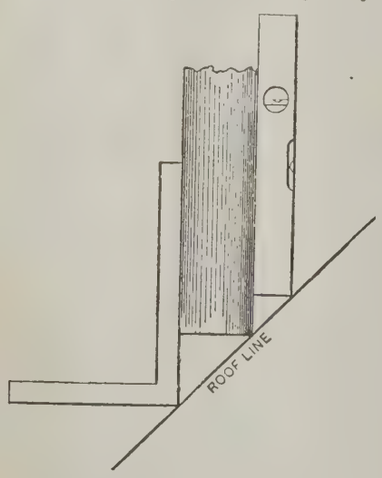


FIG. 1

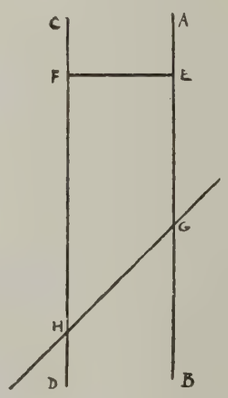


FIG. 2

or scriber fastened to the lower end, the process is somewhat simplified; but even then it requires two persons to perform the operation—one to hold the pipe plumb and the other to guide the ruler—the work being done on the unsteady footing of the roof.

The following is, to my mind, a much better plan; this can be carried out by a single person and all the fine work be done at the bench or on a table.

Every student of geometry or mechanical drawing knows that when a cylinder or round pipe is cut square across, the cross section is a true circle; but when the cut is oblique or bias, as the ladies call it, the cross section is an ellipse of which the diameter of the cylinder is the shorter or minor axis, and the extreme length along the slope is the major or longer axis; and these two measurements are all that are necessary to enable us to describe the ellipse accurately. To apply this in practice proceed as follows:

Stand a plumb-rule on the roof and by means of a bevel get the exact slope. Next draw on a board or stiff paper (common sheathing paper is as good as any) two parallel lines at a distance apart exactly equal to the diameter of the pipe. Let A B and C D, Fig. 2, be the lines representing the pipe; E F, a line drawn square across these two lines will be the minor axis, and G H, a line drawn across the two parallel lines at the same slope as that of the roof to the plumb line, will be the major axis of the ellipse; then on a piece of stiff paper or thin pasteboard draw two lines square with each other, as A B and C D, Fig. 3, and

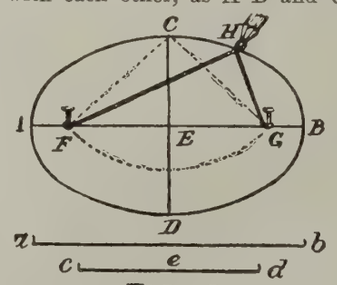


FIG. 3

let A E and E B be each equal to half the longer axis and C E and E D each equal to half the shorter axis. With C as a center and A E or E D as radius, describe arcs cutting A B in F and G; F and G will be the foci. The ellipse may now be described by various methods, one of which is to use the steel square as a sort of trammel, but the simplest method is to drive three fine wire nails, one at C, one at F and one at G, and tie a thread around them as shown in Fig. 3. The thread should be linen, of a kind that will stretch as little as possible, and it is well to wax it before using it. Then place the point of a pencil in the loop at H and move it around the curve, keeping the thread taut. The pencil will mark out an ellipse which is the exact shape and size of the hole you require. Cut the ellipse out of the paper or pasteboard and you will have a template by which you can mark out on the roof the outline of the hole. One advantage of this method is that you can move the template about so as to get the best position on the roof.—Albert Fair, in **The Operative Miller.**

VENEERED BRICK CONSTRUCTION By B. F. YOUNG

THERE are some good and some bad features about veneered brickwork on houses, but the bad features can be entirely eliminated by the proper construction of the work in all its details.

On concrete buildings, this is an economical finish, as it is very expensive to make and set forms to get a good smooth finish on the exterior of the building.

On frame houses, this method is also economical, in that the completed structure has the appearance of a brick house at a greatly reduced cost.

In veneering a frame house the framework should be sheathed with either lap joint or tongue and grooved sheathing, jointed and well nailed on every bearing, to make a tight job and substantial fastenings for the anchors of the brick.

After sheathing, the building should be covered with a good

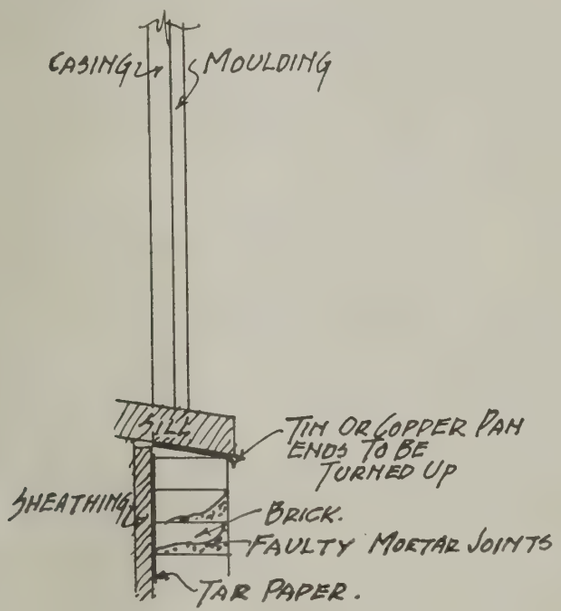


FIG. 1.

grade of tar paper (waterproof), well lapped, because every precaution should be taken to protect the sheathing from leaks and dampness.

In setting the window frames, we come in contact with the principal part of our work, and the cause of many of the evils of veneered brickwork. Too much care cannot be taken in having the window and door frames properly tinned or flashed. The bottom of the window sills should be grooved about three-quarters of an inch deep on the sheathing line or back edge of the casing, to admit of a tin or copper pan being inserted up into the same, and then the pan should be wide enough to extend out over the edge of the brick about one-eighth or one-quarter of an inch, to prevent the water from driving under the sill. This is not extremely essential where the brickwork runs to the ground, but in case brick are carried on a girder spanning a room below with a roof adjoining the same it is then desirable to throw off the water from each individual window and prevent it from running down between the brick and the tar paper. For detail see Fig. 1.

On the sides of the window frames the flashings should come under the outside case moulding, and then be bent back against the sheathing, the outer edge being bent or turned over on itself about a quarter of an inch, not flattened out, but left a little open so that the water in running down the flashing cannot spread out,

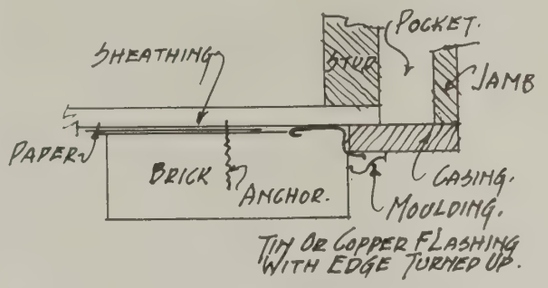


FIG. 2.

but will be guided down to the sill pan below, and carried out beyond the fact of the brickwork. See detail Fig. 2.

The tar paper should by all means be neatly lapped down over the window cap to prevent any leaks from gaining access through the head of the window frames, and on the sides of the windows the paper should be under the side flashings of the window casings.

I think I have covered all the principal details that can be mentioned regarding the carpenter and tinner, and the rest is now up to the bricklayer to lay up a tight wall, properly anchored to the sheathing, and resting on a good solid foundation. A water-tight or pressed brick is preferable to any of the soft porous brick. A great many leaks come through faulty laid brickwork, the joints between the ends not being properly mortared, which leaves the top of the joint with a thin point of mortar and is easily accessible to the elements of nature and the cause of many bad leaks. See detail Fig. 1.

I was called upon recently to inspect a brick veneered building for leaks, which had cost many dollars for needless carpenter and tinsmith bills. The worst thing about this building was that the brickwork came down on a girder spanning the rear of a storeroom, the rest of the rear being tin roofed.

The water always leaked through this girder into the room below. I came to the conclusion that there was either no tar paper on the buildings, or the tin roof did not come up under the brickwork and tar paper. Now, to repair this property was an expensive

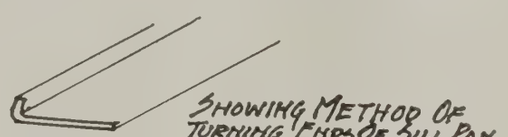


FIG 3

job, so I set out to find how the leaks came behind the brick, which I soon found undoubtedly came through defective mortar joints, which had opened up at the top edge of the joint between the ends of the brick. The brick were repointed, and the treatment has apparently fixed the leak.

GEORGE'S DECISION By N. E. DUFFY

GEORGE, a youth of seventeen summers and the son of a retired builder, had spent the greater part of his time at school, with the understanding that on his seventeenth birthday he was to decide upon his future occupation.

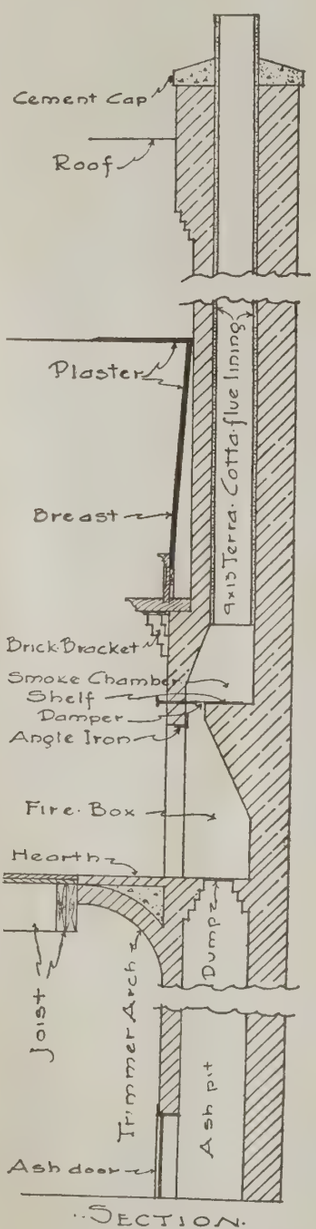
His education was as nearly perfect as could be obtained in common and high school branches, and while his father had allowed him to decide for himself, his wish was that he would take up one of the professions. He agreed to furnish him with the means for any course he should care to pursue, or tools for any of the trades, should he thus decide.

The time had come, and George, who had been doing considerable thinking, decided to become a builder and learn the carpenter trade; he had always been a lover of tools and a close observer of plans. The tools required were furnished and George was requested to examine them, which he did, while his father stood by and looked on. The boy stood still in deep thought for a moment and his father inquired if there was anything missing. George answered, "Yes, Father, there is one thing I want that I have often heard you say every carpenter needed and should have, the NATIONAL BUILDER." And he got it.

HOW TO BUILD A CHIMNEY

By DONALD FOLSOM

FIREPLACES and chimneys have been in use for over three hundred years, says Donald Folsom, in The Country Gentleman, and yet we usually build them in a hit-or-miss way that relies chiefly on luck for success. The result, nine times out of ten, is either a big fire and no heat, or a smoldering pile of logs and a room full of smoke. A little care and thought given to the design and the construction would banish these objectionable features. The properly designed fireplace should throw the maximum amount of heat into the room and the minimum amount up the chimney, and should carry all the smoke up the chimney. It should also be an ornament to a room and should be made safe against fires.



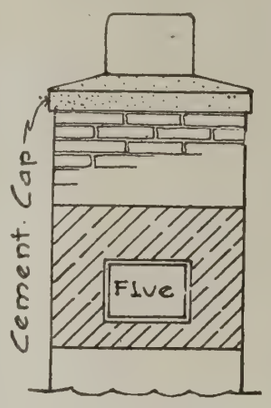
·SECTION·

One of the illustrations shows a fireplace the design of which is along the most modern lines, and those generally accepted as mathematically correct. It has a simple brick front with a wooden mantel shelf, supported on corbeled brick brackets. The only attempt at ornament is the line of half-bricks or "bats" round the opening of the firebox, and the bricks on end at the base of the jambs. This front, of course, may be elaborated or the character changed to suit the architecture of the room in which it is to be placed or the individual tastes of the owner, or it may be built of stone or other material; but the principles involved in its construction would be the same.

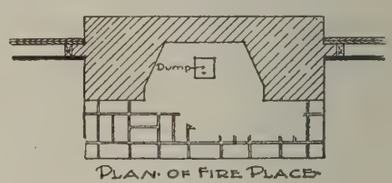
For practical purposes the opening of the firebox should not be over three feet wide and from two feet six inches to three feet high. The depth should be one-half of the opening; and the width across the back, two-thirds. The flue should have an area equal to one-tenth of the area of the opening of the fire box if wood or bituminous coal is to be burned, but it may be reduced to one-fifteenth if anthracite coal is used.

The ash-pit is a very convenient though not an essential part of this design. In a fireplace that is frequently used it will be found to be a great saving in time and labor, since the pit will have to be emptied but once or twice a year and then from the cellar. The piers on each side of the firebox, known as the jambs, must of course, begin at the cellar bottom. These jambs and the back wall form the sides of the ash-pit. The front is a four-inch brick wall and at the bottom of this is placed the ash door for removing the ashes. At the top the sides of the pit are corbeled out toward the center to support the hearth. An opening six inches square should be left in the center for the ash dump. From a point below the floor line the trimmer arch is turned against a specially prepared framing of joists, and the space above the arch is filled with concrete and leveled up to receive the hearth. By this arrangement it is almost impossible for the fire to come into contact with any woodwork. A hearth set directly upon a wood joist is very dangerous.

When the ash-pit is finished and the trimmer arch is in place the really important part of the construction begins. The illustration shows the opening to the firebox three feet wide so that the depth should be one foot six inches and the width across the back two feet. Beginning at the three-foot opening, we extend the side walls straight back for four inches, or the width of one brick. This saves grinding the brick. They are then carried back at an angle to the two-foot width at the back. These angles by reflection increase the amount of heat thrown into the room. The back wall rises vertically for twelve inches, and then slopes forward to a point two inches above and four inches back from the inside of the top of the opening. This forms a throat or smoke outlet four inches wide.

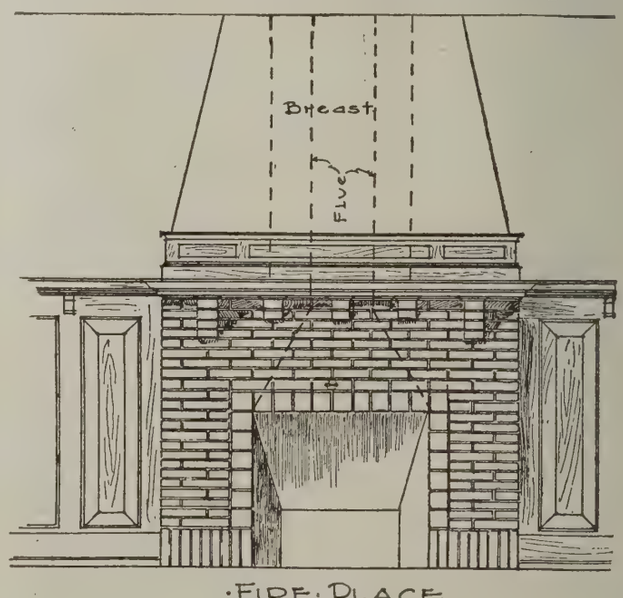


·CHIMNEY·



PLAN OF FIRE PLACE

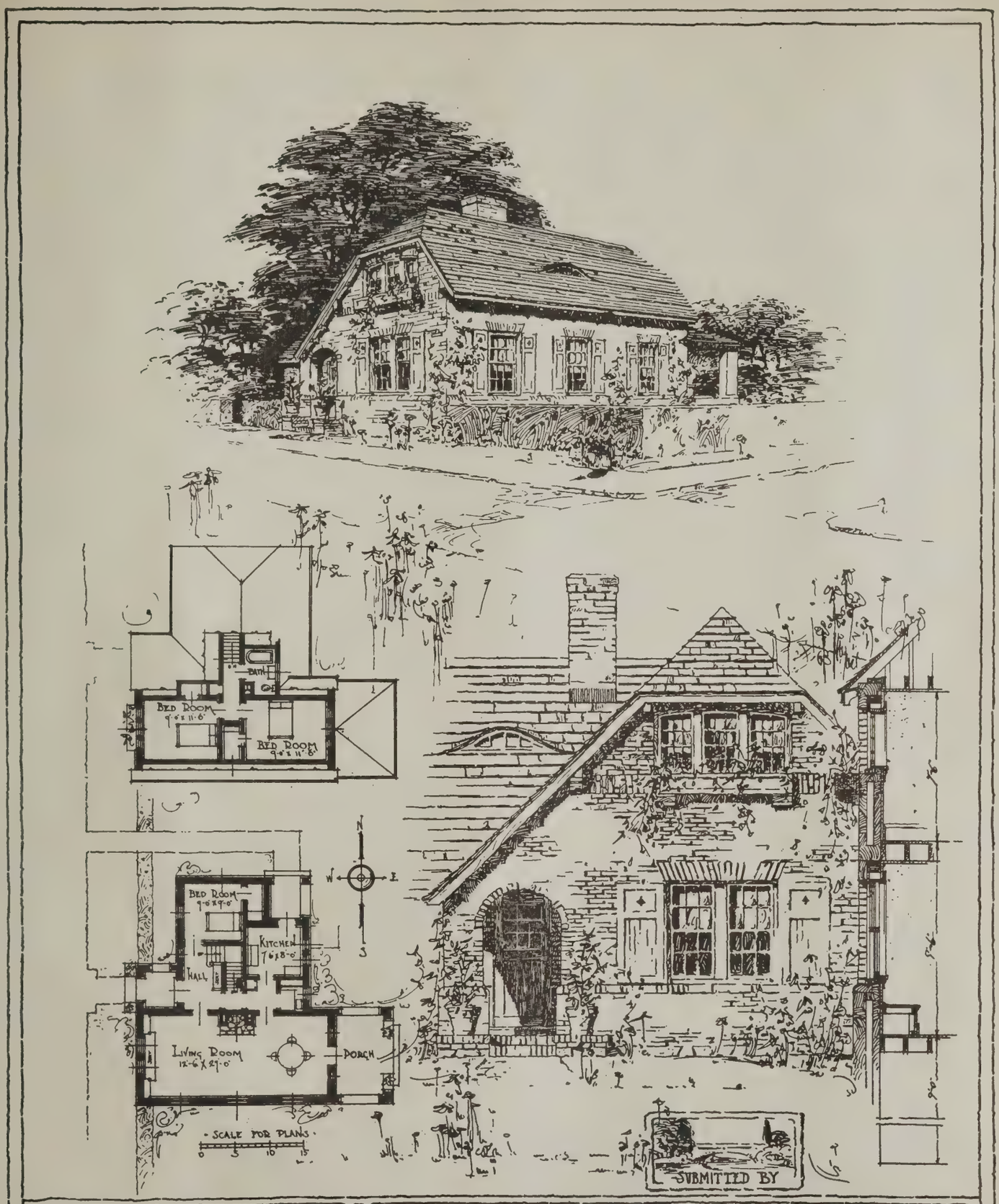
The sloping out of the back is sometimes accomplished by corbeling or "stepping" out the brick. This will give, however, a series of sharp edges that are likely to become chipped and unsightly. A better way is to tip the brick to the angle of the slope, and thus form a smooth surface. Even when a flat arch is used the brick across the top of the opening should be carried on a small angle iron. For a segmental arch or a stone lintel this iron will not be necessary. The shelf extends back to a point directly under the back of the flue. The space just above the shelf is the smoke chamber, the front and sides of which converge toward the top at an angle of not less than sixty degrees until they meet the flue. To determine the size of our flue we shall have to find the area of the opening of the firebox. The opening is three feet wide and two feet eight inches high, and so would have an area of 1,152 square inches. The area of the flue must be one-tenth of this, or 115 1-5 square inches. A nine-by thirteen flue will give us an



·FIRE·PLACE

area of 117 square inches and will be the size used. The shelf and the smoke chamber are of vital importance in fireplace construction. The shelf serves to deflect the descending currents of cold air outward to meet the ascending currents of hot air at the throat, thereby preventing the smoke from being forced into the room by "down draft," while the chamber allows the smoke to accumulate and roll easily round until it finds its way out of the smaller flue opening.

The flue should always be started directly over the center of the firebox to insure an even draft, but if necessary may be deflected to one side after going straight up for two or three feet.



MAIN PART ▲	14' × 29' × 26' (arch)	= 10556
KITCHEN WING	19' × 20' × 22' -	= 8360
REAR PORCH	(9' × 14' × 12') ½	= 378
ENTRY ▲ ▲	(6' - 6' × 12' -) ½	= 108
▲ COST = $	2,910.30 = $ 0.15 ×	19402

BRICK HOUSE TO COST $3000
BRICKBUILDER COMPETITION

A PRIZE WINNER. The competition of the Clay Products Exposition brought out a great many interesting and artistic designs for a $3,000 brick bungalow. Mr. L. J. Batchelor of Boston was awarded the first prize and the bungalow, from the plans shown above, was erected at the Exposition and was one of the features of the Show.

ROOFING TILES

IN DEALING with tiles as a roof covering, the first thing to be sure of is that the tile selected is capable of excluding all dampness, and that it will withstand the disintegrating influence of the weather.

Roofing tiles are subject to the same defects as terra cotta, namely, if they are burnt thoroughly many of them may twist and warp and will be found to be untrue, and if they are not burnt very hard they are liable to decay.

A good tile should be well tempered, of good color, free from stones, carefully trimmed, should give forth a clear ringing sound when struck, show a clear fracture and fine grain when broken, and take its weathering quickly.

The characteristics of a good roofing tile are density, toughness, homogeneity, and incipient vitrification. Tiles should have this last named quality throughout and not merely on the surface.

The comparative merits of tiles as to their weathering qualities cannot be told from the amount of water they absorb, though this is one of the chief tests. The durability of tiles depends upon their structure and chemical composition, as well as their power of absorption, just as stones and bricks do. These qualities are dependent upon the processes the tile had gone through in its manufacture.

The refractory nature of any clay is due to silica being present in large proportion and alkaline matter in small proportion. Such clays are difficult and expensive to work, but give the best tiles; they require long continued firing, so that they shall be burnt thoroughly throughout. It has therefore become the custom to use less refactory by adding the requisite alkaline matter, which causes the clay to become more easily vitrifiable. Then again manufacturers, for the sake of cheapness, have introduced machinery for moulding the tiles. If this is used properly, no harm will result, but there are difficulties in its use which tend to cause inferior tiles to be burned out. The moulding machines press the clay out through dies in thin sheets, or stamp it into moulds. The former are mostly used, and the thin sheet of clay is cut into shape. The clay is mixed with a certain amount of moisture, and is known as hard, firm or soft, according to its amount. The effect of pressing the clay through the die is to cause exfoliation, the sheets being laminated. This occurs to the greatest extent with hard clays, the exfoliation being insignificant with soft clay on account of its greater plasticity. The hard clay is generally used, however, for the sake of economy, as it requires less fuel in drying to get rid of the moisture, and allows the tiles to be carried in the hands without losing their shape directly they come from the machine, and cast-iron moulds can be used instead of the fragile plaster ones used with soft clay to avoid adhesion, as occurs with cast-iron. To overcome the exfoliation with hard clay considerable and repeated pressure is necessary, and stronger firing to weld the laminae together, but if the pressure or firing is insufficient, as it usually is, water will be absorbed between the laminated layers and the frost will scale the tiles. To save in firing by the more quickly fluxing the laminae together and to prevent the buckling which comes from hard firing, a considerable quantity of alkaline matter is added to the clay, and this gives a semi-glazed surface that looks extremely ugly, and which, with the expansion and contraction caused by alternations in temperature, cracks and crazes, allowing frost to scale it off.

Sanded tiles are the best if well burnt; the slight porosity is not a material objection, and their surface is quickly given a protecting covering by nature. Hand-made tiles fixed on buildings centuries ago are as good and sound as when first laid. The process of making tiles by hand is similar to that of making bricks, the mould being well sanded to prevent the clay sticking. Hand moulding has the advantage over machine moulding of giving a homogeneous tile without lamination. They are as a rule slightly thicker and heavier than machine-made tiles.

Tiles may be obtained of almost any color. When of a bright red or an earthy red color, they should be viewed with suspicion and avoided. Old-fashioned tiles have no nibs or stubs for hanging, and must therefore be kept in situ by means of wooden pins or nails. Tiles with nibs are often nailed only every third course, and on flat-pitched roofs are sometimes only nailed every tenth course. Where tiles are bedded in lime-and-hair mortar the tops only should be bedded, the mortar extending, say, not more than three inches below the head of the tile. Where a roof is close-boarded (and sometimes felted), there is no need for bedding, though, of course, a covering of bedded tiles is less liable to breakage, when a man is climbing about the roof, than would be one of unbedded tiles.

In tiling roofs it is well to cover them with roof boarding and felting before laying the laths and tiles. This should always be done in good work. Occasionally architects are compelled, owing to the cost of work, to eliminate the felting, or covering with 2-ply paper, and lay the tiles on the boarding; but this practice is unwise, as experience shows, and the boards alone do not stop draughts.

Secret gutters should only be used in positions where they will always clear themselves; especially if the building be surrounded by trees.

Ridge tiles should be of such a section as to admit of being pressed or made in one piece. Where an ornamental cresting is required, it should be made as a separate piece entirely detached from the ridge tile proper, the latter being made with a groove to receive the cresting.

The cresting should not be stuck on the ridge tiles by means of semi-liquid clay while they are in the clay state. Such work is more or less defective and unsatisfactory in the end.

Pan tiles should be laid on laths and a good bed of hair plaster in order to secure them to the roof.

Outside brick work should be cut up to the rake of the roof, and so nearly flush with the back of the hanging battens, that the verge, when completed, will have a tilt on its outer edge of at least ½ inch to throw the rain on to the body of the roof, and so avoid rain drippings from the verge. The tiles to be used on the verge should be soaked to saturation, and allowed afterwards to drain, and then be bedded in Portland cement.

Well-formed roofing tiles are straight in their width and hollow in their length that the tails of each course may lie close and tight on the backs of the undercourse. Straight tiles will not clear themselves one over the other, and should therefore be rejected.

Stoneware tiles are useful for chemical factories. They are very hard but brittle, and twist out of shape when firing.

The gauge of tiling is the distance from head to tail minus the lap divided by two; thus a 10½ inch tile laid to a 2½ inch lap will only expose 4 inches of its length to the view when the work is completed.

Pan tiles are the commonest class of tiles and are very cheap. They hold moisture a long time, and require extra strong roof timbers. They are best laid to a slope of about 24 degrees, and are mostly used for covering sheds, barns, and buildings which do not require a plastered ceiling. Glass tiles are made of this shape to give light in lofts where there are no windows.

Plain tiles are smaller than pan tiles, but, being laid with more lap, are heavier per square. They can be laid to any slope from 25 degrees to 60 degrees.

Roman tiles were trapezoidal trough shaped, and the joints were covered with round tiles.

Fancy roofing tiles are similar in many respects to plain tiles, and are much used for external walls of half-timbered houses.

Sizes of tiles—plain tiles: 10½ in. by 6½ in. by ½ in., and weigh about 2½ lbs. each; and 11 in. by 7 in. by ⅝ in., and weigh about 3 lbs. each. Pan tiles are 13½ in. by 9½ in., and weigh about 5¼ lbs. each.

A square of roofing requires 800 plain tiles laid to a 3 in. gauge, 700 tiles laid to a 3½ in. gauge, and 600 tiles laid to a 4 in. gauge; and 180 pan tiles laid to a 10 in. gauge; 164 pan tiles laid to a 11 in. gauge, and 150 pan tiles laid to a 12 in. gauge.

One square of plain tiles weighs about 15 cwt., and one square of pan tiles about 8 cwt.

Pine or spruce tiling laths or battens are 1¼ in. by ¾ in. to 2 in. by 1 in., and oak tiling laths 1¼ in. by ¼ in.

One hundred plain tile laths, 5 ft. long equal 1 bundle.

Twelve pan tile laths, 10 ft. long equal 1 bundle.

One square of tiling requires 1 bundle of laths.

One and one-half hundreds of nails, 1 peck of tile pins, and 3 hods of mortar.

One square of pan tiling requires 1 bundle of laths and 1¼ hundred of nails.

HARDWOOD DOORS AND INTERIOR FINISH

Modern architecture differs from the ancient styles in no one thing more than in the homes for the so-called "middle classes." Given the unlimited means of the Church and State, imposing masses of public buildings rose in the past, but how slowly and how little did this concern the workingman, the farmer, the small storekeeper? The influence of architecture on the home became noticeable only when unlimited quantities of material were found, and when modern methods and machinery placed artistic possibilities and present-day conveniences within the means of the great majority of every-day workers.

The pioneers of the United States found ready for the builder vast forests of the finest lumber; found yellow pine in the South, white pine in the North, and redwood in the West. Millions of homes have been built. While many of these were more like shelters from the wind, many displayed an earnest desire to advance the cause of good architecture. When it could be afforded, expensive woods such as mahogany, rosewood, etc., were used for the doors and trim, but styles changed to walnut and other woods, which enjoyed local favor from time to time. As means were found for correcting the varying qualities of the various woods, each had a certain value.

To secure the best results, the doors and sometimes even the trim is made up of a score of soft pine, while the exposed surface is a veneer of a more expensive wood, or one having a more beautiful figure. In the manufacture of large panels, this feature is of especial value, as the figure can be matched to secure the most pleasing results. Woods for this purpose may be either sawn in thin slabs or cut in rotary machines to give a long "shaving" as wide as the log is long, and the length depending on the size of the log. Veneers of this character are too thin for exterior use, however, and are mainly used for inside wall panels, doors, etc., where they do not come into contact with dampness or hard usage.

The kind of wood used depends on another factor not generally considered. The building field may be divided into three classes; the first, relatively small, want the best and most expensive regardless of cost, the second, a little larger class, want all they can get for their money. With them it is a question of how many rooms they can get and how big a house for how small an amount; for the third class, we have about 75 per cent of the total, for this is the class who want as good as they can afford without aping the rich or building mere walls. For them, the skill of the architect and artist is expended, and the manufacturer makes every effort to please, for in the quantity of millwork of this character turned out, lies the profit. The owners of these houses want to display good taste without ostentation, a modest appearance with moderate cost, and preserving a harmony of exterior and interior in keeping with his entire circumstances. To such, the use of expensive materials is barred by both the cost and lack of harmony.

So, at the start the man of moderate means cannot have much real imported mahogany, but must be satisfied with a cheaper domestic wood. But the walls, trim and doors should harmonize with the furniture if possible. There is a wide range of finish in furniture, as well as in the materials of which it is made, but in general if the wood used is mahogany or a representation of it, the trim will harmonize with the furniture and appear to be a part of a well thought out plan of furnishing.

While several of the softer woods, such as poplar or whitewood, and some grades of pine, are sometimes used to take the place of mahogany, birch is universally conceded to be the one best wood for the purpose. It has in its favor a grain and figure closely resembling that of mahogany, and when properly seasoned is easily worked and holds its shape remarkably well. It can be used in the solid for mouldings, casings, etc., but for panels, doors and similar work, is usually worked into veneers. The greater part of the veneers are made by sawing, making the sheet about ⅛ inch thick, while for outside doors a veneer ¼ inch thick is frequently used.

The prevalence of birch in the northern woods renders this wood adaptable for general use. Its use in furniture is widespread, and as a material for trim and interior finish, it has been a favorite for many years. The great variety of finish to which it readily lends itself makes it popular among the discriminating home builders.

But hardwood finish and doors are sometimes considered to be above the price which the ordinary home builder wishes to pay. Such is not the case. At present prices and under present conditions of manufacture, the difference in cost is slight. A few dollars to each room, or possibly forty or fifty dollars to the entire building will cover the difference between a soft wood trim easily marred and scratched, and a first-class birch job, which will look rich when first finished and continue to improve with age.

There is a real economy in building with hardwood doors and trim, especially when it is proposed to sell the house. Speculative builders have well gauged the demand where they show off their buildings. They realize the demand for fine hardwood doors and trim and provide them, as the extra cost is less than a month's interest on their investment. Landlords, too, know that the prospective tenants are influenced by the appearance of the doors, and a nicely polished birch door, swinging easily in its hinges, presents a play of light and shade in the figure of the material which makes the door seem what it really is, the most used, most moved, and most attractive piece of furniture in the house.



A WISCONSIN BIRCH READY FOR THE AXE.

A BUILDER'S COURSE IN ARCHITECTURAL DRAWING.

RALPH F. WINDOES.

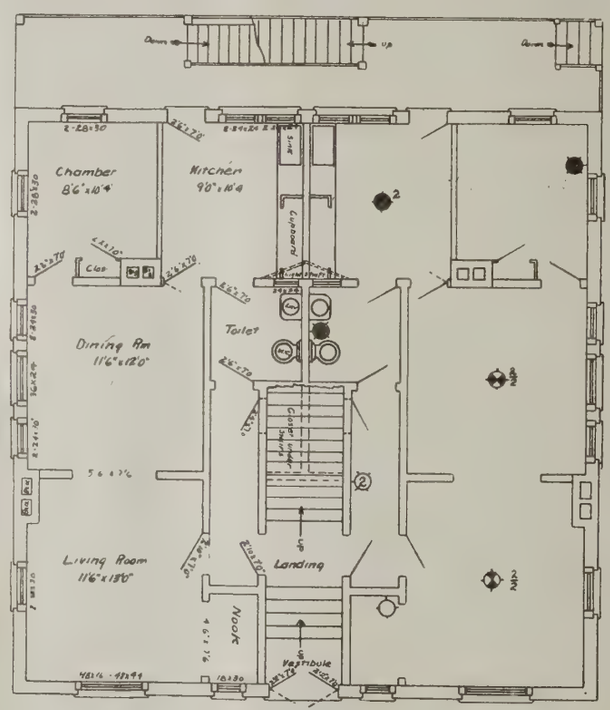
THE next problem to be undertaken is the drawing of a set of plans for a brick building. It differs but slightly in general plan of treatment from the frame building. We will take for an example a modern four-flat apartment, two stories in height and with two flats on each floor.

PLATE XXXVI.

FIRST FLOOR PLAN.

The student must bear in mind that the building here given is of the most simple brick construction, though it differs but slightly in general from a more pretentious type of structure.

On the first floor it will be noticed that the outside brick walls are thicker than the wooden partitions. They are drawn 9 inches thick, while the wood are but 6 inches, the same as in the former problems. It will also be noticed on this plan, that a different method has been used in illustrating some of the conventions. This has been done to familiarize the student with more of the common



FIRST FLOOR PLAN

practices of the day. The most noticeable of these changes is to be found with the windows, the room dimensions and the practice of giving the dimensions on one side of the plan when they are both alike. This has also been done with the location of the lights.

Notice that there is no front porch; entrance being made through the vestibule into the different flats. Each flat has two chimney openings, there being no furnace or other heating plant. Also pay particular attention to the light shaft and where it is placed. It is shown dotted where it comes down onto the first floor plan because it does not extend to the floor, but only far enough to let light into the toilets; and lastly, notice that no wooden partition is merged into a brick wall, but that a line separates the two.

With these suggestions the student should experience little trouble in working up this plan.

PLATE XXXVII.

SECOND FLOOR PLAN.

Figure 24 is given as a suggestion for room arrangement on the second floor. Notice how it differs from the first floor arrangement, though the principle partitions are directly above those on the first. If the student thinks he can improve upon this arrangement he certainly should on his set of plans, as it is by so doing occasionally that he advances in his study.

A great amount of detail has been left out in this figure, it being done purposely that the student could get some practice in putting it in with nothing to copy it from. Of course the scale for drawing this plan should be the same as upon the first floor, that is, one-fourth inch to the foot.

PLATE XXXVIII.

BASEMENT PLAN.

Figure 25 illustrates the basement plan as it should appear when finished, properly dimensioned. It should be drawn to the same scale as the other plans. The margin on the plate will have to be run out a little in order to get all of the dimensions on.

The wall is of concrete, 14 inches thick, and the partitions are of wood and brick. These latter divide the cellar into four rooms,

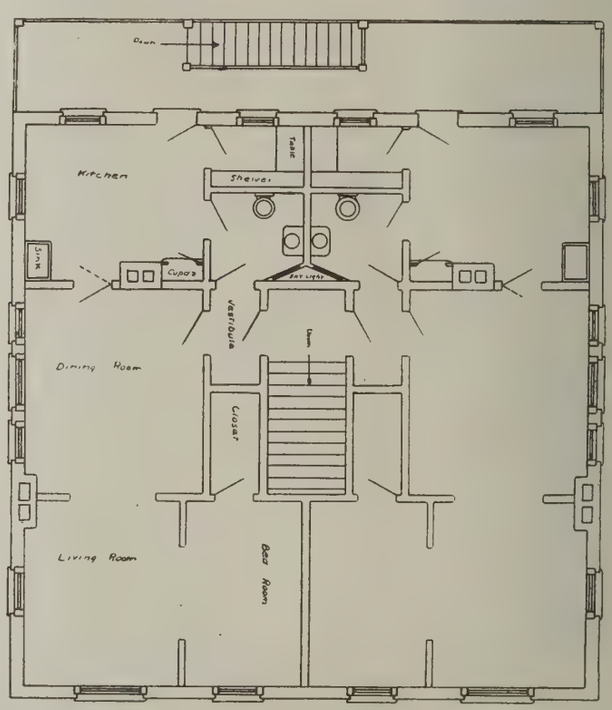


Figure 24

one for each flat, and each has a separate door. It would be well for the student to devise other arrangements by which this could be accomplished.

It is unnecessary to draw a roof plan for this building, as it is an ordinary flat roof with a slope to the rear. This will be clearly shown on the elevations and there is no need for a repetition.

PLATE XXXIX.

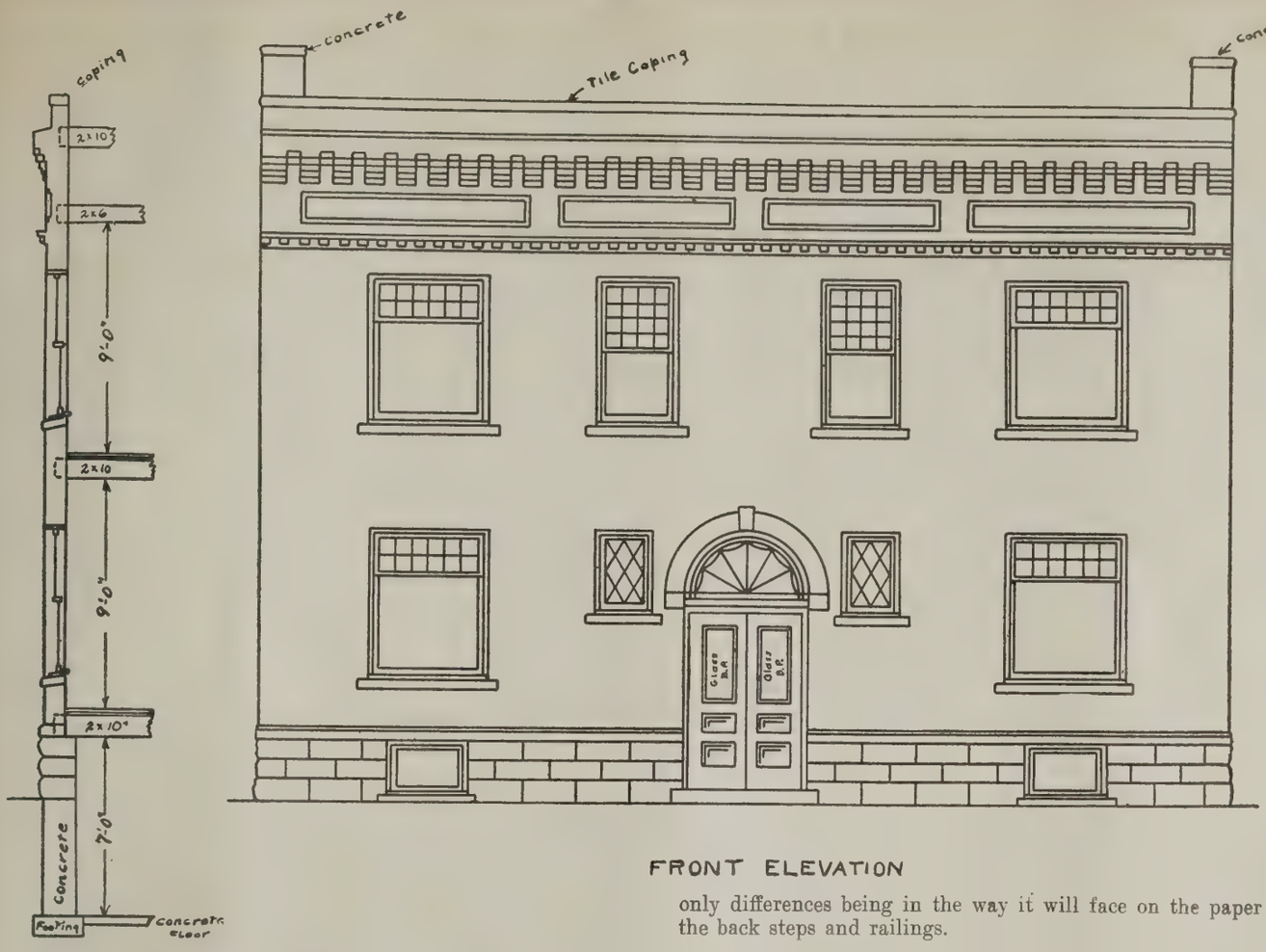
FRONT ELEVATION.

This plate shows the front elevation as it should appear in the finished drawing of the student. It is typical of the class of drawing it represents, as it gives, in the simplest manner possible, all of the essentials such an elevation should comprise. Pay particular attention to the section, as it differs somewhat from the section of a frame building.

PLATE XXXX.

RIGHT SIDE ELEVATION.

The only difficulty likely to be encountered in drawing this elevation will be in the slant of the roof. Do not make it too steep and slant it toward the rear. The top of the side wall also slants in the same direction. Be sure to show an arch of headers over



FRONT ELEVATION

every window, also all of the chimneys. The window sizes must be determined from the floor plans and their height from the section.

PLATE XXXXI.

LEFT SIDE ELEVATION.

The left side elevation will be very similar to the right, the only differences being in the way it will face on the paper and in the back steps and railings.

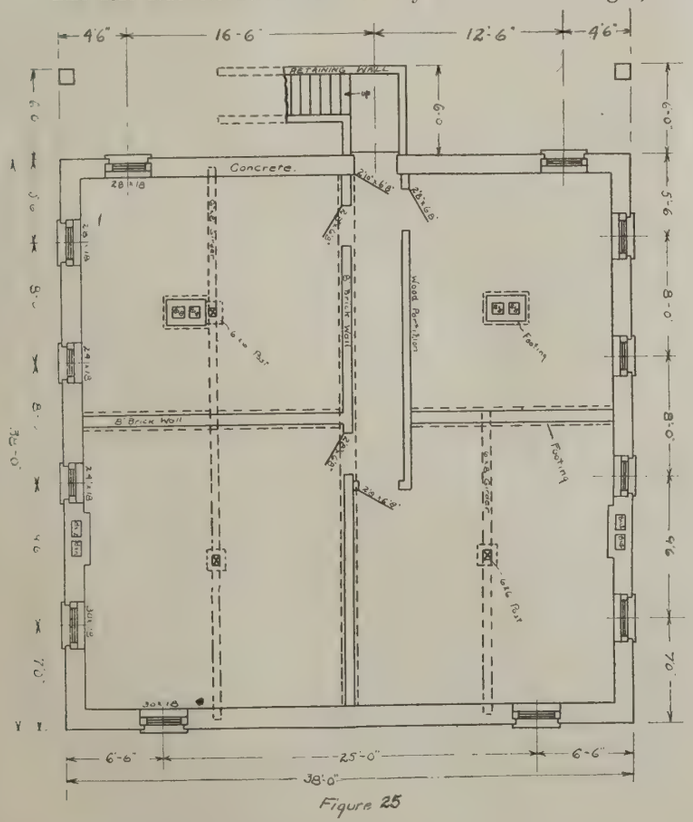


Figure 25

PLATE XXXXII.

REAR ELEVATION.

The rear elevation will be the most complicated to draw, but if the draftsman uses his head in matters with which he is already familiar, he should experience little trouble. Remember that this elevation will show considerable of the roof construction, since the latter slants to the rear. It should also plainly show the skylight.

PLATES XXXXIII and XXXXIV.

DETAILS.

These two plates should give the details of construction and finish used in this building. They should consist in the following, at least: Head casing, base for first floor, base for second floor, and porch trim, all drawn out full size. Also the pantry cupboard and work table drawn to scale.

When this set has been completed it should be shown to some architect or builder of the student's acquaintance for advice and criticism.

CONCLUSION.

If the student has conscientiously worked out the problems presented in a satisfactory manner, he need have no fear of accepting a position as an architectural draftsman in any office in the country. But it would be advisable for him to look up something upon the subject of architectural perspective and work upon it until he at least knows the underlying principles. He should also spend a little time studying the orders of architecture, as it is upon these that all architectural construction is based.

If the young builder that has followed these articles does not intend to pursue his acquirements into the drafting profession, he has at least prepared himself to be a better builder, as he can now read any working drawing without making a mistake. He can also prepare details that the architect has omitted, work up plans of his own and further his interests by so doing.

And, lastly, let me state that if he does decide to go into an architect's office and finds methods of representation somewhat different than he has learned them through this series, he should remember that the ways here shown are typical of one class of architects, and that they have always served their purpose.

OUR PRACTICAL PAGE

To Soften Putty.—Slack 3 pounds of stone quicklime in water, then add 1 pound of pearlash, and make the whole about the consistence of paint. Apply it to both sides of the glass, and let it remain for 12 hours, when the putty will be so softened that the glass may be easily taken out of the frame.—Exchange.

To Imitate Tortoise Shell Paint.—Paint a ground of salmon color; then when dry and smoothed off, coat it over with rose pink, mixed in varnish and turpentine; then with a flat piece of glass press on the surface, and remove the glass quickly, being careful not to push it over the paint so as to disturb the curious figures which the pressure will form thereon. Varnish when dry, and you will find you have a beautiful imitation of tortoise shell.

Varnish or Imitating Gilding.—A French authority affirms that a very perfect imitation of gilding on brass and bronze articles may be made by a varnish of 80 grains gum-lac, 20 grains dragon-blue, 5 grains turmeric largely mixed with alcohol. It is to be applied with a sponge to metal, which is afterwards warmed over a charcoal fire. At first it may have a deadened appearance but afterwards brightens.

To Give a Rich Color to Mahogany.—Ingredients: One pint of cold-drawn linseed oil, ten cents worth of alkanetroot, and five cents worth rose-pink. Put these ingredients into an earthen basin, stir them well and leave them one night; then, having washed the furniture perfectly clean with vinegar, and removed all stains, cover it lightly with the above, on a soft rag. Leave it for some hours, then polish off with linen cloths.

Varnishes for Furniture.—The simplest and perhaps the best is the solution of shellac only, but many add gums sandarach, mastic, copal, etc. Spirits or naphtha can be used with the following: 1. Shellac one and a half pound, naphtha one gallon; dissolve and it is ready without filtering. 2. Shellac twelve ounces, copal three; dissolve in one gallon of naphtha. 3. Shellac one and a half pound, seed lac and sandarach each four ounces, dissolve in one gallon of naphtha. 4. Shellac one a half pound, seed lac and sandarach each four ounces, mastic two ounces, rectified spirit one gallon; dissolve. To darken polish, benzoin and dragon's blood are used, turmeric and other coloring matters are also added, and to make it lighter it is necessary to use bleached lac.

To Clean Marble.—For whitening boards or cleaning marble, take a half-pound each of soda, powdered chalk and powdered pumice stone, stir together in a small quantity of water and then add half a pound of soft soap. Mix it as a paste and apply with a scrubbing brush.—Ex.

For the Pestilential Fly.—Heat a shovel and drop thereon twenty drops of carbolic acid; the vapor will kill flies. One dram bichromate potash in two ounces of water, add a little sugar, will answer the same purpose. The extermination of the common house fly means not only health but life itself to us.—Ex.

To Mix Colors in Oil.—As all colors for use in decoration should dry flat and unshining, substances called dryers require to be mixed with them, care being taken not to mix too much, as this defeats the object. The principal dryers are acetate or sugar of lead, litharge, white vitriol and japanner's gold size. Some of these act injuriously on light and tender colors, as oxide of lead on lake, and the mixture of two, as sugar of lead and vitriol, is often bad, for chemical reasons. The colors are ground in oil and the proper consistence obtained by turpentine.

The True French Polish.—To one pint of spirits of wine add a quarter of an ounce of gum-copal, same of gum-Arabic, and one ounce of shellac, the gums to be well bruised and sifted through muslin. To dissolve the mixture, place it near a warm stove, and frequently shake. Strain through muslin, and keep tightly corked for use.

Bleaching Wood, Ivory, Etc.—It is not difficult to bleach any of these materials and make them beautifully white, but the trouble with most bleaching recipes is that the ingredients used destroy or greatly weaken the texture of the material to which they are applied. This is very apt to be the case when chlorine, caustic alkalis or sulphurous acid is used. Of course, for common work these bleaching agents serve very well, as they are quite cheap, they are used extensively, but for delicate work, such as piano keys, etc., pexoride of hydrogen is greatly to be preferred. It does not injure the material to which it is applied, and it gives excellent results. It is now manufactured so extensively that the price is quite moderate.—Furniture Manufacturer and Artisan.

How to Clean Polished Wood.—An encaustic composed of wax, sal soda and a good soap is excellent for cleaning and polishing at the same time. Shave the wax and the soap and dissolve them in boiling water, stir frequently and add the soda. When the wax and soap are thoroughly dissolved place the mixture in a vessel which can be closely covered, and stir constantly till cool. This mixture will remove ink from polished surfaces and may be satisfactorily applied to marble, brick, furniture, tile and floors.

Care of Tools.—Don't grind tools on dry emery wheels. Use a good grindstone with plenty of water.

Don't get your bevels too long; a 3/8-inch bevel on a new chisel is enough, with a short bevel on edge to strengthen it. In whetting a tool whet on bevel side only.

To keep tools clean and bright rub over with a little mercurial ointment which will form a slight coating resisting moisture, or take six parts lard and one part rosin and heat slowly together until rosin is all melted, then add benzine to thin it down, in about the proportion of one pint of benzine to one-half pound of lard. Rub over tools lightly. This last preparation is what we have used in our own works for years. Tools treated with it will resist rust even when immersed in salt water and left for some time.

Sawdust Concrete Floor.—Sawdust concrete was used in the new Public Library building at Springfield, Mass., as a base on which to lay cork carpet covering the floors. The object of the sawdust concrete was to obtain a layer into which nails could be driven and which at the same time would hold the nails. The company that laid it states that it accomplished both purposes. After several experiments with different mixtures it was found that a 1:2:3-4 mix, three-fourths of a part of sawdust, gave the desired result and 5,000 square feet of this mixture were laid. The thickness of the layer was one inch, and after four months of service indications are that the material is a success.—Cement Record.

Each Had a Way.—"What is the secret of success?" asked the Sphinx.

"Push," said the button.
"Never be led," said the pencil.
"Take pains," said the window.
"Always keep cool," said the ice.
"Be up-to-date," said the calendar.
"Never lose your head," said the barrel.
"Make light of everything," said the fire.
"Do a driving business," said the hammer.
"Aspire to greater things," said the nutmeg.—Exchange.

The Quip Modest.—Mrs. Cobb—"Was the grocer's boy impudent to you again when you telephoned your order this morning?"

Cook—"Yes," Mrs. Cobb, "he was that, but I fixed him, I sez, 'Who the hell do you think you're talkin' to, this is Mrs. Cobb?' "—Ex.

"If a house contains six bureaus, eleven armoires, seven chiffoniers and fifty-three miscellaneous drawers, how many of 'em is the husband entitled to and how many is the wife?" asked the young clubman.

The second clubman laughed harshly. "You are young and have much to learn," he said. "You may as well understand first as last that if there were in your house a mile of bureaus, three acres of armoires and 17,000 drawers, all these would still be stuffed full of veils, ruchings, hatpins, ribbons, silk stockings, petticoats, powder puffs and safety pins, and the best course for you to pursue would be to wrap your own things—your shirts, underclothes and so on—in a newspaper and keep them under the bed."

LAYING SLATE ROOFS ON CONCRETE

It goes without saying that a concrete building should be covered with a consistent roof, says C. A. Lippmann in "Concrete"; that is, the roof with the same characteristics that have made concrete such a popular material. These are durability, fireproofness, freedom from necessity of painting or coating, handsome in appearance, reasonable first cost, and lowest per year of service cost.

These advantages are found in slate roofs. Being non-absorbent, slate does not decay. Being non-metallic, slate does not rust; nor does it burn. It has practically no contraction or expansion; its co-efficient being only .000005.

There used to be an impression that slate was not practicable for flat roofs. But this is successfully contradicted by the excellent record of flat slate roofs which have been in use for upwards of fifteen years. A notable building roofed in this manner is the Arrott building, Pittsburgh, Pa.

In flat slate roofs there is, of course, no "lap." Instead of partly "overlapping" each other (as in pitched roofs) the slates are laid along adjoining edges and embedded as described in the following standard specifications:

First cover sheathing with one layer of sheathing paper, weighing 10 lb. to the square, single thickness. Upon this lay four layers of best all wool felt, weighing 25 lb. to the square, single thickness, felt to be 28 in. wide, with 4-in. lap, and exposed 6½ in. to the weather. As the felt is laid, mop between the sheets the full width of lap with best roofing pitch.

After the felt is laid, coat the entire surface with a composition of 60 per cent pitch and 40 per cent best asphalt, weighing 125 lb. to the square, and embed solidly in the composition while hot, roofing slate. After the slate is laid the joints are to be well filled with the composition.

It is better to omit all cleats or tin ducts, but sometimes during windy weather it is necessary to use tin ducts to hold the felt in place until the slate is laid.

It is necessary to cleat the felt at walls. This is very important. The contractor should build into the brickwork 2-in. by 4-in. wooden blocks about 3 in. above sheathing, so that there will be a good surface to cleat to. Tin counter-flashing built into the brickwork and extending down to and out on roof about 3 in. is necessary to make a complete roof.

In factory buildings, foundries, and other structures where an elaborate finish is not required, the roof frame consists often only

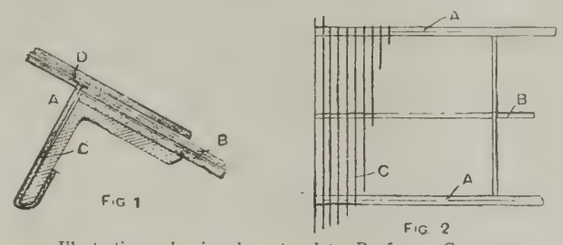


FIG 1 FIG 2

Illustrations showing how to slate Roofs on Concrete.

of a series of trusses, crossed by purlins, and the slate is fastened tight to the latter with soft metal clinch nails. These are clinched around the bottom of the purlin angles, as shown in Fig. 1, in which A is a soft metal clutch nail, B the slates, C the purlin, and D the hole to be punched at the quarry.

When the trusses are spaced more than 10 ft. apart, the general practice is to use jack rafters, as shown in Fig. 2. In this, A is the truss, B the jack rafter (I section), C the purlin, 10½ in. for 24-in. slate.

ROOF FRAMING

By A. A. STAFFORD

In some previous issues of the NATIONAL BUILDER I have tried to illustrate and explain some of the methods of hip roof framing, and I think if the reader will take into consideration just how a rafter sets on the plate. It might be a hip that sets out over the corner, and has its working line from the corner. Although the side of the rafter at the seat and tail cut sets away from the edge of the plate, it must be remembered that the plumb line of the edge of the plate, to the top of hip rafter either to corner or gauge line for backing must be the same as that of common rafters because it must be a line on top, the same as the plate line of common rafter at plate edge, but does not change the working length any.

Now to get valley center at seat just high enough, take valley rafter, and back from the end as far as you want the length of the tail. Lay the square on same as for side cut at top. Mark across both ways so lines cross in center of top edge. See Fig. 7. This cross when rafter is up will be exactly over angle in plate. Square a cross top of rafter at this point from this mark. Make plumb line on side of valley. Measure down this plumb line, the same distance. Common rafter plumb line is at edge of plate, Fig. 7. Use rise and run of valley and reverse square at this measure, and mark seat cut. This cut must extend to plumb lines,

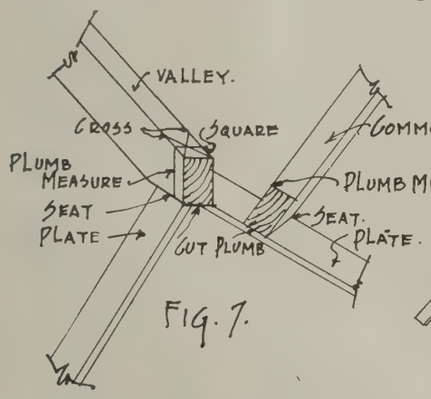


FIG. 7.

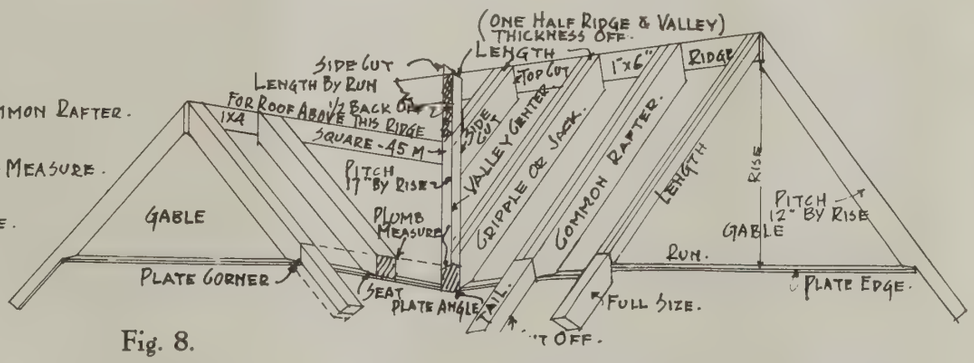


Fig. 8.

The difference from where you measure to where you cut is a line on the bottom. At this time I will illustrate a section of valley roof, with cripples, and endeavor to show how to get the valley rafter to set just high enough in center to form a line with top side of the common rafters. Remember that in the valley problem, the bottom cut of cripples is just like the jack rafter top bevel reversed, and the heel when placed against the valley must be raised up, so the top will line to center on top side of valley rafter.

Now think how the valley sets at the bottom, not like the hip, for the angle of cut is at edge of plate, instead of being away about ⅞ inch. Don't think you have to take away, or leave on, any more at seat cut, to get the length of rafter, as you don't. That is governed at the top by half the thickness of stuff the valley leans against. The difference at the bottom is in thickness of tail, which is made by the seat cut, and governed by plumb from the ends of X lines on top, Fig. 7. If you want the tail, or finish any way to suit.

figures for X on top, and exact middle of it is your rafter length, and if you know it, on top of the rafter is the best place to measure the total length, with a tape or pole, taking all plumb and side cuts from the center line.

I think Fig. 8 will show clearly the idea of a valley and two gables, one higher than the other, valley rafter extending to upper ridge, as some men frame them. These drawings are not to scale and does not show full amounts of rafters. It is to show how the different ones set, and how any one can get measurements and cuts. My giving figures in other issues for ten-inch pitch, does not signify that the ideas and principals won't work on any pitch, for they do. The same way of measuring across the corner of your square gets the length of any rafter, then the routine of pitch figures gives all the cuts, and my endeavor is to show the reader how to get the figures and how to apply them by illustrations in the NATIONAL BUILDER.



OUR READERS' PAGES

[The Editor does not hold himself responsible for the opinion of correspondents. Short, crisp letters will be appreciated. To insure publication, the name and address of the writer must accompany the communication, not necessarily for publication. Sketches of work or methods will receive our earnest attention. These columns are open to our readers at all times without charge, and any questions or experiences will be given proper space.—Editor.]



ANSWERS

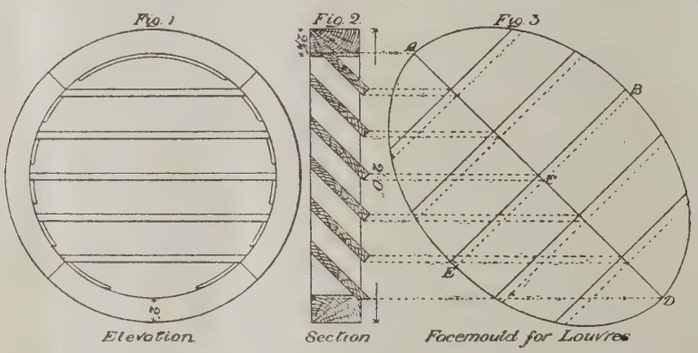
LOUVRE AND FRAMES.

From "Joiner," Erie, Pa.:

I submit the following for the benefit of "Willis B.," Middletown, N. Y.: It is old, but has been asked for, and given, many times these last 25 years. There are several other methods of solving this problem, but I have never yet come across one that suits me as well as the one I give herewith: A circular louvre frame is a ventilating frame fixed in the wall of a stable or other building where air is required without much light. The fixing of the louvre boards in the manner shown in Fig. 1 prevents the driving rain from passing to the interior, whilst currents of fresh air are directed upwards towards the ceiling and there diffused.

The method of obtaining the outline of the louvres will readily be seen when it is understood that they terminate upon a cylindrical surface, the diameter of which is equal to the distance between the quirks of the beads. By producing these lines, and by drawing the line A C D, Fig. 1, parallel to the sloping sides of the louvres, and intersecting the lines produced in A and D, the major axis of the elliptical section of the cylinder is obtained. The minor axis E C B, Fig. 3, is made equal to the

Circular Louvre Frame.



diameter of the cylinder; the axes bisecting each other at right angles, the outline of the curve may be drawn. In order to find the true shape of any louvre, project its extremities from the section of the frame to the major axis. If, from these points, lines be drawn at right angles to the major axis to meet the curve, the outline of the surface of the louvre will be obtained. A pattern will be required for each side, and both may be obtained by the same process.

BRICK CISTERN.

J. A. B., Fall River, Mass., in answer to J. B., Lancaster, Pa.:

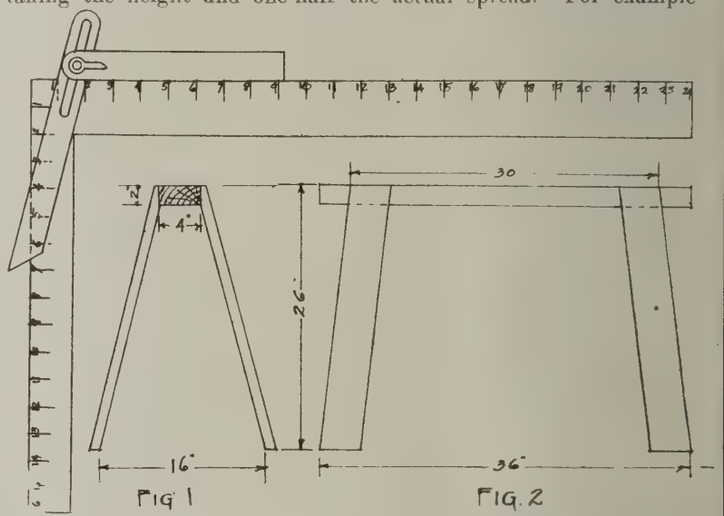
To build a cistern 5 ft. in diameter, build a 9 in. wall 3 ft. deep. Put 4 in. of concrete in the bottom, mixed 3 to 1, and 1 in. finish on top of that, mixed 1 to 1; the same for inside of the wall and on top. That will leave your cistern 2 ft. and 7 in. deep when finished. 675 bricks, 1½ barrels of cement, approximate cost, $12.

BEVEL FOR SAW HORSE.

From W. A. W., Rochester, N. Y., in answer to questions by T. T. D., Wichita, Kan., concerning how to get the bevels for making a saw horse by using fingers on the steel square:

To get the bevel of the top piece for the side spread of legs, take the height of horse to underside of back and one-half the actual spread of leg inside. For example, to get the bevel for 25 in. high 16 in. spread inside with a back 4 in. wide on underside and 2 in. thick. To set the bevel for chamfering the back, take (Fig. 1) 26 in.-2 in. or 24 in. and ½ (16-4) or 6 in. But 24 is to 6 as 4 is to 1. Therefore, 4 in. and 1 in. will give the same bevel as 24 in. and 6 in. Place bevel on square, as shown in Fig. 3, the blade of bevel coinciding with 1 in. and 4 in. and it will give the right spread.

To get the spread endwise, proceed in a similar manner, taking the height and one-half the actual spread. For example

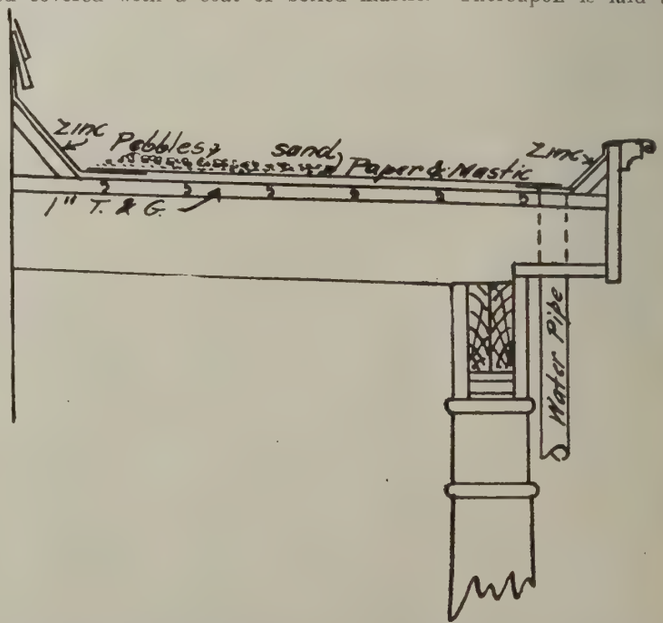


(Fig. 2) take 26 in. and ½ (36-30) or 3 in. But 26:3::8 2/3:1. Therefore, set the bevel as in Fig. 3, taking points 1 in. and 8 2/3 in. This method can be applied to any height and any spread.

FLAT ROOF FOR A PORCH.

From A. S., Bussum, Holland, in answer to J. J. Russel, Kans.:

There are many houses here with flat roofs. To get them waterproof there is laid out four times a bed of paper and every bed covered with a coat of boiled mastic. Thereupon is laid a



bed of sand of about one inch thick and all this is covered with a bed of pebbles of about two inches in thickness, as shown in the illustration. I can add that the construction is very strong and lasting.

PLASTERING.

From "Old Hand," Cincinnati, Ohio:

In reply to H. A. C. Cleveland, plastering that is cracked cannot possibly be "good plastering." It may be satisfactory to those concerned, but no good honest architect would pass it. If it is much cracked, it will not be a great while before it will begin to fall off in places. The only sure remedy that I know of, is to take off all the old plaster and do the work over again with better mortar. It would help some to "scratch" the old work, and float over a good "putty coat" made good and strong.

With regard to your other question, it would certainly be unreasonable to ask any sash and door company to make good any glass that was supposed to have cracked or broken because of the "action of the wood." It would be difficult to prove any undue "wood action," and if you could, it would be the joiner, who fitted, or hung the sashes, who would get the blame, not the sash maker.

THAT OLD BRICK WALL.

From "W. T. P." Detroit, Mich.:

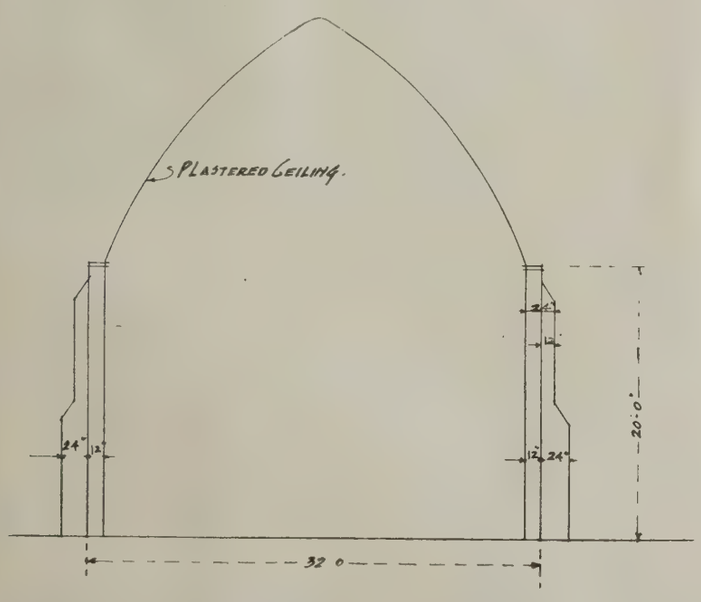
The cheapest and best way for C. G. L. to clean the paint from his old brick wall, will be to burn off the paint by using an ordinary paint burner. This will not be difficult to accomplish on a brick wall. So far as the joints are concerned, it would be well to rake out the mortar for a short depth, say three-quarters of an inch, and tuck-point the work with some good hard mortar. This will make a good reliable job, and will look well, if the color of the bricks is uniform. Should the brick work look shabby and speckled when the paint is off, it will be better to paint it over again, first giving the whole wall a generous coat of raw linseed oil, then cover with any suitable color mixed in lead and linseed oil.

QUESTIONS

TRUSS DESIGN.

From T. D., Joliet, Ill.:

You will find enclosed sketch of a church building which is to be 32 ft. wide with ceiling in as shown. Would you please return sketch showing how the roof can be substantially constructed showing the trusses, purloins and rafters in place on said sketch, and also how far the trusses are to be set apart, and how strong?



VENTILATION ON NOISY STREET.

From J. L., North Tarrytown, N. Y.:

I would like to ask if any reader could advise me how to ventilate windows facing on the street and at the same time keep out noise, which is very trying in cases of sickness. Any suggestions would be thankfully received.

OCTAGON CUTS.

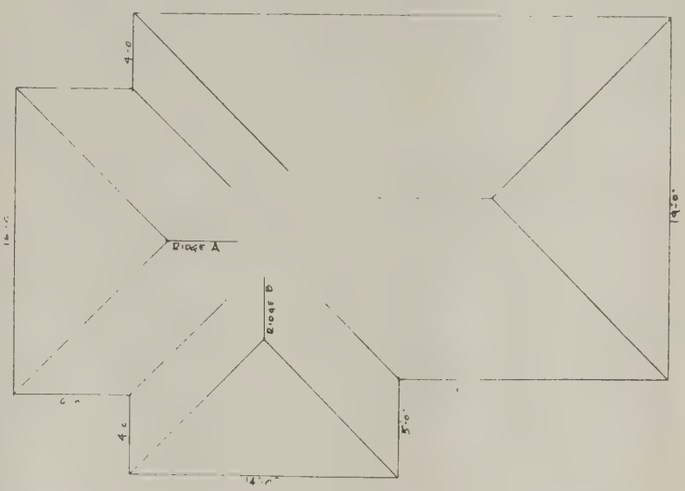
From S. K., Franklin, Nebr.:

Would you give me a method of getting the lengths of an octagon, say 12 ft. across. Please make it as plain as possible.

A ROOF PROBLEM.

From A. D., Sweetwater, Tenn.:

Will some reader be so kind as to finish this drawing for me? I built this house in 1909, but could not make the roof work out without an offset where ridge "A" intersects with ridge "B," so I made a small ventilator to fill up the offset. Can these lines all be run to a point? I will feel very grateful to anyone that will work this puzzle for me.



CORRUGATED SIDING.

From W. A. W., Volga, S. D.:

I would like to know through the columns of THE NATIONAL BUILDER how to fasten V crimp steel, corrugated steel or some other kind of steel roofing at eaves and ridge on a flower house so that no snow can blow in under the ends of roofing.

ACID PROOF CONCRETE SURFACE.

From A. S., Sandusky, Ohio:

The writer has an inquiry from one of his clients in regard to concrete tank of 5,000 gal. capacity for the purpose of equalizing Ohio wine. Can you give any information regarding the waterproofing of this tank that will not affect the taste of the wine or will not itself be affected by the wine. Would water glass be satisfactory and do you know where it can be obtained? There are a number of these tanks used in California, but these wines are not as strong acid as the Ohio wines.

SLATE AND TILE ROOFS.

From "Roofer," Birmingham, Ala.:

I am after information regarding the covering of roofs with slates or tiles, or both. Readers: Please tell me right here in this column, what you know about it and I will say a prayer for you the next time I go to church.

STEEL SQUARE.

From "J. D. V.," Elmvale, Ont., Canada:

I see you recommend two or three different makes of steel squares, but you do not say which you think would be the best for the working carpenter to use, why? Can you tell me which of the "knock-down" steel squares would be the best for general use. Perhaps some fellow readers would be able to say something regarding these "knock-down" squares.

From J. F., Forest Hill, N. Y.—What is the exact weight of one square yard of a 3-coat plastered ceiling on metal lath. That means iron furring 12 inches apart, expanded metal lath and three coats of good plastering. The beams on ceiling are probably six feet apart, center to center.

BOOK NOTICES.

Notice.—All books noticed in these columns may be obtained from this office at Publisher's prices. All postage or express prepaid. (Money and address must accompany all orders.)

How to Make Show Cards.—A practical treatise on the fundamental principles of artistic letter making with pen and brush for retail merchants and their clerks. By Charles A. Miller. Published by the Spatula Publishing Company, Boston, Mass. Stiff paper covers. Price, postpaid, $1.00.

This is a practical book, written by a practical man, and it is intended to be an every-day guide rather than a scientific treatise. It gives concisely all the essential principles of sign letter making, and demonstrates how easily a person of ordinary ability may acquire a facility in making attractive card signs for counters and show windows. The subject is so thoroughly covered that anyone who conscientiously follows the text will need no further assistance. The book is printed on heavy coated paper and is profusely illustrated. A large number of sample alphabets and signs are included and in the last chapter are scores of snappy "catch phrases," that may be used as legends on window cards. Just the book for young draftsmen or others who wish to become good letterers.

Factories and Warehouses of Concrete.—Published by Association of American Portland Cement Manufacturers, Philadelphia, Pa. Price, 50 cents, which is only intended to cover cost of production and postage.

In the preface the compiler of this book says: "Its purpose is to present to those intending to build industrial buildings of any kind, a few of the many hundreds of examples in this country—reinforced and otherwise, and to give important facts concerning these buildings, together with an expression as to their merits by their owners." The facts presented in this book have been gathered from all over the country and are authoritative. There are 235 buildings shown which house 195 industries. Thirty states are represented, as is also the work of 132 architects, 193 engineers and 97 contractors. It will prove a very useful book in every architect's office.

The Kingdom of Dust.—By Prof, J. G. Ogden, Ph. D., professor of physics, Fifth Avenue High School, Pittsburg. 128 pages. 40 illustrations. Cloth cover. Popular Mechanics, publishers, 318 W. Washington street, Chicago. Price, postpaid, 50 cents.

This is rather a remarkable book and is likely to make people "sit up and take notice of things about them." It is not exactly a technical book, nor yet is it a scientific one, but rather a mixture of science, practical matters, theories and instructive technical suggestions. Here are some of the questions dealt with: Can we obtain food from dust? Shall we dispel fog by means of electricity? How shall we deal with the great problems of tuberculosis and typhoid? How many Londons and Jerusalems have there been? Will the wind-driven sands of the Sahara eventually overtop the mountains near the Red Sea and spread into Arabia, carrying ruin and destruction? Shall we solve some of the great secrets that lie hidden within the mighty kingdom of dust? These and scores of other interesting phases of this subject are treated at length in a most entertaining and instructive style by Prof. Ogden, making this book more fascinating than the best fiction ever penned, because it is true and "written so you can understand it."

Street Lighting.—By J. M. Bryant and H. G. Hake, of the University of Illinois, Urbana, Ill. Bulletin No. 51. Published by the university. Paper covers. Price, 35 cents.

This is a well-considered essay on the science of street lighting and contains a large amount of reliable information regarding street lighting, including methods, plants, cost and results. Every person having charge, superintendence, financial management or direction of the generation or distribution of light will find much in this bulletin that will be very useful in aiding the more efficient working of their plants.

The Mechanic.—This is a neat, "chic" little journal published by the H. B. Smith Company of Smithville, N. J., a copy of which will be sent free to any woodworker making an application for same.

The little journal shows and describes all the new woodworking machines made by this firm and also illustrates and describes artistic designs in woodwork suited to the requirements of millmen and other woodworkers.

Die Glasfabrikation von Robert Dralle. München und Berlin, R. Oldenbpurg, 1911. 2 vols. Illus., pl., plans, diagrams, royal 8vo.

Twenty-five years ago the author of the above-mentioned work issued a book on the construction and operation of glass works. The present work was undertaken with the idea of making a revision of the earlier one, but soon developed in scope and contents until an entirely new book has been the result. These two handsome but ponderous volumes constitute a complete treatise on the technology of glass manufacture, by a German mechanical engineer of more than thirty years' experience in his field. He has had the benefit of the assistance of specialists in the preparation of the several sections of the work, which begins with three chapters on the physical and chemical principles of glass production, on raw materials and on fuel, by Dr. Gustav Keppeler of the Royal High School at Hanover. The following four chapters, by Prof. Dralle, deal with furnace and kiln construction, gas producers and other details of equipment. Volume two is largely taken up with the modern machinery and apparatus used in the glass industry, and with processes and principles of operation in its various branches. Separate chapters deal with the manufacture of optical glass, window and mirror glass, wire, cathedral and black glass, ornamental glassware and bottle blowing. An appendix which will interest American manufacturers gives a classified list of German dealers in the various raw materials, machines and apparatus used in the art, as well as a list of German glass works and of manufacturers of glass working machinery. Among the most valuable features of the book, especially to those who are unfamiliar with German, will be the forty-eight large folded plates appended to the volumes and illustrating every phase of the subject. These, together with 1031 illustrations scattered through the text, and executed with characteristic German thoroughness, give a pictorial survey of the present state of an art in which our German competitors have for centuries enjoyed a well earned pre-eminence.

Proceedings of the Seventh Annual Convention of the National Association of Cement Users.—Held in New York City during the month of December, 1910. Edited by the president, and published by the Association, New York, N. Y. Well bound, in cloth, hard covers, and printed on superfine paper.

This is a pretty large work, covering as it does some eight or nine hundred pages, and is profusely illustrated with fine photo-engravings and working diagrams. The contents consist of a series of excellent papers, dealing with cement, the making of concrete and the various uses to which it is applied and the many methods of its application. It also deals with concrete failures, their cause and prevention, and of over-reinforcement, and of almost every phase of the scientific use of cement. If space permitted we would reproduce some of the papers read, in extenso, but this, at present, would be impossible; later on we may do so, however.

To workers in cement and to those having the constructural superintendence of cement or concrete work on an extensive scale, this volume should prove a valuable friend and competent adviser.

PATENTS.

The following list of recent patents and trademarks relating to building interests is especially reported for The National Builder by Wm. G. Henderson, solicitor of American and foreign patents and trademarks, Norris building, 501 F street, Washington, D. C. A copy of any of the United States patents will be furnished by him for 25 cents.

1,008,463. Emergency-exit-door fastener. W. H. Hart and J. P. Holtzhouser, assor. The Stanley Works, New Britain, Conn.

1,008,975. Making concrete-work permanently water-tight. H. J. Livingston, Baltimore, Md.

1,008,982. Store front, etc. D. J. Murnane, assor. Zouri Mfg. Co., St. Louis, Mo.

1,008,987. Means for sustaining sliding doors. Theo. C. Prouty, assor. Richards-Wilcox Mfg. Co., Aurora, Ill.

1,009,218. Fireproof door and window. Ed. O. Boyd, Oklahoma, Okla.

1,009,497. Sash-fastener. Ira G. French, Orange, Mass.

1,915,989. Door frame. T. Buchholz, assor. Faconeisen-Walzwerk, L. Mannstaedt et Cie., Act. Ges. Kalk, near Cologne, Germany.

1,016,006. Disappearing wall-bed. Ed. L. Gillespie, Seattle, Wash.

1,015,981. Concrete mixer. C. E. Roberts, Atchison, Kan.

1,016,189. Moving stairway. Geo. A. Wheeler, New York City.

1,016,485. Form for concrete construction. Jno. Elsmere, Battle Creek, Mich.

1,016,422. Latch for sliding doors. B. Lauritsen, Twin Brooks, S. D.

1,016,760. Reinforced concrete structure. M. Mingay, Detroit, Mich.

1,016,713. Window ventilating appliance. R. Schimek, New York City.

1,016,446. Floor dressing tool. W. A. Scott, Evansville, Ind.

1,016,984. Deformed reinforcing bar for concrete. Wm. A. Collins, Chicago, Ill.

1,017,386. Building construction. L. K. Davis, New York City.

1,017,252. Sash pulley. F. Egge, assor. The Smith & Egge Mfg. Co., Bridgeport, Conn.

1,017,327. Keyless combination door lock. J. Schaefer, Elgin, Ill.

1,017,340. Weather strip. R. B. Swart, assor. Am. Metal Screen & Weather Strip Co., Detroit, Mich.

1,017,341. Sheet metal window sash and frame. M. Swartz, assor. Natl. Fireproof Window Sash and Frame, Brooklyn, N. Y.

1,017,611. Roofing cleat. H. R. Wardell, assor. H. W. Johns-Manville Co., New York City.

1,017,876. Machine for molding concrete. F. F. Landis, Waynesboro, Pa.

1,018,077. Door lock. A. Petterson, St. Cloud, Minn.

1,018,018. Clip used in concrete construction. J. H. Strauss, assor. of two and one-half to R. H. Williams, Baltimore, Md.

1,017,714. Door closer. H. G. Voight, assor. The Am. Hdwe. Corp., New Britain, Conn.

85,398. Metal weather strips. Acme Metal Weather Strip Co., New York City.

85,449. Metal doors, windows, etc. Kawneer Mfg. Co., Niles, Mich.

85,526. Heating, lighting and ventilating apparatus. Turner Brass Works, Sycamore and Chicago.

1,018,404. Apparatus for washing stone and mixing macadam and concrete. Wm. H. Baxter, Harrogate, England.

1,018,871. Door stop. J. W. Buoy, assor. one-third to M. V. Parsons, Eugene, Ore.

1,018,503. Window sash. G. Kahn, Detroit, Mich.

1,018,946. Cleat for securing roofing. H. W. Topping, Chicago, Ill.

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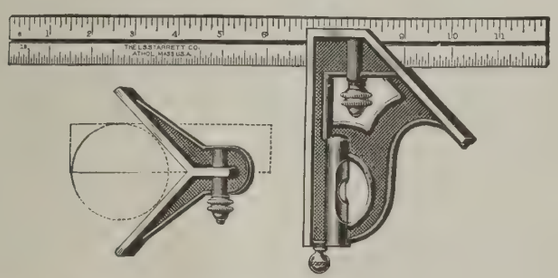
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Building Material Price List

REVISED TO DATE

*—Price not given. yp—Yellow pine. wp—White pine. np—Norway pine. op—Oregon pine. rw—Redwood. s—Spruce. oc—Ontario Cedar. h—Hemlock. bc—British Columbia cedar. rc—Red cedar. F—Fir. Cdr—Common Cedar. Cyp—Cypress. BM—Board measure. S1S—Sized one side. D4S—Dressed four sides. KD—Kiln dried. RG—Rough C—Clears.

	Chicago, Corrected by J. H. Touchstone.	Omaha, Neb. Corrected by I. P Hicks.	Southern Ontario. Corrected by F. O. Frantz.
Dimensions, Hemlock Lumber	M. ft. BM S 2 S	M ft. BM S 2 S	M ft. BM S 2 S
2"x4" to 8" up to 16', No. 1	$20 00	yp $26.00	h $24 00
2"x4" to 8" up to 16', No. 2	18.00	24.00	22 00
2"x4" to 8" 18 & 20', No. 1	21.05	27.00	26 00
2"x10" up to 16', No. 1	20.50	28.00	24 00
2"x12" up to 16', No. 1	21.50	30.00	25.00
2"x14" up to 16', No. 1	*	*	26 00
Mash 2 ft. over 20 ft., add per M	1.00	1.00	2.00
Select stock as above, add per M	5.00	*	*
Exterior Finish, Etc.	M ft. BM D 4 S.	M ft. BM D 4 S.	M ft. BM D 4 S.
1"x8" to 1"x8", No. 1	yp $32 00	yp $45.00	wp $35.00
1"x10", No. 1	32.00	43.00	40.00
1"x12", No. 1	37.00	46.00	42.00
1¼"x8" to 1¼"x12", No. 1	45.00	48.00	45.00
1½" and 2" same as above	42.00	48.00	42.00
1" drop siding, No. 1	24.00	30.00	35.00
½" lap siding, No. 1	*	rdw 30.00	30.00
Enclosing and Fence Boards.	M ft. BM S 1 S	M ft BM S 1 S	M ft BM S 1 S
1"x4" to 1"x8", No. 1	yp $23.00	yp $25.00	wp $30.00
1 x8" to 1"x10", No. 1	23.00	24.00	h 24 00
1"x10", No. 1	*	24.00	24.00
1"x10", No. 2	*	22.00	22 00
Interior Finish, Flooring, Ceiling, Etc.	M ft. BM D S.	M ft. BM D 4 S.	M ft. BM D 4 S.
⅛", T. & G. Flooring No. 1	yp $26.50	yp $38.00	wp $40.00
⅛", T. & G. Flooring No. 2	*	34.00	wp 30.00
Add for ceiling per M	1.00	2.00	1.00
Add for partition per M	2.00	2.00	2.00
⅝"x4", Ceiling No. 1	22.00	30.00	sp 30.00
	100 ft. run	100 ft run	10^ ft run
4¼" Moulded Casing	yp $1.52	yp $2.00	wp 2.00
4¾" Moulded Casing	1.68	2.50	2.50
7¼" Moulded Base	2.53	3.50	4.50
⅛"x9½" Moulded Base	3.75	4.00	6.00
1⅛"x4½" Moulded Window Stool	2.12	3.00	4.00
Miscellaneous List.	Per M.	Per M	Per M
Shingles, No. 1	re $3.30	$4.00	be re $3.75
Shingles, No. 2	3.35	3.75	*
Shingles, fancy	W. C.	4.50	6.00
Lath, 4 ft., No. 1	yp 3.60	F 5.50	wp 5.00
Lath, 4 ft., No. 2	2.75	5.00	s 3.75
Pickets, 1"x3"x4' 6", dressed	35.00	30.00	*
Pickets, 1 x3"x4' 6", rough	*	*	*
	Piece.	Piece	Piece.
6"x8" Post split	Cdr $0.13	Cdr $0.25	*
8"x8" Post split	.17	.30	*
8"x8" Post whole	.66	.40	Cdr $0.80
6"x8" Post whole	.25	.25	.25
Hardware List.	Cw	Cwt.	Cwt.
Nails, wire, common	$2.25	$3.00	$2.85
Nails, cut, common	2.10	*	3.00
Nails, wire, fine finishing	2.65	3.50	4.00
Sash Weights, cast iron	1.60	1.50	2.25
Tarred Felt Paper, best 2-ply	Roll. $1.00	Roll $1.00	Roll *
Tarred Felt Paper, 3-ply		1.25	*
Red Rosin, Atlas brand		.90	$3.50
Red Rosin, durable brand		.75	.60
Black Neponset		*	2 50
Masons' Supplies.	Per M.	Per M.	Per M.
Brick, blue, at kilns	*	*	
Brick, blue, at kilns, No.	*	*	
Brick, blue, at kilns, No. 2	*	*	
Brick, waite, delivered, face	7.50	*	*
Brick, red, delivered, backing	7.00	7.50	*
Brick, delivered, dry pressed	7.00	18.00	$17.00
Brick, vitrified, dry pressed	18.00	24.00	*
	bbl.	bbl.	bbl.
Lime, best gray	$1.30	$1.25	*
Lime, best white	1 40	1.25	1.80
Cement, Portland	0.95	1.85	*
Plaster, calcined	2.40	1.80	bbl. $2 50
Hair, 8 lb. per bush	.25	.25	*
			Plaster (patent) $6 per ton. White Rock $11.00 per ton.

NOTE—While these figures are appoximately correct at the time of preparing, the continual fluctuations and shifting of prices make it necessary to advise our readers to consult local price lists when making up tenders.—ED.

Building Trades' Interests In The Courts

Under Rev. Laws, c. 197, § 3, one furnishing materials for the erection of a building has no lien on such building for the materials, where he, before furnishing them, did not given written notice to the owner that he intended to claim a lien, where the owner was not the purchaser of the materials.—Thornley vs. J. C. Walsh Co., 92 N. E. (Mass.), 1007.

Where defendant contracted to construct a house for plaintiff in accordance with a duplicate, a radical departure from the sample house would not be excused because unintentional.—Nance v. Patterson Bldg. Co., 131 S. W. (Ky.) 484.

A contractor who has been paid all installments so far due under the contract and who refuses to proceed with the work unless he is paid another not yet due, abandons the work without legal cause.—Steiger v. London, 126 N. Y. S. 256.

A building contract provided that, on the certificate of the architect of the default of the contractor, the owner, after notice, could provide the labor or materials and deduct the cost thereof from any money due or to become due, and that, on the architect certifying that the default was sufficient ground for such action, the owner might terminate the employment of the contractor and complete the work under the contract. The contractor abandoned the work without legal cause. The owner gave notice, referring to the architect's certificate of the contractor's default, and then notified the contractor that he terminated the employment and would enter on the premises to complete the work. Held, that the contractor could recover the contract price, less the amount paid, plus the cost to the owner of completing the work.—Seiger v. London, 126 N. Y. S. 256.

THE FIRE DEMON

By WALTER B. SNOW

It is not often that our daily papers have to chronicle the details of a fire involving a loss of more than $1,000,000; but statistics compiled by the various fire insurance companies, boards of underwriters, etc., lead to the belief that there are comparatively few days in the year when the total fire tax in the United States does not exceed the above mentioned figure. The actual loss by fire is supposed to average about $250,000,000 per year. It is certainly within the bounds of probability that the expense of maintaining and operating fire departments and the operating costs connected with fire insurance would make up another $125,000,000.

Innumerable means have been devised from time to time to minimize this loss, involving the use of both automatic and hand-operated devices. It is needless to say that the former are, at the inception of a fire, much the more valuable by reason of the fact that, when properly operative, they act as soon as the fire has made its presence distinctly manifest. As a matter of fact, in many cases, particularly those in which automatic sprinklers have operated, the fire is actually extinguished before it is seen by anyone. In these cases, of course, the automatic fire alarm has brought fire-fighting apparatus to the spot, but in about two-thirds of the cases the apparatus is not called upon to do any work further than what the sprinkler system has already accomplished.

Students of the subject of fire prevention and protection seem to be unanimously of the opinion that the automatic sprinkler is by far the most important of all fire protection devices. As a matter of fact, no instances are on record where a fire starting in a building equipped with modern automatic sprinklers in good operative condition has extended beyond a limited space in that building. Be it understood that when someone has shut the water off the system, or there is an inadequate supply of water, or the system is crippled by an initial explosion, it is not "in good operative condition." Among the strong points in favor of the use of sprinklers might be mentioned the facts that it puts all of its water on the exact place to do the most good; it operates only where it is needed; it works just as effectively in a room full of smoke as anywhere else, and stays on the job when the heat would drive human firemen away.

When we realize that a fireproof building is fireproof in the same sense in which a furnace is fireproof, and that its contents will burn in much the same way as will those of a furnace, it is very apparent that the need for automatic protection to those contents is very great. The $6,000,000 fire in the State Capitol at Albany a few months ago illustrated this fact most beautifully. Many of the documents and records destroyed were absolutely irreplaceable, and yet from the testimony of eye-witnesses who were on hand at the time the fire started a single pailful of water directed at the right spot would have extinguished it.

A reduction of fire losses by means of automatic devices operates really in three ways. In the first place, there is a conservation of created wealth by virtue of the fact that valuable property or records are not destroyed; in the second place, there is, in very many cases, the ability to continue business with, at most, but very brief interruption; and in the third, there is a very definite saving in fire insurance premiums enough, in fact, in the general case to completely pay for the sprinkler equipment in about three or four years. Everything, therefore, points to the great desirability of making an installation which will not only pay for itself in a short period, but probably be worth many, many times its cost in potential saving.

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DEPARTMENT

This advertisement is not written by an advertising specialist or expert, but by a varnish man - one who knows his business as you know yours. We must confess that Architects and Builders, as a rule, are considered hard to interest - chiefly because they will not listen. As a rule they are too busy to talk to a supply man.

Did it ever occur to you that without varnish or enamel your work would lack beauty and the finishing touches so necessary to the completeness of the job? We can help you if you will let us. The finish is the first thing one looks at upon entering, and the last thing one looks at when leaving a building, therefore, it is of vital importance and should be given careful attention.

Let us take care of this vital matter for you. Send us a description of just one of your jobs, and we will write the specifications for you. We know how. Isn't it worth a moment's time? We ask for only one job to show you what we can do.

THE GLIDDEN VARNISH COMPANY

Factories: Cleveland, Ohio - Toronto, Canada.
Branches: New York - Chicago - London.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

TRADE REVIEW

STAMPED METAL WORK.

Few people realize the extent to which sheet metal is supplanting other forms of roofing, siding, lining, etc. The fireproof sheets have a value not only as a protection against the weather but as a protection against fire as well, so that the use of metal reduces the fire risk and the fire rates.

At the recent convention of the Wisconsin Hardware Association, which was held in the Auditorium at Milwaukee, the Milwaukee Corrugating Company had a most interesting exhibit. Their booth was composed entirely of sheet metal products and showed somewhat the variety of artistic forms which could be used in buildings of that character. Not the least interesting was a miniature bungalow, constructed entirely with steel, the roofing and gables being covered with miniature TITELOCK shingles, the outside dimensions of the building being 24x38 inches and 30 inches high.



MODEL HOUSE OF STAMPED METAL PRODUCTS.

The exhibit also showed a full line of eaves trough and conductor pipe trimmings in galvanized steel and copper. It is interesting to know that their CRIMPEDGE gutter was allowed a patent a few days ago, the patent number being 1,020,087.



BOOTH OF MILWAUKEE CORRUGATING CO.

The Milwaukee Corrugating Company, Milwaukee, Wisconsin, is anxious to hear from all those who want a fireproof, waterproof or lightning-proof roof and will be glad to send samples and catalogue "N-B" on request.

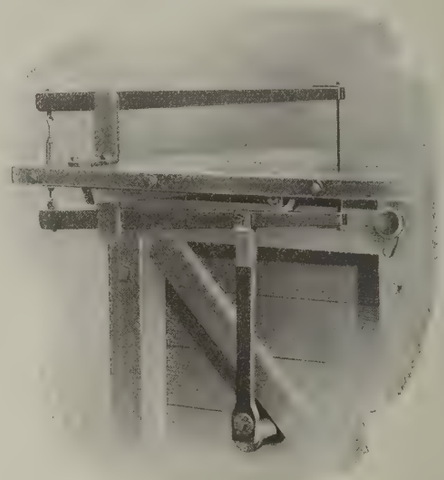
WHY CONTRACTS DON'T PAY.

Many a contract-estimate looks like a payer—on paper—but turns out to be a loser—on the ledger.

The lumber is figured all right—so is the joiner's material—so are the metal work, nails and findings—but the time, that is the rub. How to estimate time, how to anticipate accidental delays, etc., is a sticker. Plainly, any method that will materially save time on a job ought to receive a glad welcome from all contractors.

Sawing seems to eat up most of the carpenter's time. If he had this stuff all sawed and ripped to proper lengths it would cut a great chunk out of his time.

The Oshkosh "Eveready" Saw Rig seems to solve this problem. It is a compact, handy frame and table of very best rock maple, air and kiln seasoned, containing a reliable 4 h. p. gasoline engine of latest improved type. Two men can load it into a wagon. Once on the job, it can be skidded anywhere, upstairs or down.

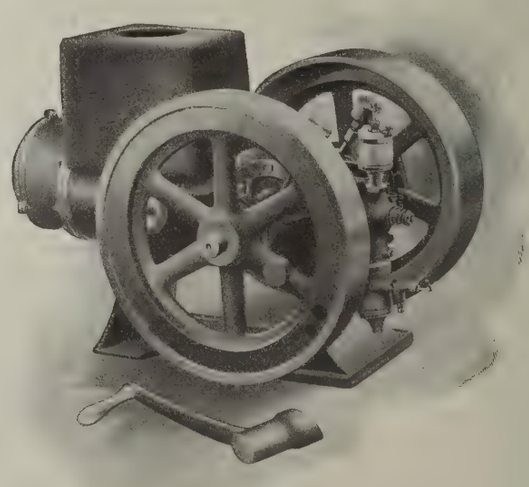


JIG SAW ATTACHMENT.

The outfit as generally furnished consists of one cross cut and one rip saw with other attachments such as jointer head, boring attachment, jig saw, sander, mitre device, dado head, emery wheel, etc.

This brings a veritable carpenter shop right out onto the job. It is said that with "Eveready" two men can do as much sawing as twenty-five can by hand. This would effect an extremely large saving in a carpenter's time, and make the contract yield a good, solid return, that would soon pay for the cost of the rig.

The engine is easy to understand. Any carpenter can learn to operate it. Just a whirl of the wheel and it's off. It will run, it is said, for only two cents an hour.



THE ENGINE.

The "Eveready Saw Rig" is made by the Oshkosh Mfg. Co., 414 S. Main St., Oshkosh, Wis., and we understand that their guarantee is simply "For Life." This would seem to pretty near make it a safe purchase for anyone having this class of work to do. A catalogue showing further particulars and descriptions will be sent on request, together with their special free trial offer to contractors and builders.

ARTISTIC WOOD COLUMNS.

However much we may talk about the American style of architecture, the fact remains that the dignity of the Greek Orders cannot be surpassed. Try as they will, modern designers can prepare only a caricature when they try to evolve a new "Order."



SARGENT

STORE DOOR HANDLES

For the New Stores of Your City

Do not be satisfied to use the common patterns which make every store entrance look alike, but apply SARGENT Cyclinder Store Door Locks and Handles that will work easily, give absolute security and always prove satisfactory. From the many patterns different designs can be used for the different owners that will give individuality to each store.

You will also receive credit for using good taste and the considerable advantage of having many pleased customers in your neighborhood.





SARGENT

HARDWARE AND LOCKS

by persistent and extensive advertising and satisfactory service have become well and favorably known, but these are not the only reasons for the excellent reputation they have throughout the world. The experience of three generations, the well organized body of craftsmen, the use of right materials, correct construction and care in manufacture, all count in the production of these satisfaction-giving goods.



Sargent Hardware and Locks are obtainable from representative hardware merchants in all parts of the world. The Sargent Catalogue, a large and comprehensive volume, may be consulted at any hardware store.

SARGENT & COMPANY

Makers of Dependable Hardware

1151 Leonard Street, New York

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

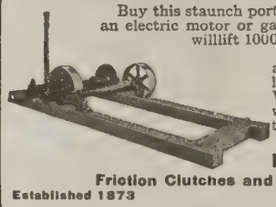


REGAL Sash Cord is always marked with **two blue strands**

This sash cord has been approved by the United States Government and many leading architects. It will outwear the best Chain 3½ times. It is perfect in construction and, therefore, without waste. *Send for the surest test, that made by the Government, and for free samples.*

PURITAN CORDAGE MILLS, 1560 Story Ave., Louisville, Ky.

Reliable "Erie" Portable Contractor's Hoist



Buy this staunch portable Hoist with frame 7 ft. long on which you can mount an electric motor or gasoline engine to drive it. Rated capacity 600 lbs. but it willlift 1000 lbs. This is just the Hoist you have been waiting for. Can be operated from a distance. Simple, compact, absolutely reliable and easy to handle. Sold complete with long frame, pulley, hand and foot lever, ready for use. Weighs 325 lbs. A high grade Hoist at the price you are willing to pay. Send your order today, you cannot afford to be without it **Catalogue H 1 for the asking.**

Also sold with our Economy Gasoline Engine.

ERIE CLUTCH & PULLEY COMPANY

Friction Clutches and Pulleys, Bone Cutter and Feed Grinders

Established 1873 **ERIE, PA., U. S. A.**

Improved Quick and Easy Rising Steam Electric and Hand Power Safety

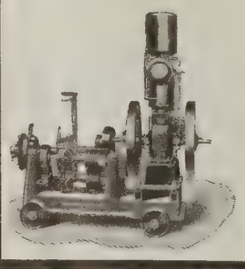
ELEVATORS



and Dumb Waiters, Automatic Hatch Gates

SEND FOR CIRCULARS

KIMBALL BROS. CO., Council Bluffs, Iowa



POLYGON BUILDERS' HOIST 95% Efficiency.

Great lifting capacity in ratio to power. Reverses drum or sheave with engine running one direction. Patent Quadruple Helix Clutch. Cone friction. Cold rolled steel shafting. Semi-cast steel base and standards in one piece. Rigid, durable, simple. Steam, gasoline or electric power. All the advantages of others and then some. Don't fail to investigate the POLYGON before buying a hoist.

WATERLOO CEMENT MACHINERY CORPORATION

111 Vinton Street, - WATERLOO, IOWA

ELEVATORS

Dumb Waiters, Carriage and Store Elevators, Sidewalk Hoists, etc.

MECHANICALLY PERFECT

State your requirements, giving capacity, size of platform, Lift, etc., and we will name a money saving price on your exact needs. Write today.

SIDNEY ELEVATOR MFG. CO. SIDNEY, OHIO



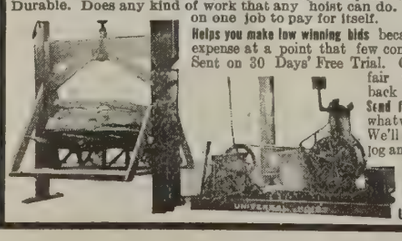
DUMB WAITERS
FREIGHT ELEVATORS
PAVEMENT LIFTS

Easy to Erect and Easy Running

J. G. SPEIDEL Reading, Pa.

Catalgo Upon Application

Special Hoist for Contractors and Builders Lessens operating cost and increases profits. Saves time, money, labor. Easy to operate. Costs little Durable. Does any kind of work that any hoist can do. Saves enough on one job to pay for itself.



Helps you make low winning bids because it cuts your expense at a point that few contractors consider. Sent on 30 Days' Free Trial. Give this hoist a fair trial and send it back if unsatisfactory. **Send for Catalog.** Tell us what work you have to do. We'll send you free catalog and quote you an attractive price on exactly the kind of a hoist you need.

Read This

We have recently finished hoisting material for the new bank building and your Universal Hoist has fully met the requirements. We have saved enough time and expense on this job to more than pay for it and the outfit is still in excellent condition. Blacknawk Construction Co., Waterloo, Iowa.

UNIVERSAL HOIST & MFG. CO. 180 State St., Cedar Falls, Ia.

The bizarre effect attained in art nouveau has no place in prominent refined buildings.

As the orders have for their base the column, it is but proper that the column should be well constructed as well as properly designed in order to display the good taste of the owner. To save material waste and present the best surface to the weather, it has long been customary to build up large columns in six or more pieces, the number being determined by the size of the column. As the entrance of any moisture to the column would cause swelling and opening up, it is necessary that the joints be particularly well made and protected.

The Hartmann-Sanders Company, operating under Koll's patent, have been particularly successful in the manufacture of large columns, and their latest circulars show in great detail their process for manufacturing and contains many ideas useful to the designer.

The Hartmann-Sanders Company also have for distribution Catalogue "D," showing cement, garden and hall furniture; No. 27, showing Pergolas, Sundials and other Garden Ornaments in wood, and No. 40 showing Wood Columns for all purposes.

Anyone interested in these lines can obtain these catalogues by writing to the Hartmann-Sanders Company at 2155 Elston Ave., Chicago, Ill.

ALABASTINE.

The crowning achievement of the builder of the Twentieth Century lies in the beautiful and artistic decorations applied to the humblest residences, as well as to the magnificent palaces and public buildings.

Only a few years ago the use of any decoration would have meant the expenditure of considerably more money than the average householder felt that he could afford. Today, however, we have materials which give results at the minimum of cost, which could not be obtained a comparatively few years ago.

The form of wall coverings has changed greatly, as well as the method of decoration. Where formerly we had only the bare plastered walls, now we can obtain decorations in plaster, stucco, wallboard and stamped metal. The extensive use of the latter for walls, ceilings, beams, etc., has intensified the need for a proper decorating medium. For this purpose, there seems to be no material better than Alabastine, as manufactured by the Alabastine Company of Grand Rapids, Mich. This material has in its favor durability, economy and the refinement of appearance.

To obtain the best results with Alabastine on metal work, it is only necessary to first give the surface a thin coat of oil paint. Over this any tint of Alabastine may be used to get the color effect desired. The finish thus produced is a velvety softness, showing no gloss but reflecting the greatest amount of light and working in admirably with any other decorative effects which may be desired.

When it is understood that the cost of the material for work of this character does not exceed 1½c per square yard, the economy of Alabastine is apparent.

Some of the largest and best work in this country is being finished in this way and many architects are specifying this method of treatment. It should be noted that to insure the best results the Alabastine should never be applied to the raw metal surface, and even if the stamped metal has been painted at the mill, it is advisable to give it another thin coat before applying the Alabastine, in order that there may be no bare spots.

Alabastine comes in a great variety of tints, which may be further mixed to secure any desired shade. The use of the lighter colors will brighten up many dark corners, thus reducing light bills.

The soft finish is particularly easy on the eyes, as there are no high lights reflecting glaring patches, as is only too common with glossy oil paints.

The various circulars of the Alabastine Company are extremely interesting to anyone anticipating decorating their present rooms or installing new work.

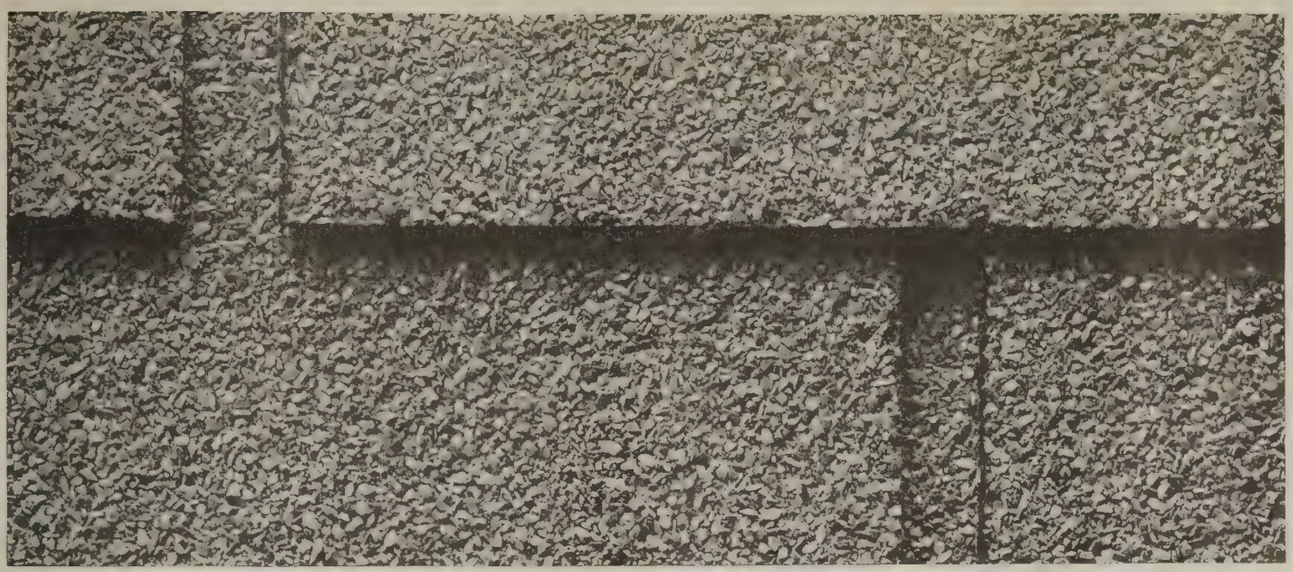
CONTRACTORS' CONVERTIBLE LEVELS.

Accuracy is required today far more than ever before in the building line. There are so many items entering into construction of a building which require accurate leveling and placing that no contractor can afford to take chances in laying out any of his work. From the very start of the job an error of a few inches in depth means a considerable waste of money for exact footings. If not properly placed on the site, there is a still greater expense for correction.

In these circumstances a contractor will do well to investigate the various forms of convertible leveling instruments now on the market. These instruments are so made that they may be used either as extremely accurate levels for doing all the leveling required on a building, or in checking, and for finding a grade from some other building or level point. The instrument is also easily converted into a reliable transit by means of which points in a vertical plane may be quickly found. Given in simple language, the transit is used for finding and checking vertical lines, such as checking the corner of a building, plumbing a column or chimney, or locating points directly over each other, or in line with each other. This enables the contractor to lay down a line of stakes without stringing a chalk line across the site, and insures extreme accuracy, as there is no chance for the wind blowing the line out of place or the stakes being accidently moved. As the work progresses through the building, the transit and level are many times useful. Incidentally in laying out a line of partitions, a center line can be accurately set off in any number of places.

The Iszard-Warren Company, 136 S. 12th street, Philadelphia, Pa., have a factory devoted exclusively to the manufacture of engineering and surveying instruments, and recognizing the value of an instrument of this character to the contractor, have designed the "Sterling" Convertible Builders' Level. This instrument is especially designed to insure the permanency of its adjustment and the accuracy of the work to be done with it. A special lens combination enables the instrument to be used under all weather conditions.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.



THIS CUT SHOWS THE SURFACE OF FLEX-A-TILE SHINGLES—LIFE SIZE—COLORS ARE DEEP RED, GREEN GRAY, SILVER GRAY AND BROWN

Here is a roofing material that is going to make every builder and contractor and home owner in the country sit up straight and take notice. A material that is as easily and quickly applied as wood shingles, as beautiful as tiling, as durable as the finest slate and surprisingly inexpensive

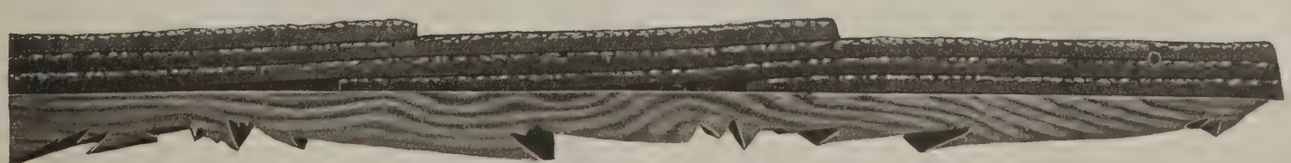
FLEX-A-TILE
Asphalt Shingles

are made of solid asphalt, into the surface of which is imbedded, so substantially that it becomes an actual part of it, chipped slate and granite. The natural color of this slate and granite gives the coloring to the shingles. There is no paint or artificial coloring of any kind. Shades are rich red, green gray, silver gray and brown—and these colors can't change—they are natural. Flex-A-Tile Shingles are cheaper than wood shingles that have been stained. They are easier to lay—and they will last as long as the house stands. The slate surface makes practically a fire-proof covering for the roof.

COMES IN ROLLS AS WELL AS SHINGLE FORM

Write To-day for a Sample of Flex-A-Tile Shingles—
also the Felix-A-Tile Book Showing Roofing Designs

THE HEPPES CO., 1012 45th Avenue, CHICAGO



SECTIONAL VIEW SHOWING HOW FLEX-A-SHINGLES ARE APPLIED—NOTE THE THREE SOLID THICKNESSES OF SLATE COVERED ASPHALT—AN ABSOLUTELY TIGHT WEATHER-PROOF AND TIME-PROOF ROOF

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

STILLWELL CALIFORNIA BUNGALOW BOOKS



PACIFIC COAST HOMES combine individuality of design with artistic and economical construction. Western Homes are of absorbing interest in exteriors and plans. Genuine Bungalows especially appeal to everyone and are a popular and profitable form of investment. Our two books contain plans, descriptions, and cost estimates of low-cost houses suitable for any climate.

"REPRESENTATIVE CALIFORNIA HOMES." Price 50 Cents. A book of 50 Bungalows, Cottages and two-story Residences, 5 to 10 rooms costing $1500 to $6000.

"WEST COAST BUNGALOWS." Price 50 Cents. A book of 50 one-story, very artistic, inexpensive Bungalows of four to six rooms costing $500 to $2000.

BUILDERS' SUPPLEMENT No. 1. Price 10 Cents. *FREE with orders for two books*

E. W. STILLWELL & CO., Archts., 2174 Henne Bldg., 122 Third St., Los Angeles, Cal.

KRAOPLATE

The Best Composition Blackboard Manufactured

EASILY ERECTED
MOST ECONOMICAL
ABSOLUTELY GUARANTEED

Write for FREE sample and prices.



ATLAS SCHOOL SUPPLY CO.
1020 Van Buren Street, Chicago, Illinois

Steel Ceilings

Are you figuring on using a medium priced Steel Ceiling? Get our catalog by all means. It shows a line of beautiful ceilings of sufficient variety to please almost any individual liking, yet at prices surprisingly low.

The possession of this catalogue and a knowledge of our line and prices will save you many a dollar if you are an occasional or frequent buyer of Steel Ceilings.

Write for It Today

Indianapolis Corrugating Co. INDIANAPOLIS, INDIANA

ARCHITECTURAL DRAWING MADE EASY

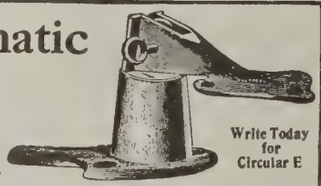
By I. P. HICKS — 94 pages, illustrated and cloth bound, $1.00 postpaid. The best yet on drawing plans. Your money back if you are not satisfied with this book. Get a copy of

HICK'S ESTIMATORS' PRICE BOOK and your troubles in estimating are over

170 PAGES—CLOTH BOUND—PRICE $1.00

I. P. HICKS, Box 22, Station A Omaha, Neb.

Whipple's Automatic Blind Hinge



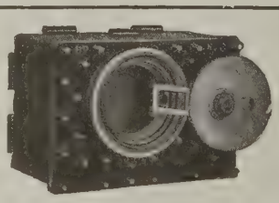
Reasons Why THEY ARE THE BEST
- Cannot slam or blow off
- No fastening required.
- No blinds to trim or catches to interfere.
- Will hold blind—open, half open or closed.

Write Today for Circular E

We also manufacture a flush hinge, constructed on same principle
Two styles, for brick or wood buildings

R. P. WHIPPLE & CO. 277 Main St., Springfield, Mass.

The Gale Wall Safe



It makes your Valuable Papers, Jewelry and Silver secure against Porch Climbers, Petty Thieves, Fire, etc.

No Home or Apartment House complete without one. It has a combination lock.

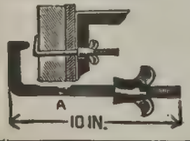
WRITE FOR DESCRIPTIVE MATTER TODAY

WILLIS MFG. CO., - - Galesburg, Ill.

Fred Liebrich, Agent for Cook County, 1102 Monadnock Bldg., Chicago, Ill.

$13.95 PER DOZ. (IF YOU SEND CASH WITH ORDER)

ABSOLUTELY SAFE, for every pair will carry a ton, and there's no wear-out to them. Besides, they're so easy to put up and take down—one man can do it alone and do it quickly.



THE TAYLOR STEEL SCAFFOLD BRACKET

Write for Catalogue of Builders' Specialties

JAMES L. TAYLOR MFG. CO.
POUGHKEEPSIE, N. Y.

and the graduated circle permits horizontal angles to be laid out or measured entirely without calculation. This is especially valuable to the builder, as the various corners and angles can be quickly found and staked out. The fact that these instruments have found a very large sale would indicate that the principles on which they are made is recognized by the contractors as being particularly adapted to their work.

The Iszard-Warren Company, 136 N. 12th street, Philadelphia, Pa., have an illustrated catalogue of great interest to the builder.

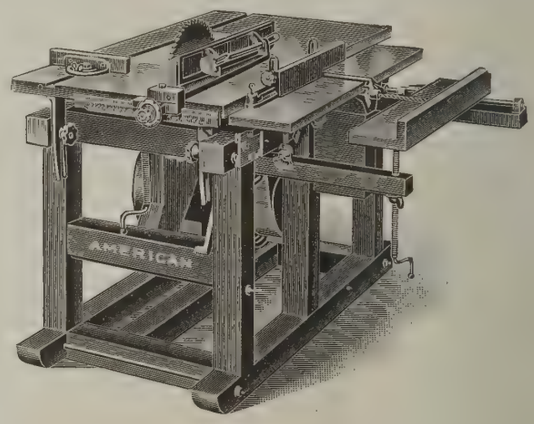
THE "AMERICAN" CONTRACTORS PORTABLE VARIETY WOODWORKER.

One of the most encouraging signs of the times is the disposition shown by the best machinery builders to improve their product, to enlarge its usefulness or to bring out entirely new machines in which the purchaser will find refinements pointing the way to larger money making possibilities.

In many cases the later machines can be had at a price but little if any more than asked for the older and less capable machines so that the customer has no legitimate reason for not possessing the best.

No machine has been more prominent in the making of the contractor than the portable saw bench. This one machine, equipped with a gasoline engine or electric motor enables the contractor to do much of the work formerly done laboriously by hand or in the planing mill. The former was expensive and slow and the latter frequently meant delays and expense in ordering and delivering the material.

The American Saw Mill Machinery Company, 80 Laight street, Hackettstown, N. J., placed a portable saw bench on the market a year or so ago. This machine was built for permanent service with



a view of bringing planing mill facilities right to the building or concrete job. It was early realized that the machine as first made did not embody everything in the ideal contractors machine and a later form, known as the American Contractors Portable Variety Woodworker greatly increases the scope of work possible. This machine is really a miniature planing mill complete in its several details and capable of doing a wide variety of work.

One of the shortcomings of the early saw bench was that but one man could work upon it at a time. In the present machines, three men may work at three different jobs. One may be working on the rip saw, cut off saw or dado heads on the table and another can be joining or planing, while the third may be boring or sanding, all without any change in the machine or its adjustments.

Some idea of the construction and design of the machine may be had from the illustration, although to secure complete information the contractor should write the manufacturer for their latest catalogue, showing the machine in detail and describing the various work which may be done upon it.

As stated before, the machine may be equipped with either a gasoline engine or electric motor, depending upon the source of power available to the contractor. As a general rule, the gasoline motor is more frequently chosen as it is entirely self-contained and required no running of wires, etc., to be made available upon the job.

We would suggest that any contractor not having a machine of this character should write to the American Saw Mill Machinery Company for further information regarding this useful machine.

HIGH CLASS CABINET AND MILL WORK.

Fine interior finish and trim in either soft or hard woods add so much to the beauty of a home or any other building that it pays the architect and contractor to do all they can to point out to the property owner what can be had by careful selection, good workmanship and material.

Property owners who have traveled extensively often see the interiors of fine buildings and decide that they want just that kind of interior finish, but when the work is finally completed by some small local mill, they realize that something is lacking.

In nine cases out of ten the interior finish and trim have been turned out by inexperienced workmen and by a mill that seldom has the opportunity for doing the finest kind of work in this line.

Few cities in the United States have better itnerior finish factories than Chicago. Among those that have a reputation for quality work is the Harty Bros. & Harty Company, 21st Place and Loomis St., Chicago. Having had over twenty-five years of practical experience in millwork manufacturing, having made the interior trim, etc., for many of the finest buildings in the country, and always carrying a large stock of kiln dried factory lumber in pine, cypress and the hardwoods, and employing only experienced workmen, the Harty

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

GOOD NEWS: "Tell It Again!"

"WHITE PINE—AND PLENTY OF IT."

There's *no way to make THIS Good News too strong* to suit the skilled and experienced *Carpenter* or *Contractor.* When he hears that (HE and YOU) CAN GET ALL THE WHITE PINE HE (or YOU) CAN WISH FOR—GET IT in any quantity—any place—any time—HE and YOU are Glad. (YOU KNOW VALUES.) You may have to do some INSISTING—and some *refusing of substitutes* —BUT WHITE PINE ***is Worth All the Insisting that's Necessary.***





The One Best Wood For Your Tools.
The One Best Wood For Your Customers.
The One Best Wood For Your Reputation.

When you know what you want—
and what you want is good old
WHITE PINE (or NORWAY)
"The Wood America is Mostly Built Of"

DON'T TAKE ANY SUBSTITUTES
Write us today for "Why-When-WHITE PINE" Free

NORTHERN PINE
Manufacturers' Association
1118 Lumber Exchange, Minneapolis, Minn.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

(FREE) HOME BUILDERS' PLAN BOOK
containing a nice selection of views for
COLONIAL HOMES, BUNGALOWS, and COTTAGES
with floor plans showing size of rooms and arrangements. Full description of finish, cost, etc. The result of years of planning and building homes.
Residences $1000-$6000; Bungalows $500-$2500; Cottages $1000-$3000. Complete blue print drawings, working details, specifications and list of material at reasonable prices. Get this handsome Home Builders' Plan Book. Send 6c in stamps for postage and mailing.
JENS C. PETERSEN, Architect
804 State Bank Building, Traverse City, Mich.

Automatic Safe-Sanitary Gas Light and Fuel
Best for cooking and heating water for kitchen, bath and laundry.
No charging, no cleaning.
No generating, no dirt, soot, fuss or muss.
Cheaper than electricity, cleaner and safer than kerosene or acetylene (in use 16 years.)
Today is the time to write home department of
Economy Gas Machine Co. 437 E. Main St. Rochester, N.Y.

Topp's Framing Tool
A PERFECT TOOL, AND THE ONLY TOOL FOR THE PURPOSE EVER INVENTED
Saves from 3 to 24 hours in laying out a single roof. Saves time for the skilled mechanic, and enables the ordinary workman to frame the most difficult roof with absolute certainty.
IT DOES ALL THIS
It is accurate, thus preventing all mistakes.
It gives angles for any pitch.
It gives lengths for any rafters.
It gives cuts for principals, jacks, hips, valleys and cripples.
PRICE, $1.75
G. A. TOPP & CO., Indianapolis, Ind.
See tool at Your Hardware Dealer's.

Van Dorn's Steel Joist Hanger Has no Equal
Send for Catalogue
THE VAN DORN IRON WORKS CO.
CLEVELAND, : : OHIO
Structural Steel and Ornamental Iron Workers
No. 1.—Steel Joist Hanger for Wood Header.
No. 4.—Steel Joist Hanger for Brick Walls.

CALDWELL SASH BALANCE
Does away with weights and cords and VASTLY more durable.
Makes sashes work perfectly.
Permits greater window space in new work, as box frames are not necessary.
May be applied to old windows without altering sashes or frames.
Write for circular to the
Caldwell Mfg. Company, 2 Jones Street Rochester, N. Y.

DIAMOND EXPANSION BOLTS
For fastening all kinds of material to Brick, Stone or Concrete.
Diamond Screw Anchor
"Diamond N" Steel Drill
DIAMOND EXPANSION BOLT CO.
90 WEST STREET, NEW YORK

50 CENTS For This Clamp Fixture
IT IS UNEQUALLED FOR STRENGTH—QUICK ACTION AND LASTING QUALITIES
Write for Catalog of Sheldon's Clamps and Vises
E. H. SHELDON & CO., 321 N. May St., CHICAGO

Bros. & Harty Co. are able to produce work which will live up to the most exacting architect's specifications.

Harty Bros. & Harty Company carry in stock window and door frames in the knock-down lumber, ready to put up, and can ship frames very promptly. They also carry a stock of 1¾-inch and 1⅜-inch windows to fit their frames. Their stock of yellow pine interior trim and jambs is complete and they also carry five cross yellow panel doors and birch and oak doors in two and five panels, enabling them to ship the trim for an ordinary flat or residence building complete from their stock on very short notice.

The second floor of this company's large factory building is devoted entirely to cabinet work, which they turn out very promptly, as well as making everything very high grade.

The Harty Bros. & Harty Company pay special attention to out-of-town business, and where plans or lists are sent them, estimates are often returned on the same date of receiving.

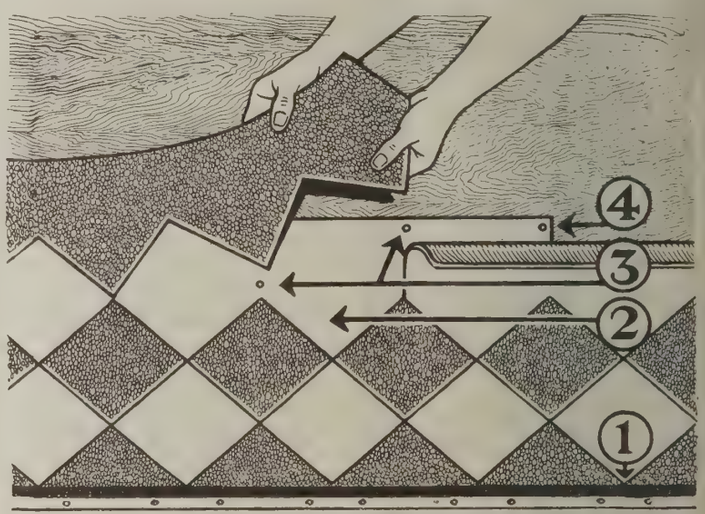
Many contractors and builders located in the smaller places have found it a very profitable and convenient proposition to give all their work to the Harty Bros. & Harty Company. In doing this they know that they will be taken care of at all times and that this company can be relied upon to give them high class materials at the very lowest price possible, consistent with quality.

Many contractors and builders make the mistake of endeavoring to divide up their work with three or four different mills. It is a much better thing every way to do business continuously with a reliable, high-class company and be taken care of in the best manner possible at all times.

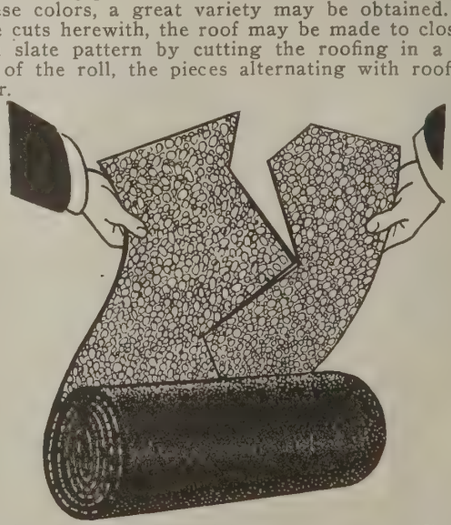
The Harty Bros. & Harty Company want to get in communication with live contractors and have the opportunity of figuring on their jobs for this year. Their work is well known in Chicago and considered the very highest class, and these statements can be verified by looking the matter up. Their catalogue showing cabinet work and interior finish will be sent to parties interested on request.

PEERLESS ORNAMENTAL ROOFING.

While it is possible to decorate the interior of the house with various finishes in wood, plaster, paper and other forms of ornamentation, the roof of the house as a rule is left in its natural materials. The variety of color combinations possible on the sidewalls of frame or masonry buildings is generally impossible on the roof.



By the use of the Peerless Ornamental Roofing, it is possible to obtain a wide variety of patterns which are both artistic and durable. This roofing is made in several finishes, red and gray slate chips being imbedded in the surface of the slate finishes and gray or gray black finishes being possible in the smooth surfaces. By a combination of these colors, a great variety may be obtained. As will be seen by the cuts herewith, the roof may be made to closely resemble the French slate pattern by cutting the roofing in a zig zag line lengthwise of the roll, the pieces alternating with roofing of a different color.



The Huber Builder's Material Company, 39-40 Vine street, Cincinnati, Ohio, are placing this roofing on the market and the literature which they are sending out shows the best methods of placing it on the roof.

A postal to the Huber Company will bring any desired information with regard to this form of roofing.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Build Bungalows

"from crest to foundation" With Washington **Red Cedar Shingles**

The pleasing beauty of shingle bungalows attracts purchasers and keeps you busy. You can secure any artistic color effect you wish by dipping them in a good stain, thus saving half the painting bill on a house.

They Sell on Sight



Designed by Herrick Improvement Co., Seattle, Wn.

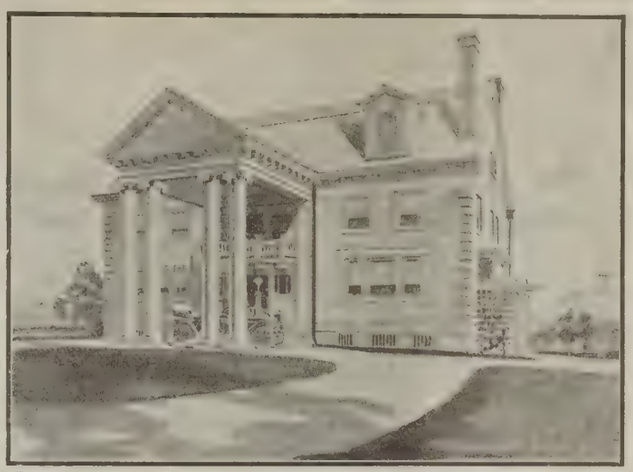
Get This Free Book

Be the "Bungalow Man" of Your Town. It Pays

Our "Bungalow Book" shows 24 beautiful designs from actual photographs with floor plans and estimated cost. Enclose 2c stamp for copy.

We have no plans or books to sell. We manufacture Washington Red Cedar Shingles, sell through local dealers only and want you to know about our product before you build.

RED CEDAR SHINGLE MANUFACTURERS' ASSOCIATION
Representing over 200 Mills. Capacity 20 Million Daily
516 WHITE BUILDING, SEATTLE, Wn.



Reproduced from a Drawing of the Residence of Milton Newman, Moss Avenue, Peoria, Illinois. Roofed with Asbestos "Century" Shingles by Frederick J. Klein, Architect, and F. Meyer & Bros., Contractors, both of Peoria.

When the architect and contractor roofed Milton Newman's residence with

Asbestos "Century" Shingles

"The Roof that Outlives the Building"

They accomplished *Three Things* for the client:—They gave a distinct *Character* to the roof as an architectural feature.

They made his roof absolutely immune from fire risk.

They protected him for good and all from the cost of repairing and painting his roof.

Asbestos "Century" Shingles are the only *Practical Light Weight Roofing* made of *Cement* and *Asbestos*.

You can get Asbestos "Century" Shingles in numerous shapes and sizes, and in three colors: Newport Gray (Silver Gray), Slate (Blueback) and Indian Red.

Write for Booklet "K. & M. 1912."

Keasbey & Mattison Company, Factors
Ambler, Pennsylvania
Branch Offices in Principal Cities in the United States

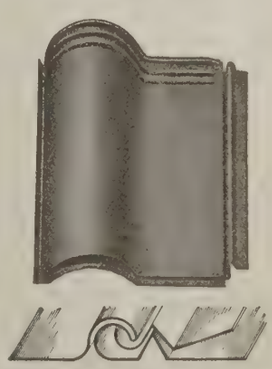


Don't Miss This Opportunity

We Want One Carpenter or Builder in Every Community to Demonstrate, Take Orders for and Apply Our EDWARDS METAL SPANISH TILE ROOFING on a Liberal Commission.

Here is a chance to build up an independent, profitable business for yourself right at home. Many carpenters are now devoting their entire time to selling our metal roofing Others have made big profits **simply devoting part of their time to selling and laying our Metal Spanish Tile.**

Edwards Metal Spanish Tile

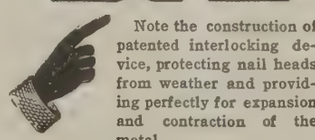


Is being advertised in the leading magazines and is now known to thousands of home builders and owners everywhere. Wherever it has been used it has made a decided "hit" because it shows off to good advantage on the roof and has numerous points of superiority over any other style of roofing.

Architects are specifying Edwards Metal Spanish Tile, for they know it will do away with roofing "troubles." Builders like it because of the finished appearance it gives any house on which it is used.

Our Metal Tile are stamped out of the highest quality Worcester terne plate in exact imitation of the most expensive Terra Cotta Spanish Tile. They come either "dip" painted or heavily galvanized, size 10 x 14 inches. Our patented interlocking side lock makes it possible to make a perfectly moisture-proof roof without soldering. Edwards Metal Spanish Tile afford the fireproof advantages of Terra Cotta Tile, but are much lighter in weight, cost but a trifle more than ordinary roofing and will last a lifetime.

WRITE US TO-DAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that someone else will be given your territory. DON'T DELAY. WRITE TO-DAY FOR OUR SPECIAL AGENTS' PROPOSITION.



Note the construction of patented interlocking device, protecting nail heads from weather and providing perfectly for expansion and contraction of the metal.

The Edwards Manufacturing Co.

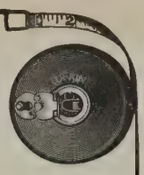
"THE SHEET METAL FOLKS"

430-450 Eggleston Ave. **CINCINNATI, OHIO**

THE WORLD'S LARGEST METAL ROOFING, METAL SHINGLES AND METAL CEILING MANUFACTURERS.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

LUFKIN
Steel Measuring Tapes



With Instantaneous Readings can be used at all times and under all conditions with a sense of utmost security. They are absolutely accurate in themselves and the improved graduations make errors impossible. Send for catalogue No. 12.

THE LUFKIN RULE CO. SAGINAW, MICHIGAN, U. S. A.
New York - Windsor

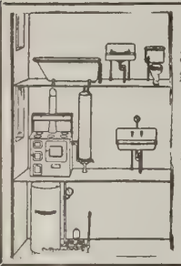


Mr. Builder:—If you are lucky enough to read this advertisement, and wise enough to write and tell us what you buy in

IRON, BRASS AND BRONZE

we will send you catalog that is attractive enough to go in any man's library. Do you want it?

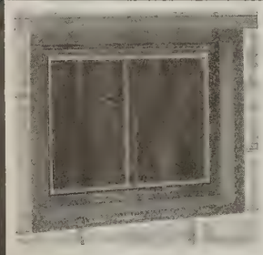
DOW WIRE & IRON WORKS, Incorporated
LOUISVILLE, KENTUCKY



ARCHITECTS, BUILDERS
Specify and Install Our Water Works for Country Homes for..... $37.80
They Are the Simplest and Best
Complete Line of Plumbing Goods—Heating and Lighting Plants, Pumps, Windmills, etc.
SOLD DIRECT AT MANUFACTURERS' PRICES
Send for Our Illustrated Book—IT'S FREE
MISSOURI WATER & STEAM SUPPLY CO.
931 S. Sixth St., ST. JOSEPH, MO.

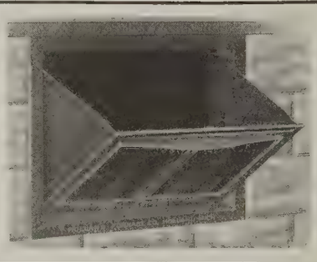


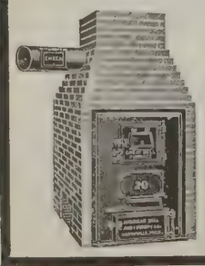
THE PERRY LUMBER RECKONER
ESTIMATING ERRORS ELIMINATED
Mistakes are impossible with the Perry Lumber Reckoner, as all the figuring is done for you.
The lumber tables give the number of board feet in any number of pieces, from one to a hundred, for all the commercial sizes of lumber. You can turn instantly to the right page. Ask your bookseller about it, or send direct.
Price, prepaid $1.00
Benjamin L. Jenks, Publisher
906 Williamson Bldg. Cleveland, Ohio



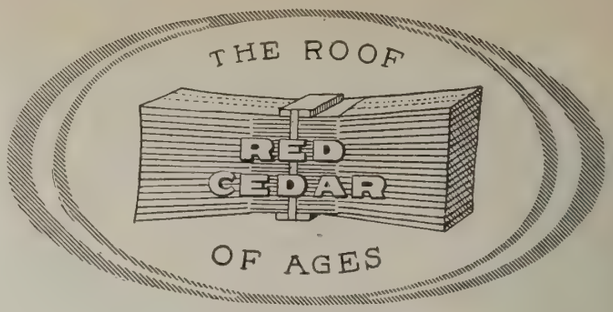
The Improved Window Chute
A Real Glass Window
when closed, which is Burglar Proof

A Perfect Coal Chute
when open. Locks from outside and can only be unlocked from inside.
Write for special proposition to contractors and builders.
HOLLAND COMPANY, Holland, Mich.



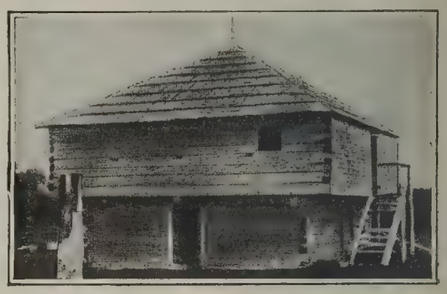


A Hot Air Furnace
For Less Than $50 Complete
For 5 and 8 Room Dwellings
An unheard of Price and a most Remarkable and Indestructible Furnace
No Pipes No Lost Heat
AMERICAN BELL & FOUNDRY CO.
NORTHVILLE, MICH.



There are some of the good old building materials so firmly established that in spite of years of continual opposition to their use from manufacturers of other kinds of material and years of continual endeavor to change, still occupy not only as strong a position as ever, but have become even better liked and more extensively used.

This is true of the wood shingle. Every one knows that in every kind of materials, there are two classes of goods manufactured, and the man who makes the very highest class has to stand to a certain extent for the harm done the trade by the manufacturer who puts out the inferior line.



The old Fort Borst Block House, built in 1845. The split red cedar shingles are as sound today as when put on.

All that the architect and contractor has to do to get a well made, reliable wood shingle is to specify and buy the shingles sold under certain brands. These shingles are the output of certain mills. Out on the Pacific Coast, for instance, are a number of shingle manufacturers who have joined hands for the purpose of making and selling Red Cedar Shingles and also letting people know where they can be had.

If any one doubts that red cedar shingles are not a credit to the building field, the best thing for him to do is to write and get



The 350-year old tree on which the dog is standing fell 300 years before Columbus discovered America. It was cut up for sample shingles in 1910.

a copy of a large booklet, entitled "Seattle's Shingled Homes," sent out by these manufacturers, who operate under the name of the Red Cedar Shingle Manufacturers Association. Thirty half tone perspective views, illustrating red cedar shingle residences are shown. These illustrations show beyond a doubt that architects of the highest standing look upon wood shingles as a reliable building material. Not only that, but they meet every requisite for a desirable combination of utility and beauty and give the property owner a better home for his money than he can get from any other material.

Looking over these shingle house views, one cannot help but be struck with their homelike appearance. There is style and beauty to every one. As to fireproofing qualities, the wood shingle manufacturer can point with pride to insurance reports which show that only 2.96 per cent of residence fires in the United States start in shingle roofs.

In point of durability, treated or untreated shingles will outlast every known substitute. Red cedar shingles last a lifetime and need no further attention if properly put on. The matter of nailing is important for only cut iron, galvanized tin, copper or zinc nails should be used. Use the proper nail and enough of them when putting on red cedar shingle roofing and the property owner will never have a complaint to make.

"Seattle's Shingled Homes," showing thirty views of beautiful shingle residences and bungalows from photographs is worth writing for.

Besides these views "Seattle's Shingled Homes" contains a lot of very instructive reading matter on red cedar and as this wood is extensively specified and used by the best architects and builders, it is well to get posted.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

NATIONAL BUILDER,

Gentlemen:—In answer to our advertisements in recent issues, so many inquiries have come to us, covering so broad a range of subjects that I deem it best to make this general answer for all readers of your publication.

Can Paper be Put Over an Alabastine Wall?

Paper can be successfully applied over a wall that has been Alabastined. Some practical men may tell you differently, based on their experience with ordinary kalsomines and the fact that they are unaware of the difference between Alabastine and ordinary kalsomine.

Can Alabastine be Applied Over Wall Paper?

Under certain conditions, yes, provided the paper is solid on the wall, that it has no raised figures in gold or flitter, that it is not printed with aniline colors, which will stain through anything. For ordinary papers Alabastine can be successfully used, stripes and figures obliterated.

May Alabastine be Used Over So-Called Flat Paints?

Yes, if the paint is solid on the wall, not scaling or coming off, it makes a good surface over which Alabastine may be applied.

Can Paint be Used Over an Alabastined Wall?

A wall that has been Alabastined can be successfully painted.

How Should New Walls be Plastered to Best Receive Alabastine?

A brown or float coat, what is known as a sand coat of plaster makes a very fine surface for the use of Alabastine. The more general way is to finish with a white, trowel or putty coat and then Alabastine over this. Either surface is satisfactory.

How Many Coats of Alabastine are Necessary?

Never more than two coats if the wall is in suitable condition. Very often, particularly where the walls are sized and Alabastine properly used a perfect job can be obtained with one coat.

What Preparing Do the Walls Require?

New walls tinted for the first time, particularly lime finished walls, are liable to have lime stains and in some cases a great amount of suction. If this be the case, a coat of size—a shellac size or a varnish size—will put them in proper condition. If a rough sand finished wall is so absorbent or hot that the material will not spread, it can be remedied by giving the wall a good coat of soapsuds, wetting it up well with a brush, then follow before the wall is entirely dried out, but, of course, not when it is wet, with a coat of Alabastine.

Is Alabastine Suitable for Use Over Wall Boards?

Yes, ask any manufacturer of wall board and he will tell you that Alabastine is peculiarly adapted to that purpose.

Does Alabastine Rub or Scale Off?

If properly applied to a surface suitable to receive a water color, it will not. If put on over old kalsomine or other materials it will stay on as long as they stay on the wall, if they let go and come off, Alabastine has to come with it.

How Much Alabastine is Required to Do an Ordinary Room?

Different surfaces depending on whether they are rough or smooth, absorbent or otherwise, has something to do with the amount of material necessary. You can figure for the regular Alabastine tints the expense of material will not exceed 1½c per square yard for any ordinary surface. The cost of *applying* is no more than the cost of applying the cheapest temporary kalsomine or white-wash, both being put on with a regular flat wall brush.

Does It Require an Expert to Apply Alabastine?

Like everything else, the better the workman and the better the tools, the better will be results. Alabastine can be applied, however, in the absence of skilled mechanics by any one who will follow directions and can use a brush properly.

J. L. HAMILTON, Manager

ALABASTINE COMPANY, GRAND RAPIDS, MICH.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

ASBESTOS PRODUCTS.

The clanging fire engine strikes no terror to the heart of a man who has built with Asbestos Products, for he knows that there is no danger of fire in his house. The exposure hazard is well known to be responsible for large portions of the loss by fire and this could be largely prevented by the use of a fireproof wall and roof covering.

Among the many and diversified lines of building products manufactured by the H. W. Johns-Manville Company none is more interesting in its composition nor artistic in appearance than the Asbestos Shingle. As it is made in a great variety of shades and colors, practically any effect can be obtained which is obtainable in either slate or shingles. At the recent New York Cement Show the booth occupied by the Johns-Manville Company contained an excellent example of the use of shingles of this character. As will be seen by the illustration, a number of different sizes and colors were artistically worked into the sample roof.



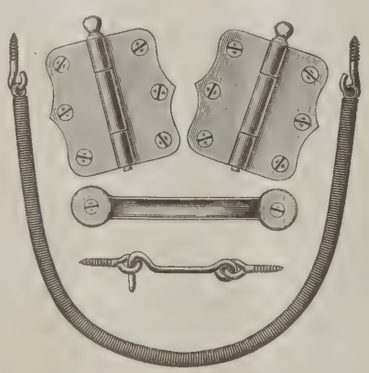
J-M Transite Asbestos Shingles are made of Asbestos and Portland Cement, compressed under great pressure and their successful use for years on many of the finest houses throughout the country proves that they will stand severe weather conditions.

The same Company prepare their Asbestos in the form of stucco, which may be applied to the walls, furnishing a fire-proof and weather-proof material in any desired color.

The exhibit also showed a large number of other Johns-Manville products, such as roofing, asbestos wood panels, waterproofing liquids, felts, and fabrics, as well as photographs of many of the beautiful houses in which the Johns-Manville fireproof materials had been used.

SCREEN DOOR SETS.

There are few localities so favored that some special protection is not necessary against the entrance of flies, mosquitoes and other insects. Possibly the explorer in the Arctic regions do not feel the need of screens during the winter, but it is a well known fact that the Alaskan summer will breed more mischievous and annoying flies, mosquitoes, etc., than the warmer climates. We who live in a fairly temperate zone, appreciate fully the use of screens and we realize to be at all efficient, the screen doors must work promptly and easily.



Practically all hardware dealers carry Stanley's Screen Door Sets, which at this season of the year, carpenters and builders will find particularly useful as all of the hardware necessary to hang the door is contained in one package. This package or set consists of 3x3 ornamental loose pin butts, a five inch door pull, designed to fit the hand comfortably, and a steel wire spring, together with the necessary hook and eye for locking on the inside and screw eyes and wood screws to hang the door complete.

Coming packed each set by itself, insures the hardware reaching the consumer in good condition, clean and free from rust, and the well known Stanley Trade Mark on the label prevents the substitution by the dealer of inferior goods.

The sets come in various finishes such as Japan, antique copper, dull brass plate or the new Stanley Shepardizing. The last finish is possibly one of the best yet discovered for preventing iron and steel from rusting and is particularly suitable when the hardware is exposed to the weather.

Those of our readers who are not familiar with the Stanley sets should write to the Stanley Works, New Britain, Conn., and obtain circular "N" which describes these goods fully.

CONTRACTORS' EQUIPMENT.

The use of power by the contractor is fast becoming a distinguishing mark of progress. A few years ago the only power used was the occasional hoisting of the material by the horse or team, taken from the contractor's wagon. Today, however, no shop is complete without a power plant and no contractor's plant is complete without several forms of engines and machines. For excavating, a power hoist is of use in getting the material to the street, and a pumping device is particularly necessary to keep the hole dry until the foundations are in. The hoist again becomes a factor in getting the materials up to the various floors and the progress of the building is frequently rated by the facilities of getting the materials to the workmen. One hoist will take up more material than twenty men, and take up much less room.

So the up-to-date contractor is investigating power machinery and is investing in machines to aid him in his work.

The Novo Engine Company, 228 Willow St., Lansing, Mich., have machines for every purpose which the contractors require, such as hoist drilling, rock crushing, pumping, etc. Most of these machines are direct-connected to their celebrated Novo engine, thus forming a complete, self-contained machine for every purpose.

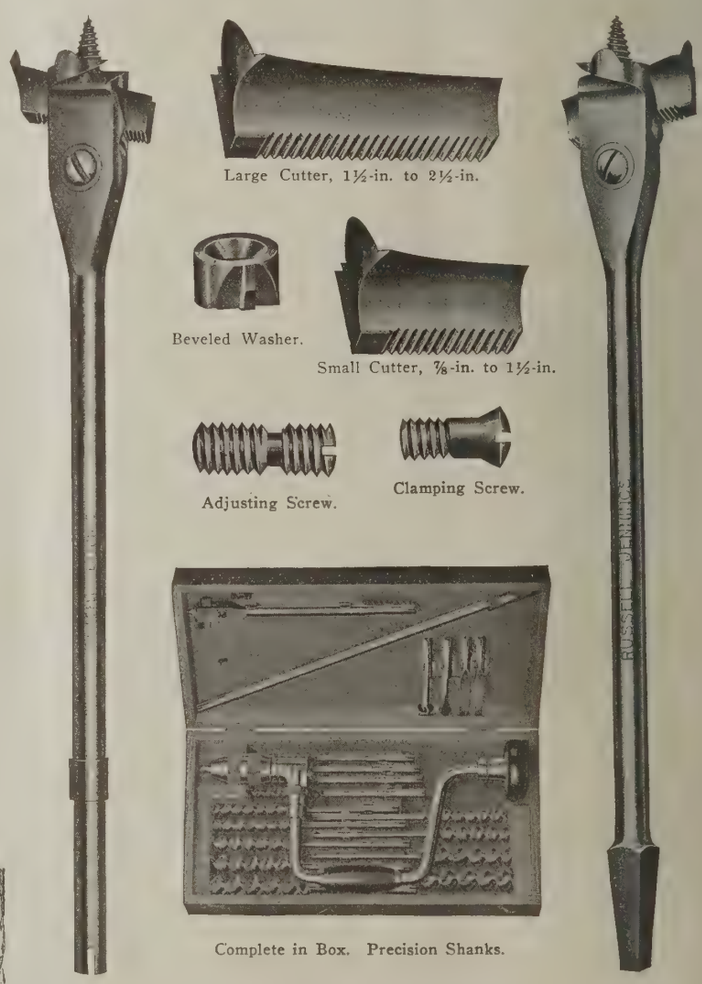
A new catalogue from the Novo Engine Company contains descriptions of various machines, together with a great deal of useful information. No contractor should be without this catalogue, as it may be the means of making a success of the job, which would otherwise mean a loss of time, money and reputation.

A NEW EXPANSIVE BIT.

Every carpenter has at times use for an expansive bit. The more frequent call he has for it, the more apt he is to make sure that he possesses the very best bit made, as, on account of its large size, it requires considerably more power to operate it.

The first expansive bits made were crude compared to those which we find in the stores today. Their life was short at the best and it was not unusual to break a cutter head off or have the bit slip and bind. Possibly no failing was worse than the slipping, especially when a number of holes had to be bored the same size.

The Russell Jennings Company, already well known as manufacturers of bits for all purposes, have recently put on the market an expansive bit, which they believe overcomes many of the faults heretofore found in most expansive bits. The solid head makes it very strong and prevents the chips from choking in under the cutter. The cutter itself is adjustable by means of a screw, one turn of which advances the cutter one-sixteenth of an inch or increases the diameter of the hole an eighth of an inch.



The cutter is further kept from creeping by a clamping screw which prevents absolutely any creeping. The shank of the bit is made in either the ordinary style or the new precision turn shank as is shown in the cuts herewith. The simplicity of the entire bit is shown by all of the parts.

While it is probable that the carpenter can obtain these bits from his regular dealer, the Russell Jennings Co. will be glad to send literature in regard to them on request.

Save 50% on Your SCREENS!!

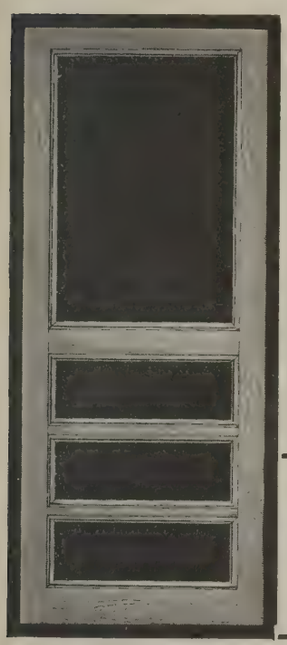
Western White Pine Screen Doors and Windows

Gordon-Van Tine Screen Doors and Screen Windows are unusually solid and substantial. Made from best Soft Western White Pine, specially kiln-dried and yard-seasoned. Artistic styles.

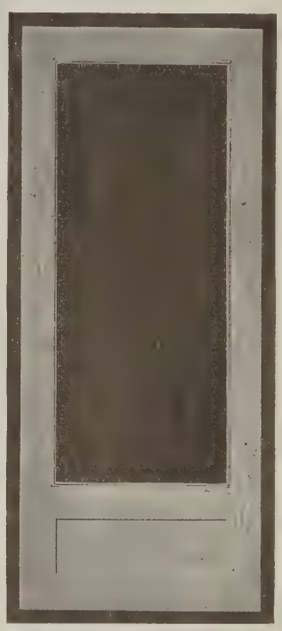
Doors have very wide side rails and heavy supporting rails.

Will not come loose at the joints. Put together with secret blind tenons. All sizes carried in stock for quick shipment. Note the low prices.

Our **SCREEN WINDOWS** are solid, well made from best Soft Western White Pine, with highest grade screen wire.



No. E 303



No. E 306

Made of best Western White Pine. Filled one coat, varnished one coat. Furnished in Bronze, Galvanized or Black Wire Cloth. 1⅛-inch thick Side rails 5½ inches wide.

	Black Wire	Galvanized Wire	Bronze Wire
2- 8x6- 8..	$2.00	$2.30	$2.65
2-10x6-10..	2.12	2.42	2.77
2- 8x7- 0..	2.13	2.43	2.78
3- 0x7- 0..	2.20	2.50	2.85

Superior Workmanship, Highest Grade Materials and QUICK SHIPMENT Guaranteed!

It Pays Big

to Build Window Screens from Ready-to-Use Screen Material

No. E 303
Made of best Western White Pine. Filled one coat, varnished one coat. Furnished in Bronze, Galvanized or Black Wire cloth. 1⅛-inch thick.

	Black Wire	Galvanized Wire	Bronze Wire
2- 8x6- 8..	$1.59	$1.83	$2.34
2-10x6-10..	1.77	1.94	2.52
2- 8x7- 0..	1.82	1.99	2.57
2- 0x7- 0..	1.85	2.00	2.63

Make big money this spring taking contracts for building **WINDOW SCREENS.** We supply the material for making Window Screen Frames, in **strips,** ready to cut to any desired size. A carpenter who uses our material can easily make

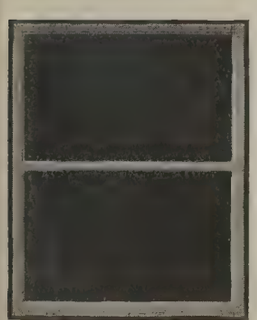
6 to 10 Window Screens Per Hour



Put in a few hundred feet of the items listed below and you can turn out finished screens for less money than local planing mills.

Prices on "Ready-to-Use" Strips

Top Rail and Side Rails, per 100 lineal feet	$ .88
Grooved Stile, per 100 lineal feet	.88
Bottom Rail, per 100 lineal feet	1.32
Screen Moulding, per 100 lineal feet	.30
Slide, per 100 lineal feet	.43



No. E 314

Porch Screens at Lowest Prices

Everybody wants screened-in porches. Our **Porch Screen Sections,** made to fit your measurements, are very inexpensive. Made of Western White Pine Lumber, dressed and sanded two sides, carefully mortised, tenoned and pinned together with steel pins. Wired with our best **wire cloth,** Galvanized or Copper Bronze wire. Easily taken down for storage in winter. **Write for Porch Screen Prices.**



Nothing so Popular as a Screened-in Porch

Screen Windows

Gordon-Van Tine Screen Windows are made from best Soft Western White Pine, 1⅛ inches thick, with rails two inches wide, and highest grade screen wire. Choice of three kinds of wire, namely—Black Wire, standard 12 mesh to the inch. Galvanized Wire and **Copper Bronze Screen Cloth,** absolutely the highest grade screen cloth manufactured. Window Screens are interchangeable with storm sash by the use of our patent hangers. Screens made full size, to cover entire window.

Specimen Prices

Screen Window to fit 2-light windows, glass size 12x20, size of opening 1-4⅛x3-11¼. **Price with Black Wire, 53c; with Galvanized, 60c; with Copper Bronze, 77c.**

Screen Window to fit 4-light and 8-light windows, glass 10x16, opening 2-1x3-3¼. **Price with Black Wire, 66c; Galvanized, 72c; Copper Bronze, 90c.**

Price for special window screens to order, 8c per square foot.

Send for Special Screen Circular

Write for Grand FREE Catalog and Special Screen Circular

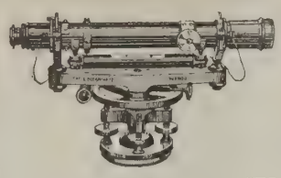
Gives full information regarding our money-saving prices on screens, screen wire and 5,000 Building Material Bargains. Write for it. **Send for Special Screen Circular, giving full list of prices and designs.**

Gordon-Van Tine Co.

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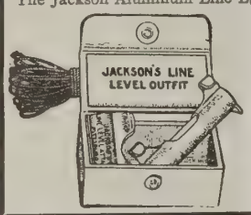
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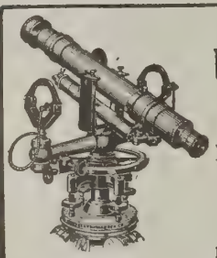
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No lumber or nails used—Pay for themselves on two jobs—Last a lifetime—Self-locking—Safe—Fold compactly—Convenient to handle—Self-adjusting—No loose parts to get lost—Always ready for use—They carry 1500 pounds.

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Is Made to Stand Up Under the Hardest Usage and Do Your Work Right.

It requires little power. It is an unusually strong and well made machine. It is very simple to operate and the different attachments for sawing, dadoing, grooving, rabbeting, tenoning, jointing, matching, molding, etc., can be instantly adjusted.

Catalog on request. Put a No. 10 Standard Universal Woodworker in your shop now, and save a lot of money.

CORDESMAN-RECHTIN CO., 10 Butler St., Cincinnati, Ohio

THE WINDOW CHUTE.

The first piece of real hardware to go into a building is the coal door or coal chute. But often no provision is made for getting coal in aside from the hinged sash, which is frequently left open, oftener broken and an eye-sore instead of a useful feature to the building.

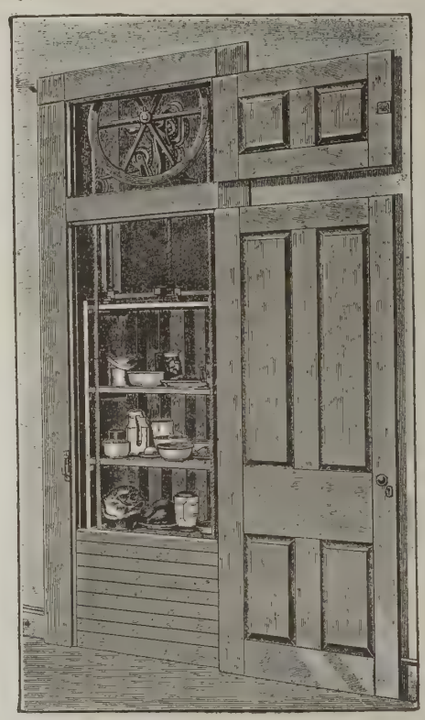
The Holland Furnace Company, in connection with their line of furnaces and building specialties, manufacture a coal door under the name of the window chute. This window chute is used to get the coal into the basement when such work is required and the remainder of the time is a clear glass window, furnishing light to the coal storage space. It is arranged to lock automatically from the outside by merely closing it and can then only be opened from the inside. This gives particular protection against burglars, as the coal man will invariably close the door when he is through.

The Holland Furnace Company, Holland, Mich., have some interesting literature on the window chute, which should be in the hands of every contractor and builder.

DUMBWAITERS.

The dumbwaiter business is practically in its infancy, as their use has been confined almost entirely to the homes of millionaires, where a corps of servants are employed, or in the luxurious apartment houses. A dumbwaiter is not a luxury, however, but a necessity and should be used in every household where the housewife does her own housework, or but one or two servants are employed, in which class of homes the problem of securing competent servants is experienced.

Comparatively few contractors and builders or private individuals have considered the installation of a dumbwaiter advisable or necessary, which reluctance is partly due to the fact that a large number of dumbwaiters (or they might be termed excuses for dumbwaiters) have proven very unsatisfactory, and it is a well-known fact that one dissatisfied customer does more injury (no matter what the article might be) than ten satisfied customers do good.



The idea of installing dumbwaiters was primarily caused by the desire to avoid the necessity of making numerous trips up and down the stairs at meal time.

The first effort made toward avoiding this tiresome task was the installation of several pulleys, the placing of a rope on the pulleys and attaching a box to one end of the rope and a balance-weight to the other end, which arrangement did not prove very satisfactory. With a view to improving on this arrangement several machines were designed and placed on the market, but they were so crude in their construction and worked so hard that they did not solve the problem of saving labor in the household. It is true that these arrangements did overcome the necessity of traveling the stairs to a certain extent, but they required too much power to hoist the load, frequently requiring two and three persons to hoist the load, which, of course, was objectionable.

Some years ago Mr. J. G. Speidel, of Reading, Pa., designed and placed on the market a dumbwaiter machine not only to hoist the load with a minimum amount of power, but to also overcome the possibility of the erector not installing same properly.

Mr. Speidel's machine is built in a very strong and compact manner, not to last only a few months, but a lifetime. The machine is self-contained, all sheaves and bearings being part of the main frame so that they cannot get loose after running a while or be placed in a wrong position, consequently they can be erected properly by any good carpenter in a comparatively short time. It must be appreciated that it is of the greatest importance to have all sheaves and bearings placed in exactly the right position, otherwise the ropes and cables will wear out very quickly. The main shafts of the machines run in self-lubricating graphite bronze bushings and the sheaves on anti-friction steel roller bearings, making the machine not only easy running, strong and durable, but require little or no attention after being in operation. The machines also have an automatic brake that is very powerful and reliable, and holds the load automatically at any point of the lift.

Since these improved machines have been placed on the market the use of dumbwaiters has become more universal and today they are not only used to hoist victuals from the kitchen to the pantry and dining room or from the cellar to the kitchen, in private residences, hotels, hospitals, etc., but are also used to hoist and lower furniture, trunks, and invalids from one floor to another.

The cost of a dumb waiter is small and within the reach of everyone, so that no well regulated household, hotel, apartment house, or philanthropic institution can afford to be without the use of one that will fill the bill.

A line to Mr. Spiedel will bring any desired information regarding the use or installation of these labor-saving devices.

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Are You Going to Build?

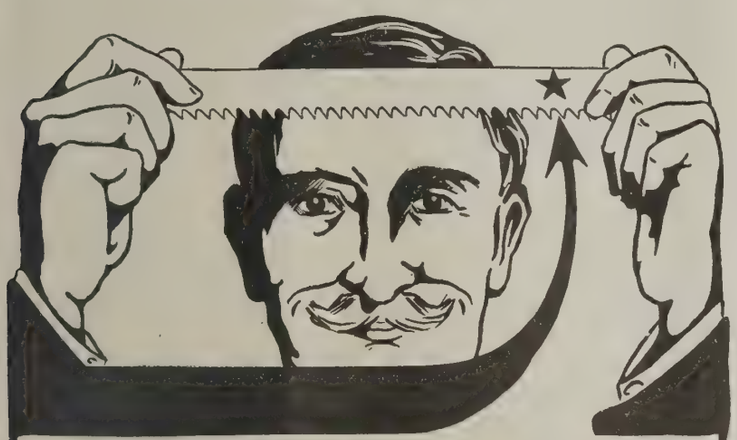
Send 25c in silver (and 10c postage) for our big $1 book of plans, "Low Cost Modern Homes," with houses from $1000 to $3000



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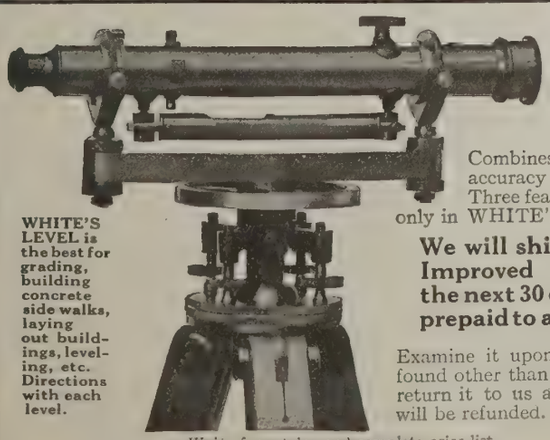
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It is being specified by the leading architects and contractors not only as a coating on cement, stucco, and brick surfaces to protect them against moisture, but on high grade interior work on both wood and plaster.

When you need a coating for cement and want something that will stand up and give protection and durability, also a pleasing finish, use the **Bay State Brick and Cement Coating,** which is the result of research and experimental work for more than a decade. Wherever it is used on stucco, concrete, wood or plaster, it stands up better than any other.

You know how necessary it is to protect concrete surfaces against dampness. My coating is dampproof and gives a pleasing appearance without destroying the texture of concrete and in addition is a fire retarder.

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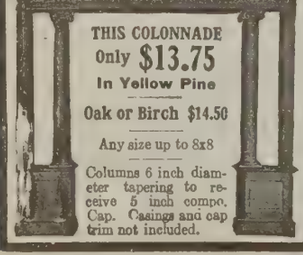


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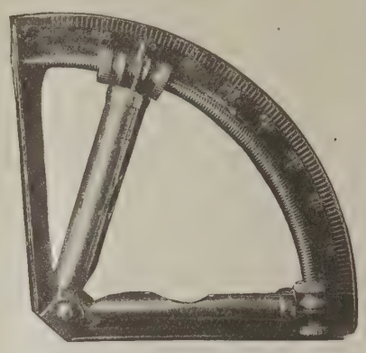
THIS is positively the best Colonnade for the price in the market today. We want every Contractor and Builder to take advantage of this special offer. Quality, satisfaction and safe delivery guaranteed. Order today. Give exact width and height of opening. State what kind of wood.

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A MECHANICS ADJUSTABLE LEVEL AND PLUMB.

Any optician can readily demonstrate to the most skeptical that it is impossible for the eye to invariably judge distance, length or form with accuracy. Parallel lines can be made to apparently diverge or converge and lines of equal length appear to be of several different lengths.



Knowing this, we can readily see how it is possible to make errors in the building field unless every precaution is taken to secure accuracy and check the work of the naked eye.

In the building line there are two base lines from which we work, the horizontal, and the perpendicular, and we are fortunate in having instruments which will determine these lines with great exactness.

While great accuracy may be obtained with an engineer's transit or level, it is possible to secure accurate results for all ordinary building work with a much cheaper instrument. The Weaver adjustable level and plumb is designed to aid the mechanic or builder in all the operations about the erection of a building, such as leveling, grading, setting partitions, etc. It can be attached to any leveling board or straight edge and when so attached takes the place of the ordinary long level. The facility with which it can be used under these circumstances is apparent to every mechanic, as it gives him the free use of the hand which was formerly required to hold the level in place. As the level is adjustable for various angles, it is possible to lay out a great deal of work which would require a great deal of extra work by other methods and possibly require one or two other men to do it. This principle is used in laying out concrete sidewalks, pitches for trusses, roofs, etc.

The manufacturer of this level, Mr. J. D. Weaver, Jacksonville, Ill., has found this level so satisfactory to his customers that he offers to allow its return any time within thirty days should it not be found perfectly satisfactory. This is about as broad a guarantee as can be made, but we believe that it is justified by the merits of the level.

HOMES OF CHARACTER.

Every age and country has its developments of architecture in cottages, in public buildings, churches, etc. In each there are good features, which are adaptable to the United States with its wide range of climatic conditions.

The architect, watching the taste of his clients sees a steady increase in individual ideas. Perhaps one has visited Switzerland and become imbued with the "Chalet" quaintness. Another finds in the old Mexican Mission the ideas which suit him particularly.

But it will not do to transplant entirely the architecture of any country or age. In its original home, it is the logical result of conditions, climate and customs. The detail, however, will often bear working into the necessary framework to local conditions. The successful architect today is he who harmonizes the ideas of his clients with the conditions and environments of the project.

From the above, it will be seen that the task of the architect is not easy. Specialization has been resorted to by many who are technically fitted for a general practice. The result of concentration has been to greatly increase the value of his work, however, and in no line do we see better results than in bungalows, cottages and low cost residences.

Among the architects who have made this line their study is John Henry Newson, 1238 Williamson building, Cleveland, Ohio. Under the name of "Homes of Character," he presents many beautiful designs of low cost homes, suitable for city suburbs or farms, adapting modern materials to the styles of various countries. Besides the plans and perspective views, he gives a great deal of valuable information for the prospective home owner.

Mr. Newson will be glad to hear from those intending to build and a two-cent stamp will bring his circular, showing a number of plans which have proven particularly adapted to this line of work.

ASPHALT SHINGLES.

Attractive and durable roofs are a necessity in every climate. Whether in the extreme north, subjected to snow and melting ice during the winter, or in the south subjected to torrential rains, the covering must protect the building from the slightest leak.

Owing to the extreme variations in temperature which are greatest on the roof, due to the direct rays of the sun, it is necessary to carefully consider the material to be used for the roof covering.

Many materials have been proposed and many are more or less satisfactory, depending upon the conditions under which they are used and the localities. But the roof must do more than simply keep out the water. It must be attractive so as to be in harmony with the rest of the building. It must be reasonable in price to come within the reach of the man with moderate means and above all, it must be durable so as not to require frequent repairs or replacements.

Possibly no material has been subjected more to the weather than asphalt. Coming from a warm climate where it has been subjected to the heat and the sun and the action of the rain for centuries, it is unquestionably the product of severe conditions and when properly used will protect the building from equally severe attacks of the elements.

The H. M. Reynolds Asphalt Shingle Company, 182 Oakland avenue, Grand Rapids, Mich., prepare a roofing in the form of flexible asphalt shingles, the top of which are covered with finely crushed

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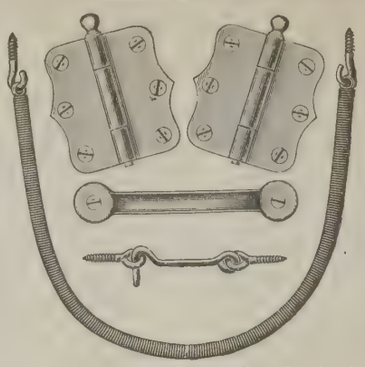
And You will Then be Able to Close Many a Contract that Would Otherwise be Lost

The demand for Architectural Perspective is increasing yearly because those who build are demanding, in addition to the plans, perspective drawings of their buildings. A well made perspective drawing, properly shaded and set off by a little landscape and secondary detail, pleases the eye, and is a valuable adjunct to the regular plans and elevations. Our correspondence course in ARCHITECTURAL PERSPECTIVE and DRAWING of BUILDINGS is complete, practical, and can be learned at home at odd times. Instruction likewise given in twelve separate, complete Art Courses, for pecuniary profit, or pleasure only, as desired. Year Book sent upon request.

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Complete Sets in Convenient Packages

One pair of Ornamental Surface Butts;
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One high grade No. 3 Steel Spring
all in a neat box with the screws to put them on the door.

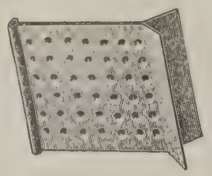
Ask for Stanley's Set No. 1750 or
write us for attractive circular "N1" giving full information.

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FOR BUILDING INTO
Brick, Stone or Concrete Walls
AS A BASE FOR NAILING



This Wall Plug can be put in place in one-tenth the time it takes to dig out mortar and drive in a wooden plug, and it is four-fold more secure. Will last as long as the building. Every Building Contractor should send for sample. Write for Folder 57-B.

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Manufacturers of Hardware Specialties
Niagara Falls, N. Y., U. S. A.

Niagara Wall and Veneer Ties for use in Brick and Brick Veneer Walls, 12-Inch Galvanized Wall Ties for Stone, Brick and Concrete Block Walls, Sash Pulleys, Sash Chain, Sash Fixtures. 9M

We Sell the JOB T. PUGH Celebrated AUGERS and BITS

Hand made. Guaranteed not to break.
Rapid boring. Will last longer than any bit made.

AUGER BITS

A complete stock always on hand.

Special: A complete set of 13 Auger Bits, 4 to 16 sixteenths, in a fine hard wood box. Price, **$7.20.**

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For boring holes in dirt. Used when laying gas pipe under walks, walls, etc.

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6-in., 9-in. and 12-in twists.

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The Bessler Stairway in Position.

Saves Space! Low Cost!
Strong and Durable!
Easy to Operate!
Operates Automatically!
Adds Value to House!
Reduces Fire Risks!
Secures Good Ventilation!

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We Allow Contractors a Commission.

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Use HERRICKS for best results



Some of the greatest Architects approve the Herrick System Refrigerators. You may have our valuable booklet No. 41 and catalog 21 for the asking. It will save you time and you can give your clients better service. We build refrigerators for all purposes and co-operate with builders in furnishing styles to conform with Architects' plans.

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Herrick Refrigerator Co.
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METAL BUILDING CORNERS



Used with lap siding in place of corner boards.

They save the price of the boards besides most of the work of finishing the corners.

Give the popular mitre-corner effect without the slow accurate work of cutting and fitting. Make a stronger and neater job.

Write for samples.

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Makers of Gossett Screen Hangers.

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slate, which gives it the same appearance as the best qualities of the national material, as well as the wearing value of the natural stone.

By their process of manufacture, the shingles are so made that there is no possibility of warping or breaking and once in place will remain in good condition, even when subjected to considerable rough usage.

The H. M. Reynolds Company have just issued a very interesting booklet showing the various styles and colors, etc., in which their shingles are made, as well as the asphalt roofing in roll form.

This booklet contains a great deal of useful information regarding materials of this character, directions for laying, etc., and will be sent on request.

ARCHITECTURAL PERSPECTIVE.

There are many conditions entering into the securing of a contract for a building when the contractor or builder is figuring with the owner, but one of the most vital points that comes up is just how this structure will look when finished.

The contractor is well enough versed in the reading of blue prints and plans to form an excellent idea in his own mind of the general perspective of the finished building, but the owner is not. The owner needs a rough perspective drawing to show general effects, as well as some details, to be convinced, which is impossible to explain in words.

It is safe to say that a great many contracts are lost by contractors, who either draw their own plans or have them drawn, by this fact: That he cannot convey to the owner the general effect, in a conclusive way, of the appearance of the structure after being built.

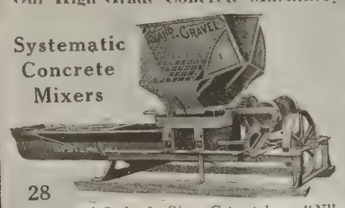
This is one of the services the large professional architect gives his client. He not only makes the working drawings, but clinches his arguments about this or that detail in a general perspective drawing.

Working drawings of straight lines and dimensions mean little to the average man not familiar with mechanical drawing, but a perspective sketch, properly shaded or set off with secondary detail, is a valuable adjunct to plans and elevations, and pleases the eyes.

It would be of interest to our readers to know that the School of Applied Art, 677 Applied Art Building, Battle Creek, Michigan, has some valuable information on this matter in connection with a course, either by correspondence or at their school. It would be beneficial to our readers to at least send for this information.

Our High Grade Concrete Machinery

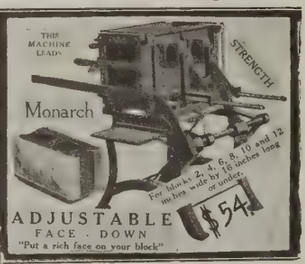
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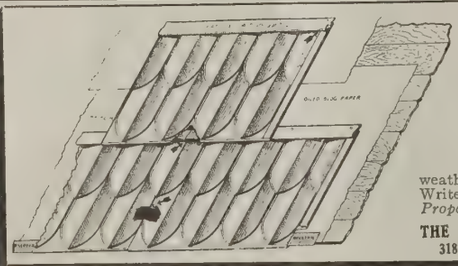


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Slate Blackboards Guaranteed Strongest and Best Finish

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It takes a good eye to estimate the length of a line within five per cent, and without tools or instruments no workman can be sure his work is accurate within that limit. The use of simple tools, such as the Jackson Aluminum Line Level, eliminate the error entirely for all distances up to forty feet. This means that any ordinary residence, small store building or factory can be built plumb and true with a vest pocket instrument.

It means, too, that all the work ordinarily done with a spirit level and straightedge, leveling floors, plumbing jambs and studding, setting stone, lining up brick courses, etc., can be done with the same simple instrument.

The Jackson Aluminum Line Level is sold by first-class jobbers generally. The Joseph Woodwell Company, sold agents, 201 Wood St., Pittsburg, Pa., will be glad to send further particulars regarding this valuable instrument.

RED GUM FOR INTERIOR FINISH.

No class of owners are more particular about the details of finish than hotel owners. Their buildings are the temporary or semi-permanent home of people with the widest experience of many buildings. From all quarters of the globe the guests are daily assembled, daily changing, and the desire of all is for a home-like interior—quiet, refined and dignified. An expensive finish adds to the cost of maintenance and rates without a corresponding degree of comfort, while a cheap, gaudy finish offends the eye.

When Messrs. Holabird and Roche, the architects of the Hotel Sherman, presented the merits of Red Gum to the owners the last word was said regarding the principal finish. The satisfaction of the owners is apparent from the complimentary remarks from the occasional guest as well as from regular patrons.



HOTEL SHERMAN, CHICAGO.

There are many reasons why Red Gum is the logical wood for the interior finish of homes as well as hotels, offices, and large or public buildings. Red Gum has a fine even grain and is easily worked with little waste at the mill or on the job. This makes it a general favorite with the mill and workmen. Whether in the solid or in veneers, the grain is figured just enough to relieve the flat surface, without being prominent enough to command attention. The nature of the wood permits a wide range of finish, from the neutral gray to green, mission or mahogany. Possibly the most satisfactory finish is in imitation of Circassian Walnut, which it closely resembles in grain and color.

Red Gum is supplied by practically every planing mill in the country, but should the reader wish samples or other information, he is referred to:

Himmelberger-Harrison Lumber Company, Cape Girardeau, Mo.
Charles F. Luehrmann Hardwood Lumber Company, St. Louis, Mo.
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Baker Lumber Company, Turrell, Ark.
Anderson-Tully Company, Memphis, Tenn.
Three States Lumber Company, Memphis, Tenn.
Lamb-Fish Lumber Company, Charleston, Miss.

WAS YOUR HOUSE WARM?

Now that an unusually cold winter is about over we look about for the summary of conditions during that period. The question arises, was the house as warm as it should have been for the fuel used? Ideal conditions are hard to realize, of course, but it is a fact that many complained that their walls seemed to simply "leak" cold air when the weather was the coldest.

How can this condition be prevented? The perfect wall excludes all passage of air, except through open windows or doors. To get a wall this tight in a frame building requires an impervious blanket over the sheathing, which shall neither conduct the heat out nor contain even minute openings through which the air may circulate.

An ideal covering of this character is found in Linofelt, manufactured by the Union Fibre Company, 41 Union avenue, Winona, Minn. Linofelt consists of two sheets of weather-proof paper, with a filling of pure flax fibre, and is applied directly to the sheathing before the siding is put on. Where a stucco finish is desired, a waterproof paper is used, thus keeping any possible dampness from entering the building.

Some argue over the expense of weather-proofing materials, such as Linofelt. The cost is small compared to the entire building—usually less than one per cent—while the saving in fuel makes up the difference in two or three years, to say nothing of the comfort of living in a draught-proof house.

The Union Fibre Company have some valuable information regarding Linofelt which should be in the hand of everyone interested in more comfortable buildings. The Linofelt booklet contains directions for using Linofelt under various conditions. Needless to say, this information will be sent free on request.

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Amatite ROOFING

Mineral Surfaced

Needs No Painting

EVERYTHING about Amatite appeals to the man with common sense. He can see its superiority at once—the real mineral surface *which never needs painting;* the two layers of Pitch which is the greatest water-proofing material known; the two layers of heavy Tarred Felt—all these contribute to the popularity of Amatite.



We can make Amatite better and cheaper than anyone else on account of our greater facilities, and consequently we sell it at a surprisingly low figure.

Simply the fact that it needs no painting is enough to make a man sit up and take notice—especially the man who has spent time and money in painting and repainting smooth surfaced roofings.

Write today for further information.

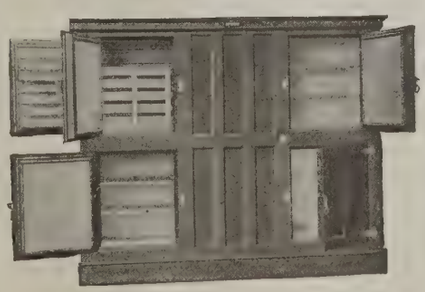
Barrett Manufacturing Company

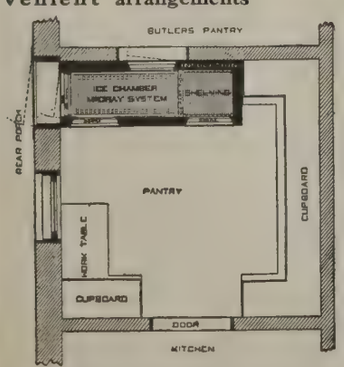
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McCRAY REFRIGERATORS

The plans of well built homes are not complete unless they include McCray Refrigerators. We will build one to order or co-operate with you in adapting one of our stock size refrigerators to your plans. Let us know what space is at your disposal and we will give you our advice free of charge. The illustrations show one of our special refrigerators and its location in the house. The arrangement shown here is a very convenient one as the entrance to the storage compartment can be had from either the Butler's Pantry or the Kitchen Pantry. Write for our free book, "McCray Refrigerators in American Homes" which shows many convenient arrangements for both built-in and stock refrigerators.

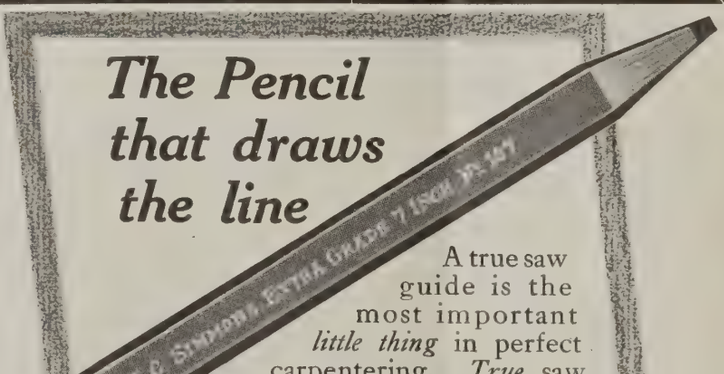




We manufacture Refrigerators and Coolers for Residences, Groceries, Markets, Florists, Hotels, Clubs, Institutions, etc., and will furnish a catalog for any of these lines on request.

McCray Refrigerator Co.
336 Lake Street
KENDALLVILLE, INDIANA
Agencies in All Large Cities

The Pencil that draws the line



A true saw guide is the most important *little thing* in perfect carpentering. *True* saw guides are the ever-true

E. C. S. Carpenter Pencils

Gritty, brittle pointed pencils are often responsible for open joints in otherwise good jobs.

Your tool *will not lack a clear guide* if the work is laid out with an E. C. S. Carpenter Pencil.

Toughness of lead, fine casing material, with parts glued together so they *won't separate,* makes the E. C. S. pencil standard for mechanical purposes.

"The Recollection of Quality Remains Long After the Price is Forgotten."
Trade Mark Registered. —E. C. SIMMONS.

If not at your dealer's, write us.

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SIMMONS HARDWARE CO., Inc.
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PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

The Contractor's Influence in the Building Field

About two full moons ago, a hardware dealer awoke one day from a Rip Van Winkle snooze—and began to wonder why he could not sell a certain Mr. Contractor any bright escutcheons. Instead of sulking around behind the counter and blaming everyone and "T. R." generally, Mr. Dealer induced Mr. Contractor to venture into his store for a few minutes chat

"Mr. Contractor," began the dealer, "I know that you are doing all the real good work out at the end of the town, I know that you buy an awful big lot of builders' hardware every year. Now give it to me straight, why do you never buy anything from me, except a package of brads, or a nail or two, when I have this great big stock for you to select from?"

"Mr. Dealer," replied the contractor, "I'll give it to you straight, although I suppose it will have about the same effect that it has when a traveling man tells a hotel proprietor that his place is a back number.

"But to begin, let's go behind your counter. Here is a bunch of lock sets. They look pretty nice and new, but they are about two years old at least in design, and so on all along. Your stock is not up-to-date, and as to price—why you are way high."

"Mr. Contractor," replied the dealer, "I buy my goods from Jones & Jones, about the biggest and best known people in the business, and they surely wouldn't sell me old style stuff, and as to prices, why——"

"The best thing for you to do, Mr. Dealer," interrupted the contractor, is to pretend you are a Contractor for a while and look around. You will find out that some of us Contractors know more about builders' hardware than you fellows, and what I have said about your stock and prices is ***right.***"

Some time after this interview, the salesman from the big, well known house called on Mr. Dealer. He saw a new line on the counters and shelves. The store had more customers in it than he had ever seen before. "Nothing doing," said the Dealer. "I'm buying from up the street now. A Contractor came in here not long ago and showed me where I got off. What! You don't mean it—20% less for the line you have been selling me? Well, well, and you have some new lines too, eh? Well, well! twice in the same place—but, Mr. Salesman, I'm stocked up for a while, and this line seems to be so good, think I'll stick to it as long as I can keep up-to-date, and even if you do come down, 20% now don't interest me. '

Now, the little point to this story is meant to show that the Contractor's influence in the building field is so great that he can swing orders from one big company to another by being posted on what the property owner wants.

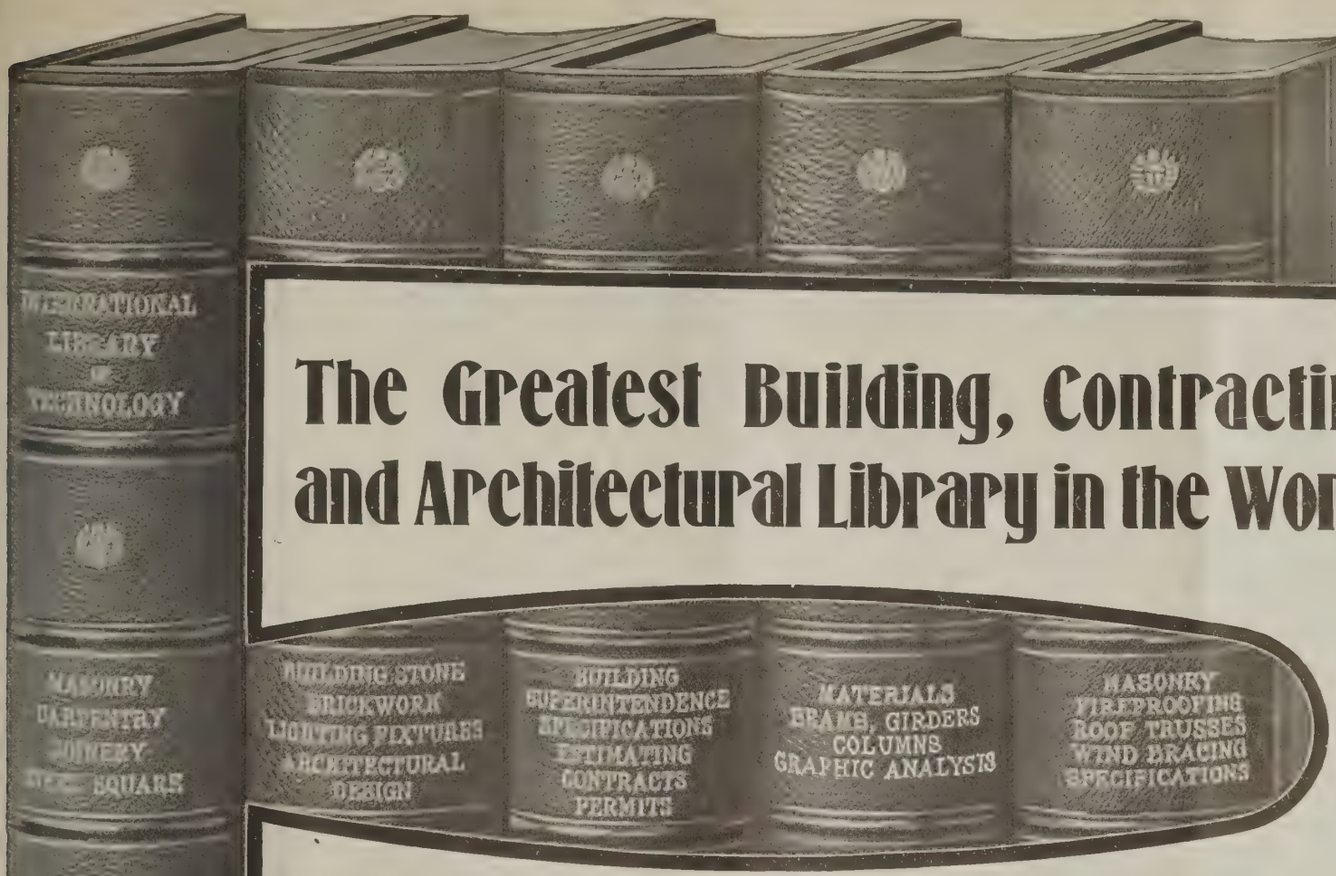
This particular Contractor is a real live man, who has built for himself a reputation for good work and honesty, that cannot be assailed by others who will do the work cheaper. This Contractor actually has to turn work down. Property owners insist that the Contractor shall have the job even at a higher price.

But, it's a sad thing that all property owners are not the same. Too many of them expect to get a $10,000 residence put up for about $2,500, with new grass already growing in the front yard. When a Contractor finds himself up against such a game, it's no wonder that some of the houses he builds begin to wiggle in the second story when the graphophone commences to play "Tramp, Tramp, Tramp the Boys are Marching."

The Contractor of to-day is no longer the sloppy looking individual of years ago. He is a business man to begin with. He must have a good appearance or customers will not believe in him. He has a large, well equipped power woodworking shop. He often has 3 or 4 jobs going in different towns, at the same time. He uses an auto truck to hike to the freight depot or to the mill for those frames that have been ordered. He takes the National Builder and reads the advertising as well as the editorial matter. He knows that keeping in close touch with the building material markets is the only thing to do. He treats his men with consideration, knowing that he can get more work out of a man who is feeling pleased with the world generally than one who is sore all the time.

Contractors today, subscribers of the National Builder, are in most cases better posted on building materials and prices than many dealers. They do the buying, so why shouldn't they be posted?

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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



The Greatest Building, Contracting and Architectural Library in the World

This Library of Architecture is part of the 99 volumes of the International Library of Technology that cost over $1,500,000 in its original preparation. It contains the results of years of experience of the best building experts in the country. It contains the best modern practical methods used in every branch of architecture. The matter has been written by the foremost technical building experts and illustrated by a special staff of artists and craftsmen. Not only is this Library suited for architects already well trained in their profession, but it is especially adapted for the use of laborers, carpenters, and contractors that wish to acquire in the easiest and most thorough manner the knowledge that will qualify them for advancement. This Library is the only practical technical library in existence wherein the subjects treated can be readily understood and practically applied by persons having no knowledge of higher mathematics.

The volumes of the International Library of Technology are used and indorsed by 95 of the leading colleges and universities throughout the country. They are also indorsed by leading engineers. An example of these indorsements is to be found in the statement of **Frank L. Mueller, Assistant Secretary of the O'Rourke Engineering Construction Company, of New York,** who states: **"Some time ago I received several volumes of your Library of Technology and it will certainly give you pleasure to know what I think of these books. I have at my disposal a reference library containing more than one thousand engineering books, but I must say that none of these works contain the information generally desired in such concise and simple form as the volumes of your Library of Technology."**

A partial list of the subjects contained in the Architectural Library is as follows: Excavating, Shoring, and Piling; Footings and Foundations; Areas, Vaults, and Retaining Walls; Cements; Concrete Construction; Stone Masonry; Stone Arches; Carpentry; Mechanics of Carpentry; Joinery; The Steel Square; Building Stone; Lathing, Plastering, and Tiling; Common Brickwork; Ornamental Brickwork and Terra Cotta; Lighting Fixtures; Use and Design of Lighting Fixtures; Architectural Design; Building Superintendence; Specification Writing; Specification-Writing Memoranda; Estimating and Calculating Quantities; Contracts; Permits; Fireproofing of Buildings; Stair Building; Ornamental Metal Work; Builders' Hardware; Roofing; Sheet-Metal Work; Mill Design; Loads in Structures; Properties of Sections; Materials of Structural Engineering; Beams and Girders; Columns and Struts; Details of Construction; Graphical Analysis of Stresses; Roof Trusses; Statics of Masonry; Heavy Foundations; Retaining Walls; Fireproofing; Roof-Truss Design; Wind Bracing; Specifications; Geometrical Drawing; Projection Drawing; Freehand and Ornamental Drawing; Wash Work and Brush Drawing; Elementary Perspective Drawing; Architectural Drawing; Painting and Interior Decoration; History of Architecture and Ornaments.

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Residence Chas. M. Lamson, Grand Rapids, Ohio.

Do You Use Kindling Wood For Roofing?



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That's what the use of wood shingles means. Did you ever stop to think that matches are made from the same thing as wood shingles, so they will light easily and burn well?

Did you ever stop to consider that wood shingles are stacked upon a building just about as you pile wood to make a quick fire?

Did you know that wood shingles are made from stumpage, fallen timber and any kind of stuff that's not good for anything else—Do you know



Residence Fred Dollenbach, Champaign, Ill.

The Winthrop Tapered Asphalt Shingles

Guaranteed for 10 Years

Will pave your roof with asphalt nearly an inch thick for the same money that you must spend for a hopeless wood shingle? This asphalt is the same as the pavement you know about—that carries heavy traffic and must stand the coldest as well as the hottest exposure and under terrific traffic wear all the time.



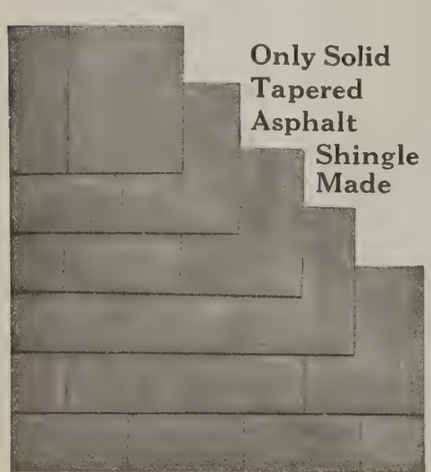
Stucco House at Waukesha, Wis.

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We make the Winthrop Shingles in the above colors and the colors are absolutely permanent and non-fading. The colors are genuine slate-pebbled and incorporated in the asphalt—actually a part of the shingle, rolled in and buried in the asphalt.

Cheap as Wood Shingle

Because there are no culls—every shingle perfect.
Because they are uniform in size.
Because they are eight inches wide and lay faster.
Because they last a lifetime.



The Winthrop Asphalt Shingle is PATENTED and cannot be made except under our patents.

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Scientific Correction of Acoustics

TO ARCHITECTS, BUILDERS AND ENGINEERS:

One year ago we established a department for the development of Architectural Acoustics along scientific as well as artistic lines. To this end, we sought out and associated with ourselves trained scientists, capable of giving expert advice on the proper methods of acoustical correction. We have spared neither time nor expense in developing the best possible technique for the work, and we expect, in the future, by continual research and practical experience, to remain in the forefront of the development of this important combination of art and science.

We are the only concern which has attacked the problem by means of scientific research. The action of our imitators in attempting to copy our methods without the necessary scientific and practical training for such work, can result only in harm to scientific progress.

It is not our desire to force our services either upon architects or upon the public. We have established this department, not with the idea of interfering between the architect or client, but in the belief that there is a demand for honest, scientific work in the subject of Acoustics. We wish to take this opportunity to make our position known and to offer the services of our department to the architectural and engineering professions. Advice will be gladly given without charge. May we be favored with your confidence and patronage.

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For Canada—THE CANADIAN H. W. JOHNS-MANVILLE CO., Limited
Toronto, Ont. Montreal, Que. Winnipeg, Man. Vancouver B. C.

1606

These Shingles Are Fully Guaranteed



THOUSANDS of buildings—homes, schools, churches, etc., are today covered with Reynolds Asphalt Shingles. Many of these have stood the heave of frost and the wear and tear of storm for 10 years and are in every way as good as when first laid.

Reynolds Asphalt Shingles have "made good"—they have stood the test. So satisfactory are they in durability and appearance, that leading architects and builders are specifying them for new work on the best class of modern homes.

Reynolds Flexible Asphalt Slate Shingles

Reynolds Asphalt Shingles last. They are 8x12¾ in. and lay 4 in. to the weather. They are fire-resisting and weather-proof. Never split, warp nor rot. Cannot color rain water. These shingles are mineral surfaced and laugh at wind and weather. No better shingles are made than these. If you want to enjoy life, roof your home with Reynolds Asphalt Shingles and—"forget it." We also make strictly high-grade granite surfaced roofing in rolls.

H. M. Reynolds Asphalt Shingle Co.
(Original Makers of Asphalt Shingles)
182 Oakland Ave., - Grand Rapids, Mich.

For CANVAS ROOFS



Order the Scientifically Prepared—

BAYONNE ROOF AND DECK CLOTH

Easiest to lay—Lasts longest. Requires but one coat of paint.
The treatment permeates the fabric and preserves the fibre

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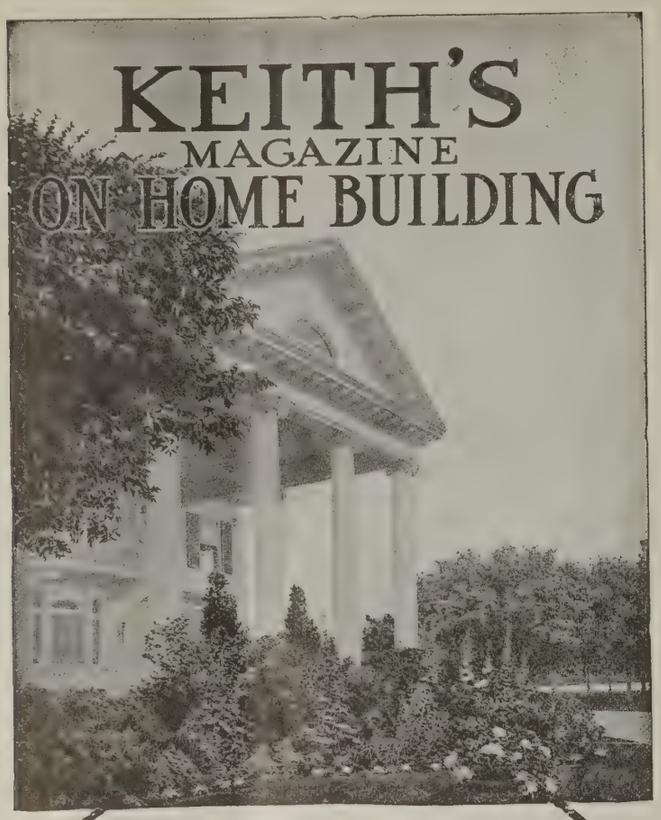
The Standard Brand of White Canvas
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GULF STREAM ROOFING CANVAS

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The Recessed Steel Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

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Never warps, shrinks, nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles—four sizes. To recess in wall or to hang outside.

Send for illustrated circular



The Outside Steel Cabinet

HESS, 907 L Tacoma Bldg., CHICAGO
Makers of Steel Furnaces. *Free Booklet.*

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Every contractor should have a letterhead in keeping with his business. Neat and dignified letterheads can be made up from the type found in the ordinary job printer's shop, but how often we see an atrocious combination of styles and sizes of type.

The National Builder readers know the value of a good letterhead, and to show them the forms which get and keep business, we are offering prizes for the best letterhead submitted.

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Send in your letterhead and you may get a New One Dollar Bill (or maybe a Five.)

Have your letter reach us not later than May 15th.

Letterhead Competition

The National Builder
542 S. Dearborn Street, CHICAGO

BERGER MFG. CO

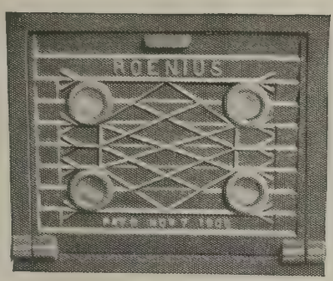
(Canton, Ohio)

METAL LATH,
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METAL CEILINGS,
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Let Us Quote You—Will Save You Money

PASTE THIS DOME ON LETTERS
THAT YOU WRITE ADVERTISERS.
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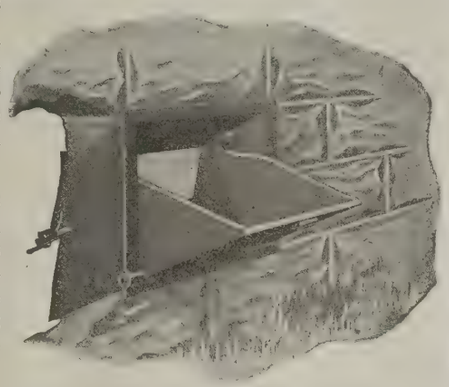


Have a distinctive and attractive style—which adds to the fine appearance of the building in which they are placed.

ROENIUS CHUTES

Roenius Chutes are made to stand the abuse a chute is subjected to. They are easily opened and locked.

Roenius style B Chutes are made with glass discs—and this chute is used especially in cases where the only available light must pass through the coal chute.



Ask your dealer for the Roenius—and get the best.
Write for Circulars and Prices.

GRAND RAPIDS FOUNDRY COMPANY
MANUFACTURERS
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The roof that stays proof

To make a roof ***lastingly*** waterproof lay roofing made of Trinidad Lake Asphalt.

The natural oils of this asphalt give life to

Genasco
THE TRINIDAD-LAKE-ASPHALT
Ready Roofing

That is why Genasco lasts.

Mineral or smooth surface. Several weights. Ask your dealer for Genasco. Write us for the helpful Good Roof Guide Book and Samples—free.

The **Kant-leak Kleet,** for smooth-surface roofings, makes seams waterproof without cement, and prevents nail-leaks.

GENASCO — THE STANDARD OF EXCELLENCE — TRADE MARK

THE BARBER ASPHALT PAVING COMPANY
Largest producers of asphalt, and largest manufacturers of ready roofing in the world
PHILADELPHIA
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Miller's Two Minute Lever Lock Mortiser

Actual Use of Tool ½ Minute



Chisels the opening for Locks. Over 6000 Mortisers Sold Mean Something.

One builder wrote us: "I was surprised, I did not think it would do the work so quick. This is the best I ever saw."

THINK THIS OVER, MR. CONTRACTOR AND BUILDER

Our patent double edge, side cutting chisel can cut more wood, four times more rapidly and 100% less exertion than any boring bit. Mortise to be of the same size.

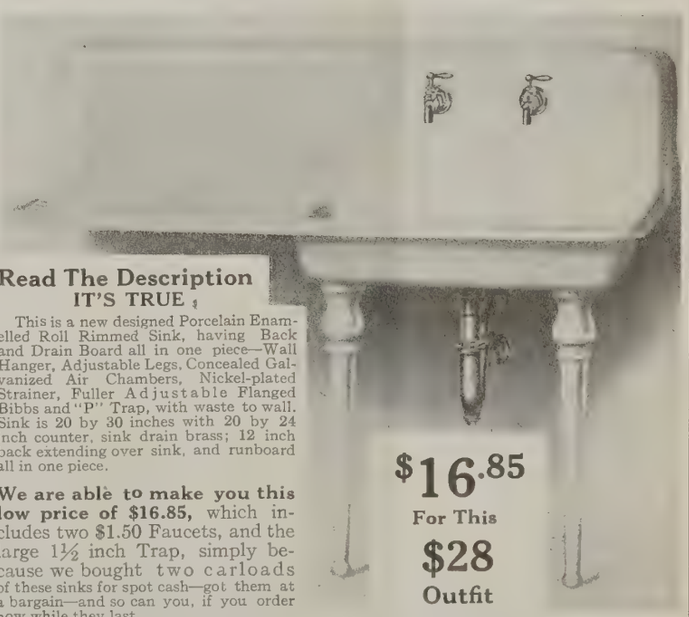
MILLER'S TWO MINUTE LOCK MORTISERS
GUARANTEED

to be as we represent, and will send on trial to any reliable contractor and builder. We will return all money paid if it does not cut an opening in a door for a mortise lock in three minutes.

We also make a Butt Mortiser and Rule Gauge which cuts out the seats for butt hinges in soft or hard doors, jambs, and similar work which we will send you postpaid for ***75 cents.***

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This is the Best "BUY" in Long Back One Piece Sinks you can find anywhere



Read The Description
IT'S TRUE

This is a new designed Porcelain Enamelled Roll Rimmed Sink, having Back and Drain Board all in one piece—Wall Hanger, Adjustable Legs, Concealed Galvanized Air Chambers, Nickel-plated Strainer, Fuller Adjustable Flanged Bibbs and "P" Trap, with waste to wall. Sink is 20 by 30 inches with 20 by 24 inch counter, sink drain brass; 12 inch back extending over sink, and runboard all in one piece.

We are able to make you this low price of $16.85, which includes two $1.50 Faucets, and the large 1½ inch Trap, simply because we bought two carloads of these sinks for spot cash—got them at a bargain—and so can you, if you order now while they last.

$16.85
For This
$28
Outfit

We Are Getting Out an Unusually Fine Catalogue—Which will be Ready to Mail About April 15th

This new catalogue shows a splendid line of modern Bathroom Outfits, from $38.95 to $175.00, Water Pressure Systems, Hot Water and Steam plants, and an endless assortment of pipe, valves, fittings etc. Everything high class and strictly guaranteed.

GET YOUR NAME ON OUR LIST now for this new catalague. It will aid you in getting the best and at prices which cannot be equalled considering quality of materials. Send in your order same time for a sink.

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Doing Business for 25 Years at the same Old Address and in the Same Square Old Way of Treating Our Customers
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Lumber, Lath and Shingles



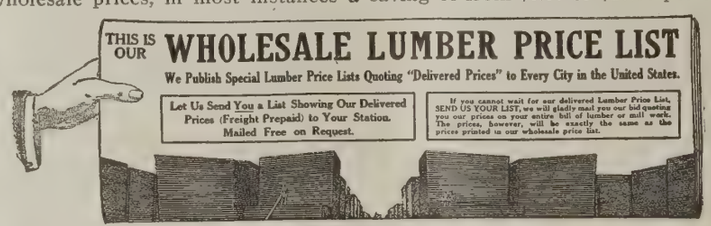
VIEW OF PLANT IN ILLINOIS.

THE WHOLESALE AND RETAIL MERCHANTS BUY LUMBER FROM THE PRODUCING MILLS, WHY DON'T YOU?

We Are Producers and Can Save You $100.00 on the Average House Bill of Lumber

You save lumber dealers' profits when you order from us. Better still, we give you a finer grade of material than the average dealer carries. Furthermore **we can insure delivery in a few days.** We are now operating **two immense lumber plants,** one in Louisiana, another in Illinois. Our Louisiana plant is located in the great lumber forests with saw mills, dry kilns, log trains, planing mills, etc., in connection, permitting us to control our costs and grades and enabling us to sell you the finest lumber manufactured for all building purposes at strictly manufacturer's prices. Our Illinois plant is located on the two largest and fastest freight railroad systems in the North with direct connections to over twenty different railroads. We make a specialty of prompt shipment from this point to the Central and Eastern States, reducing the time in transit from weeks to days. Whether you want a single carload of lumber or twenty carloads, we can make shipment in record breaking time. Remember, our prices to you are strictly manufacturer's wholesale prices, in most instances a saving of from $5.00 to $10.00 per thousand feet.

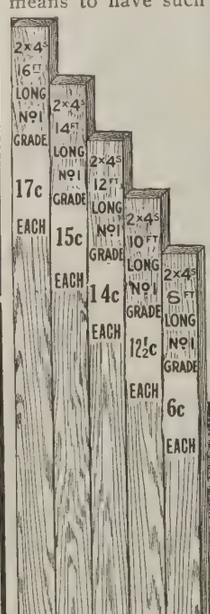
EVERY MAN THINKING OF BUILDING SHOULD HAVE THIS PRICE LIST



THE OPPOSITE PAGE SHOWS WHAT WHOLESALE PRICES WILL DO

ASK FOR LUMBER LIST 205NB.

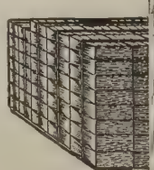
930 DIFFERENT DESIGNS AND SIZES OF BUILDING LUMBER for all building purposes. Do you realize what it means to have such a large stock of this great big assortment of lumber located at a nearby plant, every piece of it guaranteed to be strictly up to grade and which can be purchased at a saving of about $100.00 on the average order? **We pay the freight to your station** when you order from our Wholesale Lumber Price List, which you can have for the asking, and which quotes delivered prices on yellow pine and cypress finishing lumber, yellow pine and fir flooring, yellow pine ceiling, siding, partition, dimension lumber, shiplap, plain boards, bevel cribbing, joists, lath, cypress and red wood siding, cypress and red cedar shingles, etc., so that you can tell to a penny what a carload of lumber will cost you. Do not buy lumber of any kind until you get this list. It will pay you to make an intelligent comparison of prices. **Architects, construction companies, contractors, carpenters all unite in praising the quality of our lumber.** In our lumber list we print letters from people from Connecticut to Colorado who have bought lumber from us, giving facts and figures that will surprise you, and proving beyond a shadow of a doubt all we have claimed in regard to **saving, quality and quick service.**

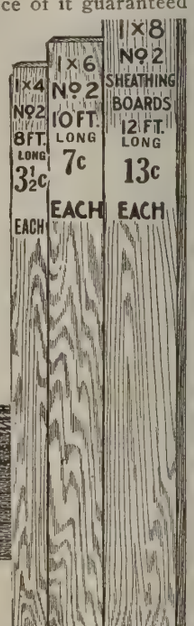




If you are thinking of building even a small size house you will need about 9,500 feet of lumber, 14,000 shingles and 10,000 lath. This will make a carload of 30,000 pounds. If you have a barn or any other outbuildings to put up you can safely figure on requiring a minimum carload. If you only require a few thousand feet, perhaps your neighbor has some building to do and can order his lumber with yours. It will pay you both handsomely to make up a club order and secure our wholesale carload delivered prices.

Do not forget that we are producers of lumber, operating two big plants. You can purchase lumber from us for the same money that your local dealer pays for his supply. Write for our Wholesale Lumber Price List today.





THE PRICES shown on this page are for the purpose of giving you some idea of what our prices are F. O. B. our Southern mill (without freight added). Write for our Wholesale Lumber Price List. It names you these same items, also our full assortment, with freight to your station added.



VIEW OF PLANT IN LOUISIANA.

There's a Reason

During March we sold **30 carloads**—more than a train load—to one firm. We sold a solid train load of **17 cars** to another, and many orders of **5 and 10 carload lots** to individuals. We will prove these statements by sending you photographs of these big shipments on request. Ask for photos N. B. 40.

Good Quality Low Prices

ADDRESS ALL ORDERS TO **SEARS, ROEBUCK & CO., CHICAGO, ILLINOIS**

NAT BUILDER
PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Which One of These Houses Interests You?

Write for further information. It will cost you nothing.

TO EVERY CARPENTER AND BUILDER

Here's a Gift of $20.00

PLUS A SAVING OF NEARLY ONE-HALF.

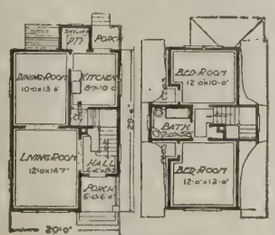
We can now furnish plans for 110 modern homes, all of which we illustrate and describe in our new Book of Modern Homes. We will send this book free and postpaid to every reader of the NATIONAL BUILDER. Write for it. Read about the wonderful bargain on this page which we offer you for April only. We practically make you a present of $20.00, but remember that even at our regular price the materials which we furnish for Modern Home No. NB194 for only $599.00 is worth fully one-third more.

Note the sketches of the different houses on this page. They will give you some idea of the splendid assortment of designs shown in our Book of Modern Homes. If you are interested in any of these houses just cut out the little picture, paste it on your letter and ask us for any information regarding it you may think necessary. We will be glad to answer your inquiries without any obligation whatever on your part.

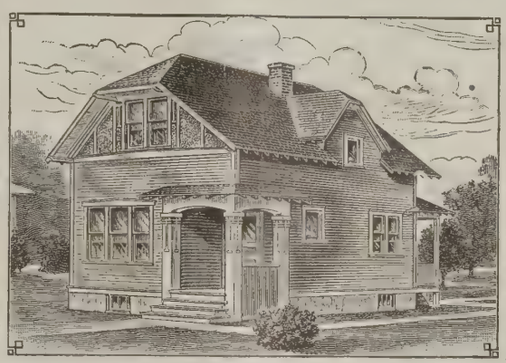


Ask for Catalog NB196.

$599.00 IS OUR REGULAR LOW PRICE — OUR APRIL PRICE IS $579.00



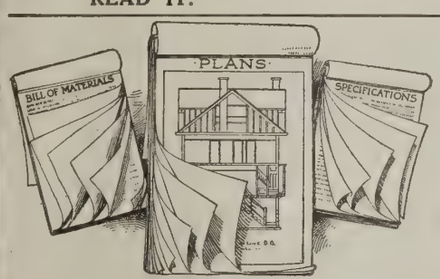
Floor Plans.



Modern Home No. NB194

Here is a five-room house that can be built complete for $1,250.00. We furnish all of the material, consisting of lumber, lath, shingles, siding, finishing lumber, building paper, pipe, gutter, sash weights, hardware and painting material for $579.00. After April 30th our price will be $599.00. If we receive your order at any time before May 1st we will ship the material whenever you get ready to start building up to June 1st at this low price. Look into the merits of this house, send for the plans and examine them thoroughly. We expect to sell 100 Modern Homes No. NB194 during this sale, and we are willing to sacrifice our own profit for the advertising these 100 houses will bring us.

Do You Know Why We Can Save You So Much Money on a House? The Opposite Page Tells the Story. READ IT.



TAKE THESE PLANS FOR 50 CENTS.

We have never before offered a set of plans for less than $1.00, but in order to show you what a big bargain we are offering you in Modern Home No. NB194, we will sell you during April, the complete blue prints, specifications and an itemized bill of materials for only 50 cents. Order now and save half a dollar.

THE ORIGINAL TRACINGS FOR OUR HOUSES COST US $100.00 A SET. The architectural service, which usually costs a builder from $100.00 to $200.00, we offer you practically free. Get the plans for Modern Home No. NB194, study them if you like, but if you want to take advantage of a free gift of $20.00 be sure to get your order for the material to us before May 1st. You do not have to start building before June 1st and we will make shipment at any time before that date to suit your convenience.

Would you like to see reproductions of actual photographs of houses built according to our plans and with our material in all sections of the country? You can see them in our Book of Modern Homes, together with letters from the builders, telling of substantial saving, high quality and good service.

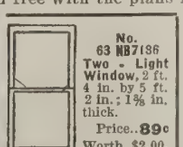
When you are writing for our Book of Modern Homes enclose 50 cents in stamps or money order and ask us to send you the plans for Modern Home No. NB194. BETTER DO IT TODAY. **THE BOOK OF MODERN HOMES IS FREE.**

OUR NEW BUILDING MATERIAL AND MILL WORK CATALOG IS NOW READY.

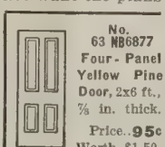
Our 1912 edition of our big Building Material and Mill Work Catalog is now ready, containing many new items, new illustrations, new cover design and filled from the first to the last page with the greatest building bargains it is possible to secure. We will send it to you free with the plans for Modern Home No. NB194, or if you do not want the plans at 50 cents a set, write for the catalog anyhow. You will have some repairing or remodeling to do during the coming months. This is the book that cuts your expenses down to nearly one-half. Compare the prices shown below with the prices you are now paying. We can make you a proportionate saving on all kinds of doors, windows, door and window frames, flooring, moldings, etc., of guaranteed quality.



Ask for Catalog NB143.



No. 63 NB7186 Two-Light Window, 2 ft. 4 in. by 5 ft. 2 in.; 1¾ in. thick. Price..89c Worth $2.00.



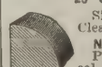
No. 63 NB6877 Four-Panel Yellow Pine Door, 2x6 ft., ⅞ in. thick. Price..95c Worth $1.50.

$1.00 WORTH OF MOLDINGS FOR 30 CENTS.



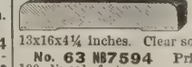
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75 CENTS WORTH OF QUARTER ROUND FOR 25 CENTS.



Size. ⅝x⅝ inch. Clear soft wood. No. 63 NB7784 Price, per 100 lineal feet.....25c

$4.00 WORTH OF CASING FOR $1.63.



Size, 13x16x4¼ inches. Clear soft wood. No. 63 NB7594 Price, per 100 lineal feet.....$1.63

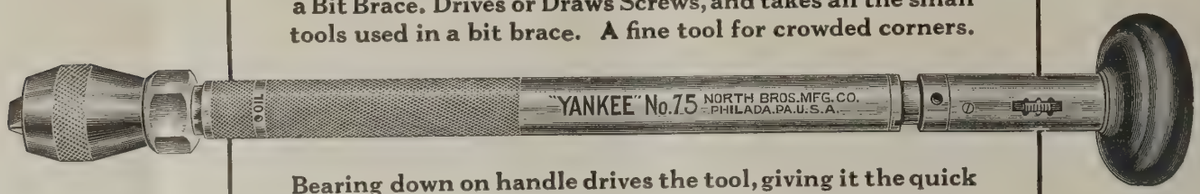
Are you going to take advantage of the above offer this month? You must act NOW. Don't wait till May.

ADDRESS ALL ORDERS TO **SEARS, ROEBUCK & CO., CHICAGO, ILLINOIS**

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Another New "YANKEE" PUSH BRACE No. 75

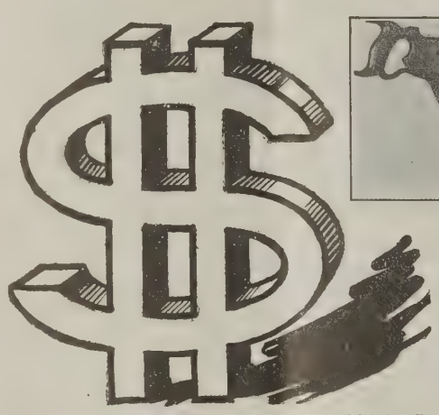
Drives Wood Augers up to 3-8 in. easier and quicker than a Bit Brace. Drives or Draws Screws, and takes all the small tools used in a bit brace. A fine tool for crowded corners.

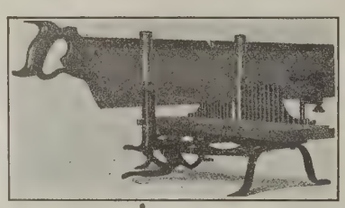


Bearing down on handle drives the tool, giving it the quick and easy motion of the "Yankee" Spiral Drivers. Built for good service—it's a "Yankee." Let your dealer show you one

SEND FOR BOOK OF LABOR SAVERS

North Bros. Mfg. Co., Dept. N, Philadelphia, Pa.





BIG MONEY

MADE IN HANDLING OUR TOOLS. Be Our AGENTS.

CROWN MITER BOXES

Formerly Manufactured by the Nicholls Manufacturing Co.

Points of Superiority

It has a high and a low stop, saw can be raised 1½ inches above bed by release lever. **You operate the release lever** while holding the handle of the swinging bar. This enables the operator to use one hand to hold stock and at the same time swing saw to any desired angle. The high stop holds saw 5¼ inches above bed while placing stock for cutting.

It has a positive center and octagon stop also a graduated brass circle and any degree can be obtained very easily.

The release lever has an eccentric latch which locks the swinging bar securely at any place.

Made of cast iron. **Malleable Iron and Steel.** It has an oak bottom ¾ in. x 5 in. x 24 in., extra lengths up to 36 inches we make an extra charge of 25 cts. **All parts easily replaced.**

FITTED UP WITH OUR BEST GRADE 30x5 BACK SAW, FORMERLY SOLD FOR $12.50. NOW SOLD AT $8.95.

PLEASE QUOTE ME ON THE TOOLS MARKED (X)

- ☐ SAWS
- ☐ BEVEL TRY-SQUARE
- ☐ NEST OF SAWS
- ☐ SAW SETS
- ☐ FOLDING HANDLES DRAW KNIVES
- ☐ RATCHET BRACES
- ☐ EXPANSIVE BITS
- ☐ AUTOMATIC SCREW-DRIVERS
- ☐ AUTOMATIC HAND DRILLS

CROWN TOOL MFG. CO., Ottumwa, Iowa

Milk's Pocket Miter Box



OF ALUMINUM

Cannot break.

Guaranteed accurate.

Requires no bench.

Always with you, in the pocket. Make cut while holding moulding. No extra saw to pay for, use any fine saw you have. Ask your dealer, if you can not get it, send $1.00 for it on one weeks trial.

SATISFACTION or your money back.

The Parsons Tool Mfg. Co., PARSONS, KAN. U. S. A.

2030 CORNING

GOODELL MITRE BOX

Made of STEEL - Cannot Break

First in Quality and Improvements



Automatic Stops for holding up saw

Corrugated Backs. Graduated Gauge for Duplicate cuts and many other features

If you want the Best you will take no other

SEND FOR CIRCULAR E

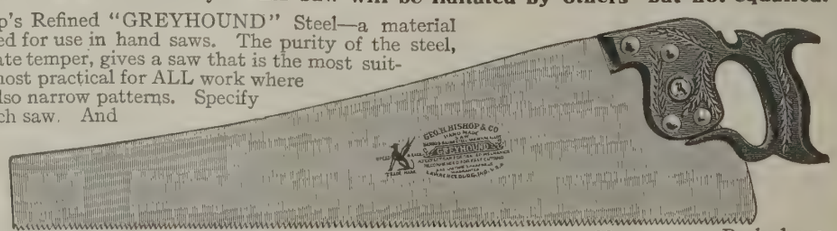
GOODELL MFG. CO., Greenfield, Mass.

GREYHOUND HAND SAWS

SPEED & EASE — TRADE MARK.

The more you know about hand saws the more you can appreciate "GREYHOUND" hand-made hand saws, with their easy-running and rapid cutting qualities and wonderful durability. This saw will be imitated by others—but not equalled.

They are made from Bishop's Refined "GREYHOUND" Steel—a material which leads everything yet produced for use in hand saws. The purity of the steel, the toughness, the even and accurate temper, gives a saw that is the most suitable for particular work, and the most practical for ALL work where a hand saw is used. Made in both straight and skewback, also narrow patterns. Specify which you desire. Remember our warranty accompanies each saw. And the warranty means that if 30 days' trial does not convince you that the "GREYHOUND" saw is the best for your use, you get your money back.



Order one today and let us take all the risk. If you want literature first, write us.

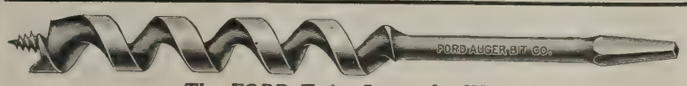
GEO. H. BISHOP & CO., Makers

Lawrenceburg, Indiana

Inches,	18	20	22	24	26	28	30	Net.	Packed one in a Box
Each,	$2.35	$2.50	$2.65	$2.80	$3.00	$3.30	$3.65		

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

Why a single lip bit and why the FORD



The FORD Twist Saves the Wrist.

You wouldn't think of pushing two wheelbarrows if one would accomplish the same work. Then why bore a bit with two lips when the FORD with one lip does exactly the same work, and does it nearly twice as easy? ¶ Yes sir, Mr. Carpenter, a FORD single lip bit bores 40% easier and does everything any double lip bit will do. The FORD draws in on any wood, even on hard knots and end grain second growth hickory; holds true against knots; is warranted not to follow the grain in any wood; and WILL BORE OUT WITHOUT SPLINTERING. Think what a saving this means!

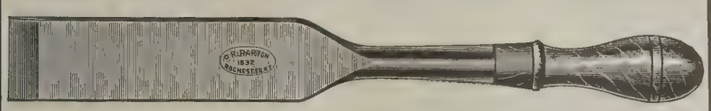
Ask your dealer for a FORD, and see for yourself what it will do. If he hasn't the genuine FORD write us and we will see that you are supplied.

If you'll write for descriptive circulars we'll send you free a handy memo. book. Simply address DEPT. 2-B.

Ford Auger Bit Co., Holyoke, Mass.

(The FORD is imitated but never equalled. The name FORD on the shank of each genuine bit is your protection against inferior imitations.)

Last a Lifetime and Give Satisfaction to the End!



The Famous Barton Planes and Edge Tools for Carpenters and other workers in wood

Unequaled by any other make for keen, smooth, lasting edges. If your hardware dealer does not handle these **Famous Barton Tools** and is unwilling to order for you, send direct for catalogue. Be sure to specify **Carpenter's Catalogue.** A postal will bring it, together with our story book, "True Stories," which will be found very interesting and instructive to those who are satisfied with the best tools only.

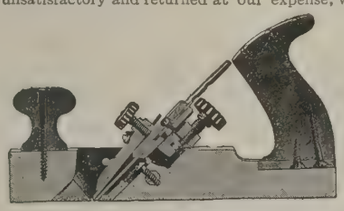
D. R. BARTON 1832. ROCHESTER, N.Y.

MACK & CO., Sole Makers

Brown's Race **Rochester, N. Y.**

Introductory Trial Offer

If the SELF-SETTING PLANES are not sold in your town and you write us saying "I saw your trial offer in N. B.", we will send you particulars, a carpenter's pencil and our $1.00 CERTIFICATE, which we will receive as $1.00 in part payment for a SELF-SETTING PLANE, as stated in our $1.00 CERTIFICATE, and if this S. S. PLANE is unsatisfactory and returned at our expense, we will send you $1.00 more than you sent us, as the $1.00 CERTIFICATE says.



As this paper guarantees we will do as our advertisement says, you know the plane must be O. K.

ALL WE ASK is to have you TRY the SELF-SETTING PLANE on your own bench, in your own way, with or against the grain, on the WORST cross-grained eaty, knurly, knotty, hard or soft wood you can find, THAT IS FREE FROM SAND OR DIRT.

If it is not worth to YOU or YOUR MEN, TWICE ITS COST, return it at our expense, as above stated.

If you send us the addresses of ten carpenters, no matter where they live, we will send you another carpenter's pencil, hard and tough.

Give the SELF-SETTING PLANE a chance to PROVE ITS WORTH if it fails, RETURN IT AND WE WILL RETURN YOUR MONEY.

Carpenter's Hard, Tough Pencils, 30c per dozen, postage prepaid.

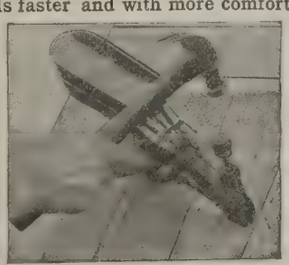
GAGE TOOL COMPANY, Vineland, N. J.

PEARSON'S AUTOMATIC SHINGLE NAILER

PAYS FOR ITSELF ON ONE FAIR-SIZED SHINGLING JOB



Works well on roofs of any pitch. You can wear gloves or mittens and drive nails faster and with more comfort than the old way. Just throw the nails in by the handful (Nailer holds easily between 500 and 600 nails in the top), and start nailing.



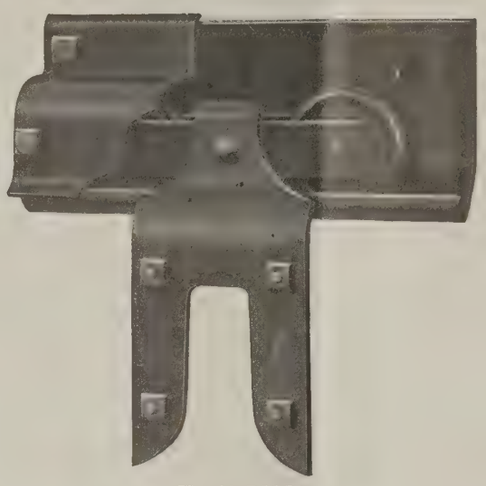
PEARSON NAILERS are made in two sizes. The Blue Nailer is for common 3d No. 14 gauge wire nails, and the Red Nailer is for the **galvanized** 3d, No. 13, 1¼-in. wire nails. Order from your dealer or send **$5.00** for either one—express prepaid. Money cheerfully refunded if Nailer is not as represented.

Write for Circular "N."

PEARSON MFG. CO., ROBBINSDALE, MINN.

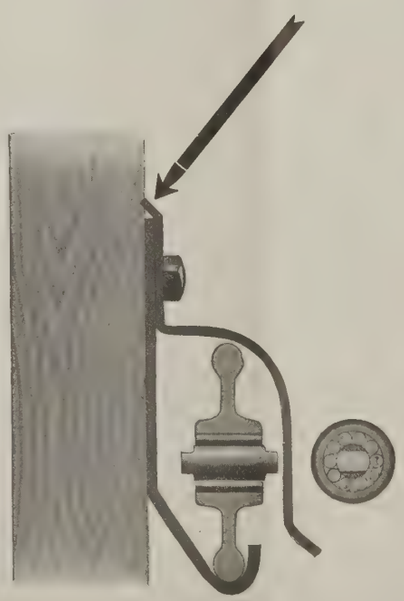
WE INITIATE—NEVER IMITATE

STORM-PROOF Hanger



No. 66 RIGID

STORM-PROOF RAIL TITE-FIT



A complete description will be found in our general catalog, a copy of which will be sent on request.

National Mfg. Co.

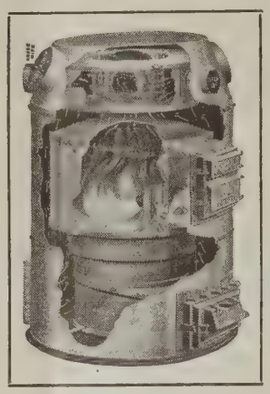
Sterling, Ill.

PASTE THIS DOME ON LETTERS THAT YOU WRITE ADVERTISERS. IT WILL HELP.

BOVEE ECONOMY FURNACES

Lowest in Price

Highest in Quality



Last The Longest

Burn The Least Fuel

The Bovee is the only Furnace that has a perfect Ventilating System for every part of the House

Don't compare our furnaces with small, cheap furnaces that do not have one-half the capacity. Measure the firepot, measure the combustion chamber, measure the compound circulating radiator. Note the long travel of heat before reaching smoke pipe. See why the Bovee Furnaces **last longer, use less fuel and cost less** in comparison with other furnaces of equal size and capacity.

Bovee Furnaces require less fuel than other furnaces because every inch of the furnace, from the ash pit to the combustion chamber, is clean, direct heating surface, and the combustion chamber is more than double the size of the combustion chamber of other furnaces, compared to the size of the fire pot.

The heat, upon leaving this combustion chamber, instead of going out of the smoke pipe, circulates entirely around a compound circulating radiator before entering the chimney. The large heating surface of the combustion chamber and the long travel of the heat before reaching the smoke pipe utilizes the utmost heat produced from the fuel consumed.

The Bovee Furnace is more durable than other furnaces because the large heating surface and long travel of the heat gives them such great capacity that they do not require to be run at such intense heat. This not only makes the furnace much more durable, but also gives a balmy and far more pleasant atmosphere in the house. All parts of these furnaces subjected to the greatest heat are made of heavy cast iron; the best that can be purchased.

The Bovee Furnace is sold at a less price than other furnaces of anywhere near equal size and capacity because we buy our material in large quantities, manufacture by the most improved methods and sell at a small profit and there is no furnace of equal merit or economy of fuel and durability sold on the market today.

Complete PLANS and SPECIFICATIONS by the best furnace engineers sent FREE on receipt of rough floor plans.

SEND FOR CATALOG AGENTS WANTED

Bovee Grinder & Furnace Works
60 8th St., WATERLOO, IOWA

SAMSON SPOT SASH CORD



Reg. U. S. Pat. Off

is the best that we can make after forty years' effort. It is guaranteed by the Samson Cordage Works to be free from imperfections of braid or finish, and it will last longer than any other device for hanging windows.

Our trade-mark on the label is Samson and the Lion **IN ANY COLOR.** The Spots **IN ANY COLOR** are our trade-mark on the cord, used by us for eighteen years to show, after the label is removed, who guarantees the quality of the cord. You recognize either of these marks by the design, not the color.

Don't be misled by imitations.



SAMSON CORDAGE WORKS
BOSTON, MASS.

Reg. U. S. Pat. Off.

BUY FROM THE MAKER



We have made and sold thousands of steel furnaces in Chicago, and we have sold them everywhere, by mail, direct to contractors, builders, and house owners, all over the country, from Maine to China. We don't offer them through dealers, for the DIRECT DEAL with the consumer is the most satisfactory to all concerned. It means BETTER SERVICE—because of the direct interest of the maker in each contract—and it means BETTER PRICES, for the middlemen's profits are cut out.

In buying the Hess Furnace, **you needn't have faith.** You can buy it now, on trial, and test it before January 1st, 1913. We will deliver it at your station, with all pipes and registers—freight prepaid.

Set it up and use it. If you're not pleased; not sure you have big value for the price—send it back to us—we paying return charges—and we won't claim one cent from you.

We don't offer you credit, however, for we require the price to be deposited with your local banker when you receive the goods. He holds it till the test is made, subject to the conditions outlined above, and gives it to you or to us, according to the result of the test. You take no risk, and you will save money.

Our furnace is made of steel, EVERY SEAM WELDED, and therefore permanently gas—dust—and smoke—tight. Made in six sizes, and burns any fuel. There is no furnace better, at any price.

Our 48 page booklet on furnace heating is free. Ask for one. It will give you a lot of useful information on heating.

HESS WARMING & VENTILATING CO.
907 TACOMA BLDG. CHICAGO

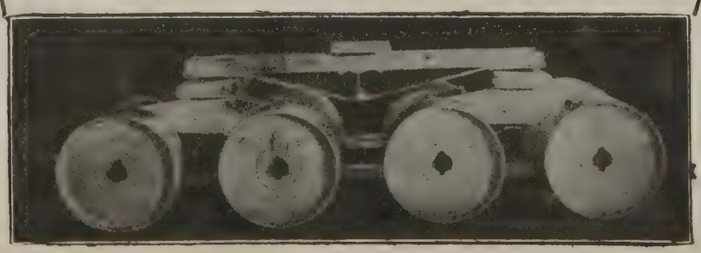
We make those beautiful white steel medicine cabinets; cheaper than wood.

Move the Old House to Another Lot—Instead of Wrecking It—You Can Make More Money by Doing So

THE LA PLANT HEAVY HOUSE MOVING TRUCKS ARE MADE

Of steel—on scientific lines—are interchangeable so they can be worked singly, in pairs or in fours. Write for Catalogue N and see how easy it is to wheel a building a mile in a day—and how little the cost is for La Plant outfit compared with the profit to be made in moving houses instead of wrecking them.

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365 Days Trial

OUR service department will co-operate with any Builder, Contractor or Architect who wishes to specify or install a dependable heating equipment. The

JAHANT DOWN-DRAFT FURNACE



solves the heating and ventilating problem for residences, schools, hotels, churches and similar structures. Our 365 day "Guaranty Bond" given with every furnace insures absolute satisfaction. Don't take the risk of spoiling your plans by specifying the ordinary "stock" furnace. Send us details, sketches or blue prints of the building to be erected, and we will furnish, without cost special plans, specifications and blue prints of a heating equipment guaranteed to furnish plenty of heat at a minimum cost for fuel. We will also tell you the cost of this special Jahant Down Draft Furnace. If you include the Jahant in your finished plans we will pay freight on the complete shipment, including furnace, pipes, registers, all fittings and the necessary tools for installings. The special plans we send give full directions for the placing of each part.

Write for our free Specification Hand Book. It tells more about the Jahant and our co-operative plan.

THE JAHANT HEATING CO.
90 Mill St. Akron, Ohio
Furnace Builders for over 30 years

DOWN DRAFT

$10 DOWN $10 A MONTH



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REO Trucks



Wheel base, 90 inches—Horsepower, 10 to 12—Length behind seat, 6 feet—
Capacity, 1,500 pounds. Front seat top, $25 extra.

Only $750

Operation—50 Cents a Day

The Reo Truck, designed by R. E. Olds—a truck of 1,500 pounds capacity—is sold for $750.

Compel those who ask $1,200 and up to prove their extra value.

We have a mammoth plant built for trucks alone. We are building trucks there at a minimum cost, and adding a minimum profit.

We are selling these trucks through Reo dealers, already established in a thousand towns.

The result of this policy is a price you can't match on a truck of like capacity.

Two Years of Tests

Mr. R. E. Olds, this truck's designer, is a very careful man.

He has built automobiles for 25 years—tens of thousands of them.

When he offers a truck you may be sure that truck is right.

To test this truck, under every condition, he put hundreds of them into service.

He tested them out in forty sections, in thirty lines of business. And these tests have now covered two years.

One loaded truck was run from New York to Oregon. Two carried the baggage in the Glidden Tour, from New York to Jacksonville.

Whatever requirement a truck must meet, these trucks have been made to meet.

Wherever you are — whatever your service—the Reo truck will do what you expect.

Simple—Strong—Efficient

A boy in ten minutes can learn to operate this truck. He can care for it, too. No expert is needed.

There is nothing to get out of order. Simply supply it with gasoline and oil.

The cost of gasoline, oil and repairs, as per many tests, has averaged under 50 cents per day.

One truck can do five times the work of a one-horse dray. It can do it three times as quickly. It can do it at 60 per cent of the cost of horse delivery.

It can do it in any weather, on any road, in rain or snow or mud. It is always ready, and it costs you nothing when it isn't busy.

You will cease your horse delivery when you prove this truck.

Our local dealer will demonstrate the truck. He will teach your man to run it. He will render Reo service.

Write us for information.

R. M. OWEN & CO., General Sales Agents for
REO MOTOR TRUCK CO., Lansing, Mich.



(50)

Price $750 f. o. b. Factory. Top over all, as shown in cut, $50 extra.

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THAT YOU WRITE ADVERTISERS.
IT WILL HELP.



TO THE MAN WHO HAS ALMOST DECIDED TO TRY AN

ATKINS

Silver Steel

SAW

You've read some of our ads.

You've probably been interested in the peculiar and excellent qualities of Silver Steel—the saw steel that takes a better temper and a keener edge, requires less filing yet files more easily, is less liable to rust and stands more hard usage than any other.

You've considered the Atkins taper-ground blade, which doesn't stick or bind in the wood and makes the Atkins the easiest running, fastest cutting saw you ever touched.

You've probably seen the advantage of the Atkins Perfection Handle, which saves your strength and makes the work easier.

Undoubtedly you like the Atkins Guaranty—money refunded by your dealer if the Atkins Silver Steel Saw isn't the very best saw you ever put through a board.

Like hundreds of carpenters who are writing us, you have probably decided to give the Atkins a trial.

We're writing this to suggest that you try the Atkins now. Why put it off?

We know this is your "busy day." But that's all the more reason why you should try the Atkins ***now***. The busier you are, the more you'll like the labor-saving Atkins saw.

Speak to Your Dealer About This.

Select the Atkins Silver Steel saw that you wish to try. Take that saw with you to your work—compare it with the saws you have been using. That's the way to find out, and ***now*** is the time! Money back if we don't make good.

BE SURE the blade says "Silver Steel"—that's our best saw. Remember, too, that it isn't a genuine guaranteed Atkins Saw unless it bears our name.

FREE to Carpenters

Have you got our FREE nail apron yet? We have it here for you. Write for it (enclosing 10 cents to cover postage). With the free nail apron—and it's a good one—we'll send our Carpenter's Time Book and our popular "Saw Sense" booklet, which contains a lot of handy information. Address our Carpenter's Department.

E. C. ATKINS & CO., Inc.

INDIANAPOLIS, IND.

Largest Exclusive Saw Manufacturers in the World

If your dealer doesn't handle Atkins Saws, or hasn't the particular saw you wish, ask him to order it for you from his wholesale house. He should be glad to do this—it's no trouble—and he will do it promptly if you make the request.

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